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Determinants of Formal and Informal Canadian Adult Learning

Insights from the Adult Education and Training Surveys

R E P O R T

by:

Dr. Kjell Rubenson

University of British Columbia

prepared for:

Learning Policy Directorate

Strategic Policy and Research

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"The Learning Research Series" are research documents disseminated by the Learning related sections of Human Resources and Social Development Canada. The objective of the Learning Research Series is to publish research on lifelong learning, from childhood to late adulthood, occurring in all learning environments, learning institutions, homes, communities and workplaces. The series intends to build a body of evidence, through critical review, analysis of different data sources, replication and confirmation of results and disseminate the results for public debate and policy development. The series includes internal research reports, commissioned research, syntheses, research symposia proceedings and annotated bibliographies.

Abstract

The urgency of expanding adult learning to support economic growth and higher living standards has put the focus on adults' readiness to engage in learning. In a time of evidence-based policy making there is a growing need to develop a better understanding of the factors that determine participation in adult education and training. This paper examines the factors underlying the observed trends and patterns in participation in formal and informal job-related training during the period from 1993 to 2002, using the Adult Education and Training Surveys (AETS) conducted in 1993, 1997 and 2002.

A main finding of this study is that, at a rate of under 8%, the increase in adult education and training uptake among Canadian adults aged 25 to 64, observed between 1993 and 2002, does not reflect all the rhetoric about the critical role of knowledge and skills in sustaining Canada's economic competitiveness and prosperity. Some inequalities are increasing while others are diminishing: training gaps due to gender, age differences have decreased while educational attainment is increasingly important to the engagement in job related training. It takes on an even stronger role not only as a hiring criterion but also in the decision on who will receive training. Consequently the established link between initial education and continuing education is further strengthened in the knowledge economy. The training situation for SMEs has been a major concern: large companies still train to a much larger extent than small enterprises but the data indicate a positive development with somewhat decreasing discrepancies. Industries that traditionally have had a very low training intensity like Agriculture, other primary and construction, show in relative terms strong improvement. This could suggest that the traditionally low-tech industries are now increasingly affected by technological changes.

The extent of informal training estimated by the 2003 AETS indicates that this is a universal phenomenon: those who participate in organized forms of adult education and training are engaged in informal training to the same extent as those not participating in organized modes of adult learning. The analyses of informal learning highlight the problem of the state of theory and difficulties in estimating involvement in informal learning. While informal learning undoubtedly plays a significant role in human capital development the existing surveys are not helpful in empirically estimating the scope of this contribution or complementarities between formal and informal training. Nor are they useful in clarifying the learning contexts and informal curricula. This detailed information can shed light on the actual knowledge, competencies and skills that people have gained from their informal learning activities.

The findings point to the necessity to anchor a Canadian strategy on lifelong learning in the world of work. The availability of training opportunities at work are strongly related to the demand structure, the more skills being used the more likely the employee is to train. Adults who cannot see that adult learning will have any positive outcomes are highly unlikely to participate. A shift from an economic and human resource strategy based on a low skill/low wage equilibrium to one that organizes work according to a high skills equilibrium will most likely change low skilled workers perception of the value of participating in adult education and training. These findings support the institutional theoretical perspective on participation in adult education and training: the present Canadian lifelong learning strategy that is primarily anchored in a youth initiative will need to be complemented with an adult learning initiative that recognizes the significant role of the work context. It needs to simultaneously affect the supply side of skills and the demand of these skills in the production process.

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1. Introduction

1.1 Background

A quick review of Canadian and international policy documents reveals the importance that is attributed to adult learning for promoting the well being of nations and individuals. This interest in adult learning is primarily motivated by economic concerns but also by an awareness of increasing social inequalities and the challenges of dramatic demographic changes in the population.

Driven by advances in information and communication technologies and reduced trade barriers, industrial countries are undergoing a period of fundamental economic transformation in which knowledge and information are being promoted as the foundations for competitiveness, economic growth, and innovation. Policy makers all around Organization for economic cooperation and development (OECD) countries would agree with Tony Blair that, “education is the best economic policy we have” (Martin, 2003, p. 567). It is from this vantage point that Canada’s Innovation Strategy was launched in order to position Canada as one of the world’s most innovative countries through the development of an appropriately skilled workforce (HRDC, 2002).

While the new economy may promise increased productivity and an improved standard of living, there is a growing awareness that it also introduces a set of transitions and adjustment challenges for individuals. These have the potential to cause the permanent exclusion or marginalisation of segments of the population and to exacerbate socio-economic divisions. We therefore have to “create an environment of inclusion” and commit to putting forth an action plan “that includes all of us” (Ibid, p. 2). On this point, policy makers can draw on welfare researchers who maintain that adult learning is part of the solution to the exclusion dilemma (Esping-Andersen, 1996, p. 259). The argument is that adult learning can promote competencies that can help the individual to adapt to the demands of the new economy and to allow full participation in social and economic life. Lifelong learning gives citizens the chance to acquire adequate skills to prevent low-paid jobs from becoming life cycle traps. To address the danger of exclusion countries need to revisit the social contract (Richards, 2000). Esping-Andersen suggests that under a knowledge economy and knowledge society the accent of social citizenship might move from a “preoccupation with income maintenance towards a menu of rights to lifelong learning and qualification” (Esping-Andersen, 1996, p. 260).

It should be noted that there is a gradual understanding that pursuing a social agenda on adult learning may in fact be very good economic policy. OECD’s Thematic Review of Adult Learning in 17 countries professes that: “Recent studies show that an equitable distribution of skills has a strong impact on overall economic performance. This is an important finding, one that helps justify policies to upgrade the skills of disadvantaged groups”, (OECD, 2005a, p. 10). Alluding to this problem the Conference Board of Canada (2005, p. 10) argues:

“In the end, low-skilled and under-skilled employees avoid taking on extra responsibilities or more demanding roles and as a consequence their skills status remains static, as does their productivity rates and potential earning power.”

Economic as well as social concerns are heightened by current demographic changes that are resulting in a rapidly aging workforce. While 80% of today's technology is less than 10 years old it is suggested that 80% of the labour force has an education and training that is more than 10 years old (Pedersen, 2006). As a response, the European Union (EU) identified lifelong learning as a key instrument in making Europe the strongest knowledge economy in the world by 2010. To reach the goal, the EU has established a very ambitious long-term training goal for all member countries. To meet the EU training target a country like Denmark, which already has one of the most developed sectors of adult learning in Europe, would have to almost double its training efforts by 2025. While the aging of the workforce in Canada is slightly less dramatic than in Europe it is estimated that by 2025 Canada will have a labour shortage of 1.2 million skilled workers (Conference Board of Canada, 2005).

The urgency of expanding adult learning to support economic growth and higher living standards has put the focus on adults' readiness to engage in learning. In a time of evidence-based policy making there is a growing need to develop a better understanding of the factors that determine participation in adult education and training.

1.2 Purpose

This paper examines the factors underlying the observed trends and patterns in participation in job-related training during the period from 1993 to 2002, using the Adult Education and Training Surveys (AETS) conducted in 1993, 1997 and 2002. The paper will present:

- An overview of the current literature summarizing the major theoretical perspectives and empirical findings regarding the determinants of participation in both formal and informal adult learning activities;
- Multivariate analyses which will attempt to answer the following questions:
 1. What are the major determinants of formal and informal job-related training undertaken by Canadian adults and Canadian workers?
 2. What is the relative importance of these determinants of formal and informal job-related training?
 3. What differences are evident over time (from 1993 to 2003)?
 4. What are the key factors related to training in firms?
- A discussion of main findings from the data analysis and policy recommendations.

1.3 Methodology

Multivariate analysis, for example, logistic regression, will be used to analyze the AETS data and to build predicting models. Like many other national surveys, the data collected in the AETS contain a variety of continuous, discrete, and categorical measurements. Moreover, the outcome of interest is participation or non-participation in certain forms of training – formal or informal training – a dichotomous criterion for which a better prediction can be estimated with a logistic regression model (Hosmer & Lemeshow, 1989).

The use of logistic regression allows us to test whether, for instance, undertaking informal training or not can be reasonably predicted, by means of a sequential modeling strategy, from personal characteristics, job and workplace factors, and how much each of these explanatory variables contributes to the ability to predict the outcome.

Changes in trends of training patterns over the period under investigation in this project (1993 to 2002) can be examined by carrying out comparable data analysis using each of the three survey data collections. A comparison of coefficients and/or odds ratios of the same variable included in the estimation models from each data set can reveal whether the influence of this particular factor on certain training decisions has changed over the period and thus contributed to the changes in training trends.

The paper uses the three most recent Adult Education and Training surveys (1994, 1998 and 2002) to explore trends in participation in adult learning as estimates from these surveys are strictly comparable. The surveys do not allow an analysis of trends in informal learning as this topic was not introduced until the 2002 survey.

All AETS were conducted as a telephone supplement to the Labour Force Survey (LFS). The LFS employs a panel design whereby the entirely monthly sample of dwellings consists of six panels, or rotation groups, of approximately equal size (for more detailed information see e.g. Statistics Canada, 2001 Annex B).

Caution should be exercised when interpreting the results of the logistic regression models. Models such as those used in this paper cannot unveil the fundamental relationships between adult learning and determined variables investigated in this study. The results presented in this paper are only suggestive of the strength of correlations existing between adult learning and the various factors considered. These results are, however, instrumental to further uncovering causal relationships and pointing future lines of research. Causal claims would require much more vigorous research models, such as experimental studies, capable of addressing issues such as the phenomenon of endogeneity that often exists among social and economic variables.

1.4 Organization of the paper

Following this introduction, Chapter 2 presents a review of theoretical perspectives and empirical evidence addressing participation in adult education and training. Chapter 3 presents determinants for formal job-related adult training. Chapter 4 is devoted to engagement in informal learning and the paper concludes in Chapter 5 with a discussion of main findings and policy recommendations.

2. Literature Review: Current State of Knowledge on Participation in Organized and Informal Adult Learning – Theoretical Perspectives and Empirical Evidence

This chapter summarizes the current state of knowledge in terms of the empirical findings and theories on factors explaining participation in adult learning in industrialized countries, with a particular focus placed on job-related adult learning. Operationally, the word “current” refers to the period spanning the last fifteen years (i.e. since the early 1990’s).

2.1 Theoretical perspectives

Questions with respect to the determinants of adult education and training can be approached from different theoretical traditions. This review will focus primarily on perspectives presented by two schools of thought, economics of education and adult education.

2.1.1 Economics of education

The economics of education concerns itself primarily with the relationship between investment in education and training on the one hand, and productivity and income distribution on the other (Riddell, 2004; Woodhall, 2001). The predominant approach to these questions has been the so-called human capital theory. The underlying assumption is that individuals maximize welfare as they conceive it. Human capital analysis starts from the assumption that individuals decide on their education by weighing the benefits and costs of this investment (Becker, 1964). Every action has a price tag in the market and every human act can be reduced to a form of rational economic calculus of cost and benefit. The probability of participation in education increases as a function of the benefit/cost ratio (U.S. Department of Education, 1998, p. 13). The human capital perspective is used to explain employers’ efforts to train workers in terms of the rationality of investing in upgrading employees’ skills with expected returns in increased productivity, quality, and competitiveness for the firm. At its core, the theory proposes that, just like a worker who would rationally invest in his or her personal productive capacities in order to maximize his or her lifetime expected earnings and status attainments, an employer invests in employees only if the investment is seen to help the employer reap the benefits of improved employee productivity (Becker, 1964; Hum and Simpson, 2004; Vignoles, Galindo-Rueda and, Feinstein, 2004).

There are at least two major implications underlying this proposition. First, there is the belief in an innate association between the development of human capital, such as work experience and workplace training, and returns in the form of improved productivity and mobility in the labour market (Mincer, 1989). The process of production is originally understood as the most critical process through which the human capacities acquired at home and school contribute to production efficiency and realize their values in the form of increased rates of return. This understanding is now strengthened by the recognition of the roles of work experience (non-formal learning) and workplace training, both of which are known as intrinsic components of the productive process. Thus, the workplace is now seen not only as the place where human capacities acquired through informal, non-formal and formal education at home and school make contributions, but also as the locality where these human capacities are further developed, renewed and upgraded. More importantly, it is not unusual that during the process of production new knowledge and innovations are created, which in turn puts a demand on the acquisition of new human capacities. This is what Mincer (1989) refers to as the dual role played by human capital in the production process: human capital as a stock of knowledge is a source of technological change; at the same time, the formation of adaptable skills in the work force is, in part, induced by changes in technology (p.190). The same could also be said of the development of human capital as being both induced by demands on increasing productivity and a cause of improved productivity.

Second, the argument of investment rationality has brought the question of continuous training of the workforce to the fore. Becker makes an important distinction between “general” and “specific” training (Becker, 1964). General training, for example, refers to portable skills and thus does not allow an employer to capture the benefits readily: the company would lose its investment since the enhanced productivity of the generally-trained worker may enable him or her to quit for a higher-paying job elsewhere. Therefore, a major conclusion of human capital theory is that employers would provide general job training to an employee “only if employers do not have to pay any of the costs” (Becker, 1964, p.12). In contrast with general training, specific training functions to increase the productivity of the workers only within the organization that provides said training (Ibid). Therefore, employers are willing to pay for specific training, expecting to benefit by larger profits resulting from their specifically trained workers’ increased productivity. In this context it is of interest to note that recent research suggests that firms appear able to select those workers most likely to gain from education and training (Feinstein, Galindo-Rueda and Vignoles, 2004). Human capital theory thus not only hypothesizes that most education and training provided by employers will be context-specific, but also that wages will increase and job lay-offs will decrease with an employee’s length of time in the firm, assuming that the amount of specific training is proportional to tenure of an employee (Farkas, England, and Barton, 1988).

Human capital theory has received serious criticism from various quarters, not only for the difficulties involved in the operationalization of the concept to provide a basis for empirical studies, but also for its individualistic approach to the decision-making in investment in human capital, and the implied notion of social equity and fairness in sharing benefits among social groups (Brown, Green and Lauder, 2001; Knoke and Kalleberg, 1996).

Human capital theory suggests that education or training raises the productivity of workers and hence increases their lifetime earnings by imparting useful knowledge and skills. Critics contend that this contribution of education and training to grow the productive capacity of workers may well be smaller than human capital theorists and development economists anticipate. It is quite possible that education simply acts as a “screening device”, which enables employers to identify individuals with higher innate ability, desirable personal traits and trainability (Blaug, 1976; Thurow, 1975; Woodhall, 2001).

“Screening” principles emphasize the demand-side characteristics of employers’ recruitment practices. The “screening” hypothesis also receives support from the perspective of the “diploma disease” or “credentialism” and “deskilling” hypothesis based on studies of the relationship between perceived needs for skills and the actual use of skills in the workplace (Livingstone, 1999). According to credential-screening approaches, in the context of adult education and training education, employers would tend to support those employees who possess perceived trainability potential. Educational credentials, as well as other attributes such as race, gender and age, serve as clues about employees’ potential trainability and labour force persistence. Training decisions made based on this “evidence” would presumably reduce employers’ risks of hiring or investing in an unstable or untrainable employee (Holtzer, 1996). This “screening” hypothesis seems to be supported by research evidence that workers with higher educational credentials receive more employer-sponsored education and training than those with less education.

Credential-screening theories seem most pertinent to the hiring decision or training decision for the newly hired, when limited information is available about the productivity and trainability of prospective workers. Thus, Bills (1988) argued that credentials are used mainly to get a foot in the company door, after which other evidence becomes more relevant to training, promotions, and wage increases. Credentials serve less as an index of acquired skills than as a crude, low-cost proxy for potential performance qualities desired by employers. As firms become more familiar with their employees’ actual abilities, the relevance of formal education for career trajectories fades. Consequently, formal educational background may only weakly explain why certain persons are most likely to be supported by employers in their further educational efforts.

Another criticism of human capital theory is what Blaug (1976) calls its “methodological individualism”, which is, in essence, an epistemological individualistic approach to the role of personal agency in decision-making on the investment in human capital. According to this approach, all social phenomena should be traced back to their foundation in individual behaviour and thus human capital formation is typically conceived as being carried out by individuals acting in their own interests. However, as critics point out, according to this perspective, problems such as social inequality, regressive patterns of income distribution, and opportunities for further education and training, are a consequence of individual psychological deficit rather than inequalities in power, wealth, and influence (Torres, 1996). Specifically, critics have pointed out differences in families’ resources (HRDC/OECD, 2000), demands of the workplace (OECD, 2005b), employers’ decisions (Vignoles, Galindo-Rueda and, Feinstein, 2004), government interventions (Rubenson, in press), and many other social structural factors that will exogenously determine the process of decisions on the investment in human capital. Hence, structuralist-oriented theories emphasize the role of

social and economic institutions (government policy, organizations, industries, markets, and classes) at the macro level, and work structures at the micro level, in the reproduction of the prevailing class structure of society, of which the educational and training system is viewed as an integral element (Brown, Green and Lauder, 2001).

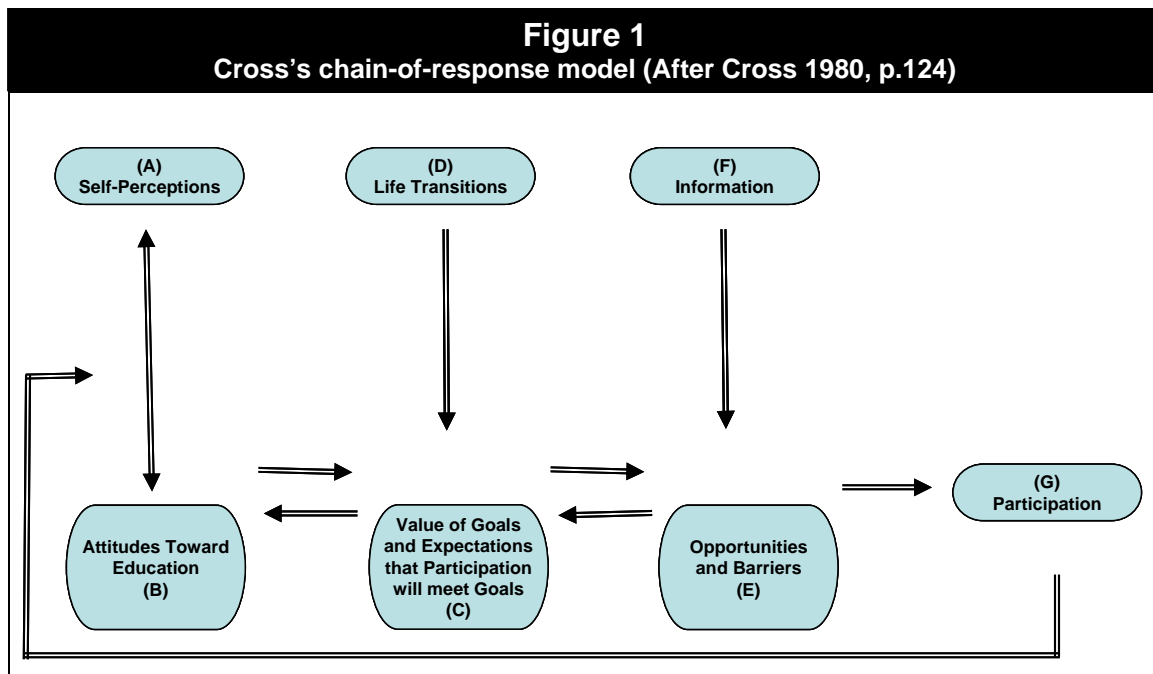
One of the most prominent economic theories within this tradition is the school of labour market segmentation (Reich, *et al.*, 1975 p.1). According to this perspective, labour market conditions can be understood as outcomes of four segmentation processes: a) segmentation into primary and secondary markets, b) segmentation within the primary sector, c), segmentation by race, d) segmentation by gender. Differential rates of return on education are not primarily the result of inequality in the distribution of schooling, but refer instead to the basic unequal structures of society. In addition, the role of the state in education and income policy is a crucial variable in determining income distribution. In this sense, taxation, wage fixing, price control, inflation, and employment policies are the means by which the state exercises this power – policies that are out of reach of education and training programs (Torres, 1996). In due course, certain industries are more likely than others to develop formal training programs, elaborate internal labour markets, and compensation packages to attract and retain a highly-skilled workforce, whereas others will seek mainly to replenish a rapid turn-over in a workforce with unskilled raw recruits (Kalleberg, *et al.*, 1996).

Turning to the micro level, the literature points to how the structure of work settings may facilitate or constrain individual training opportunities (Brown, Green and Lauder, 2001; Illeris, 2004b). These elements include normative and coercive factors such as union power, establishment size, internal labour markets and other occupational systems. The primary factors determining which individuals will receive employer-provided education lie not so much in personal resources as in workers' access to, and their positions in, those structures. With the interplay of factors at both macro and micro levels, work contexts become very complex, with explicit or implicit rules and regulations that shape the training opportunities and rewards that employers make available to their employees. These organizational structures may directly affect training decisions, apart from the importance of individual human capital and credentials (Kalleberg, *et al.*, 1996).

Thus, the institutionalist approach claims that organizational forms and actions emerge and persist not only through conscious rational-choice designs but also through cognitive, cultural and even political conventions popular in social thought and action. This concept, which is termed “organizational citizenship” (Kalleberg, *et al.*, 1996), is of special interest to understanding employers who sponsor education and training for their employees, particularly for those publicly owned or non-profit organizations. This idea points to the institutional emergence of norms about employee job rights and benefits. The human resource development practices in those organizations tend to encourage strong organizational ties to employees, inducing their commitment by offering job security, comprehensive benefits, and career opportunities. As a variety of forces – technological demands, professional association standards, union grievance procedures, legislation and judicial mandates for equal employment opportunities – converge to transform the workplace into a legalized institution whose employees increasingly come to expect a sense of participatory citizenship in their work roles, education and training that help them enhance those roles increasingly become an issue of employee-job rights or part of the benefit package.

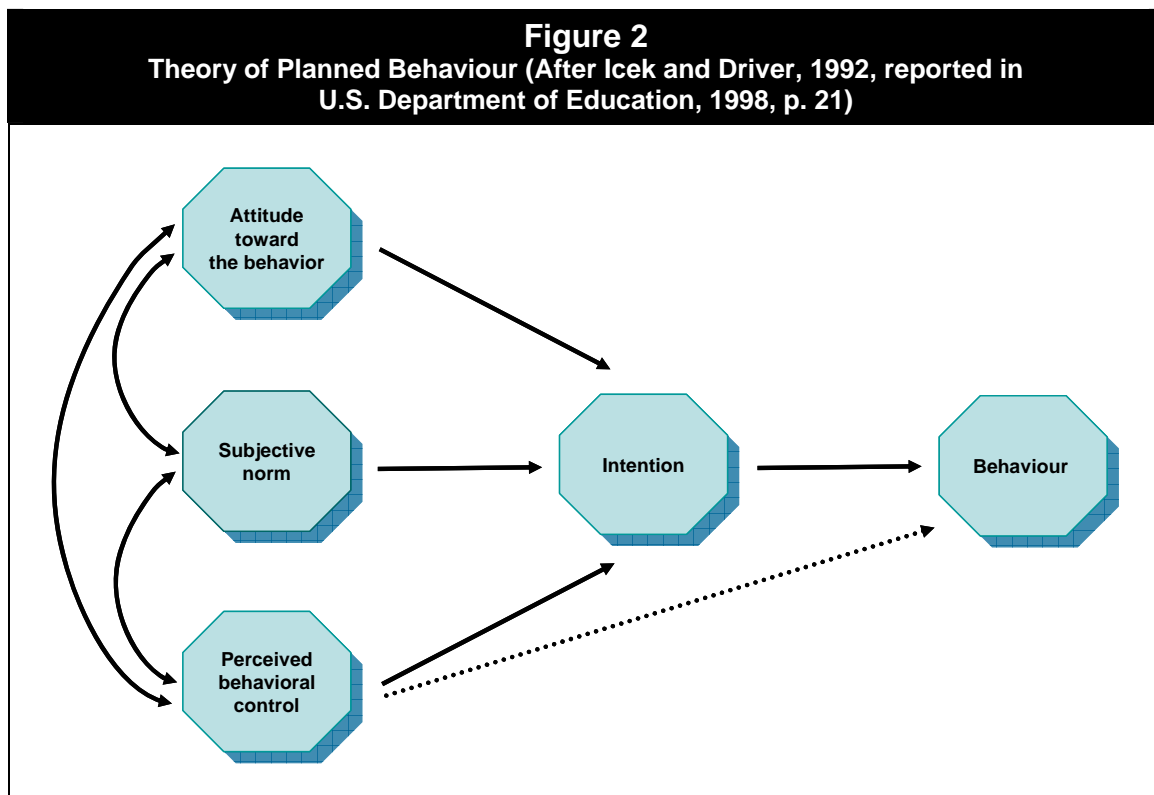
2.1.2 Adult education perspectives

Cross (1981) developed the so-called *Chain response-model*, see Figure 1, which has come to dominate research on participation. The model takes the individual as the starting point and identifies two main constructs: self-evaluation (A); and attitude toward education (B). These internal factors are seen to influence the value of goals (valence) and the expectation that participation will meet goals (C). Valence and expectations are also affected by life transition and development tasks that confront the individual in various life cycle phases (D). Opportunities and barriers (E); and available information (F) will then modify whether or not an individual will come to participate. *Chain response-model* employs psychological concepts to explain why some adults participate while others do not. Cross (Ibid) argues that this does not mean that societal aspects are ignored; on the contrary, all theories are interactionist in that they understand participation in terms of interaction between an individual and his or her environment.



However, they tend to neglect the individual's life history. Further, they do not directly address how the main constructs in the model are related to, and interact with, the broader structural and cultural context (Rubenson, 2001). Cross's and other models presented in the adult education literature have much in common with general socio-psychological models on human behaviour (U.S. Department of Education, 1998).

Figure 2, (adapted from U.S. Department of Education, 1998, p 21), presents the basic structure of a socio-psychological approach to human behaviour. According to Figure 2 the best predictor of participation in adult education is the intention to perform an action. The intention can be predicted by two motivational factors, (a) the person's attitude toward participating as a subjective norm and (b) one factor labelled "perceived behavioural control." The latter refers to the extent to which the person has control over the action in question. This approach neglects the individual's life context and the broader structural, economic, public policy and cultural context. The importance of addressing these aspects is supported by findings in recent national and international surveys on supply and demand of adult education and training (see Desjardins, Rubenson and Milana, in press; Illeris, 2004a; Statistics Finland, 2000).



Recent surveys of adult learning point to three major findings: first is a dramatic shift in participation patterns over the last 25 years. In the OECD world this is caused by a remarkable increase in employer-supported activities that has radically altered the landscape of adult education (Bélanger and Valdivelso, 1997; Boudard, 2001). This development is housed in the broader changes that have occurred in the labour market, which, among other things, forces people to participate because they are ordered or feel pressed to undergo some form of adult education and training linked to their work (Carré, 2000). Thus, contrary to the standing position in the adult education research literature, participation is not always a voluntary act, as Cross and other similar theorists seem to assume. Further, knowledge about how the individual interprets the world cannot by itself give an understanding of barriers.

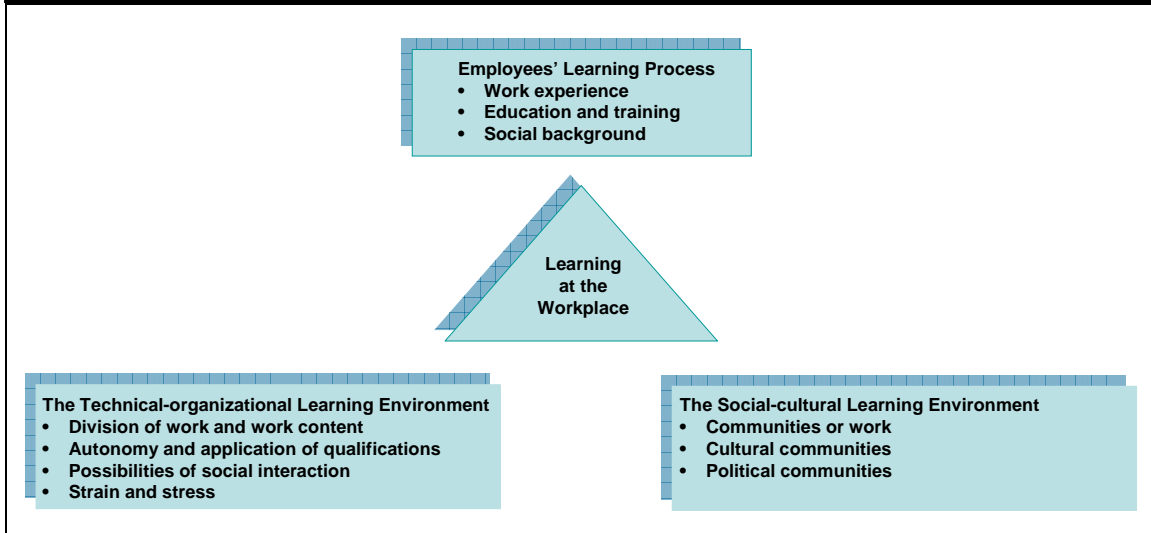
Only when we also include structural factors and analyze the interaction between them and the individual conceptual apparatus does an interpretation become possible. Participation in adult education as well as in training culture – in its broadest interpretation – can be understood in terms of societal processes and structures, institutional processes and structure, and individual consciousness and activity (Rubenson and Xu, 1997).

Results from the *International Adult Literacy Survey* (IALS)(HRDC/OECD, 2000) support the integration of the macro, meso and micro levels in trying to understand determinants of participation in adult learning. The IALS data show that public policy can be somewhat effective in moderating inequality in adult education participation. Thus, while there is a noticeable relationship between social background, educational attainment, and participation in adult education in all 22 countries in the study, the relationship is stronger in some countries than in others (OECD, 2000). Further, IALS notes that there seems to be a strong relationship between economic inequalities in a country on the one hand, and literacy and adult education participation inequalities, on the other.

The IALS findings support Martin Carnoy's (1995) point that there are crucial differences in what adult education attempts to do and can do in different social-political structures. So, for example, funding regimes reflecting the importance of public policy affect the recruitment of those traditionally not participating in adult education and can explain the differences in participation patterns across countries (McIntyre, Brown and Ferrier, 1996; Nordhaug, 1991; Tuijnman, 2001). These findings point to the importance of focusing on how an individual's subjective rationality, as expressed in motives for attitudes to adult learning, is influenced by socio-political structures and how these in turn affect what has been called "the impact of the long arms of the family and work on adults' readiness to engage in learning". The "long arm of the family" refers to the strong link between family background, level of education and the employment situation on the one hand and participation in adult education and training on the other. This relationship indicates a stratification process that started in early life and progresses through schooling and working life.

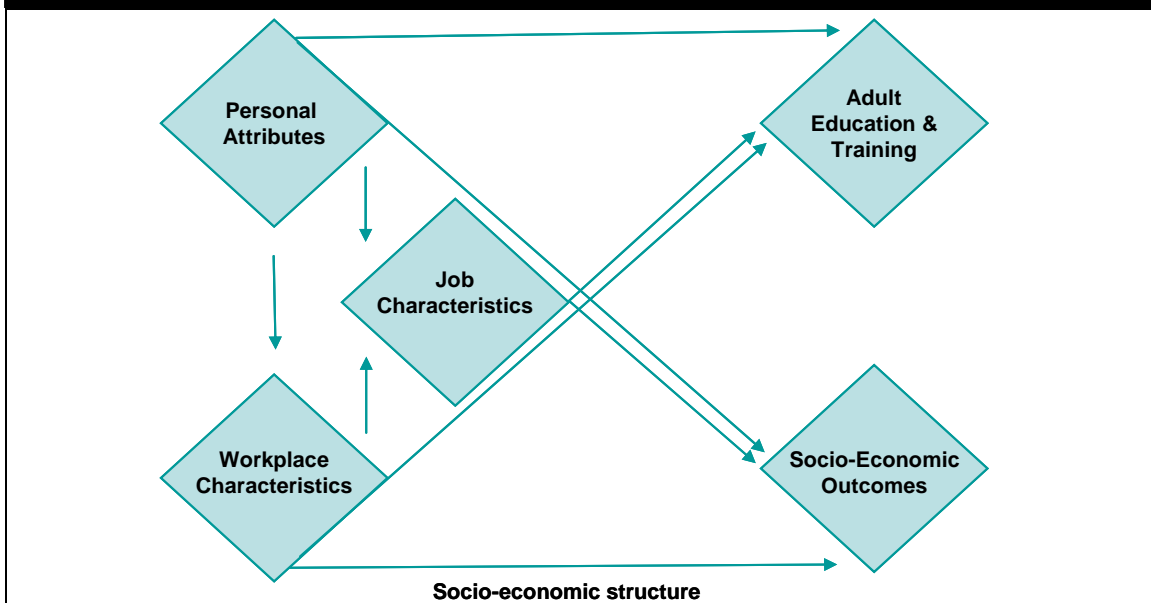
For Bourdieu (1977) socialization within the family, and later in the school, creates a positive disposition (habitus) towards adult education for some people but not for others. The "long arm of the job" refers to how the allocation of work roles influences participation in at least three ways: First, certain roles provide more opportunities to take part in adult education than others, and, second and third, not only do those in higher positions get more opportunities through their work to take part in institutionalized forms of education but they also have by far the best chances to learn new things on the job itself. Figure 3 has some similarities to the structural theories within economics of education, see above. It provides an analytical framework for how societal processes and structure, institutional processes and structure, and individual consciousness and activity shape and form adult learning.

Figure 3
Understanding learning at the workplace
 (After Helms-Jørgensen and Warring, 2003)



In summary, existing theoretical and applied work by sociologists, economists and adult educators indicate the influence of a variety of factors on participation in education and training sponsored by the employer. The model depicted in Figure 4 illustrates the interplay between individual attributes, organizational factors, job characteristics and influences at the macro level, such as socio-political situation, affecting the chances of participating in educational and training activities. Derived from the major theories previously reviewed, this model will be used as a guide to investigate the previous empirical studies relevant to this topic and will be further operationalised to consider the specific factors that have been thus far identified.

Figure 4
Participation in adult education and training: determinants and consequences



The basic chain of logic in this general model is as follows: individuals entering a working environment bring with them personal attributes--such as personalities, family background, acquired educational qualifications--which not only influence the kind of enterprises that hire them, but also determine what types of job they will be qualified for. The environmental context, such as company size, the composition of workforce, the degree of technology application, literacy demands at work, labour relations and internal employment market, will decide what kinds of jobs or work will be available at the workplace and will interact with individual factors to influence each individual's job characteristics, such as full- or part-time employment, the degree of autonomy, degree of labour intensity, occupational status or supervisory role.

Personal attributes, particularly educational attainment, will directly and indirectly influence the person's readiness to invest in her own learning as well as the chances of receiving employer-sponsored education and training. Workplace level factors will directly and indirectly, and perhaps through interaction with job characteristics, influence the chances of receiving training. The nature of the job has a direct effect on the likelihood of employer-sponsored training as well.

All personal level attributes, workplace factors and job characteristics have direct, as well as indirect influence, mediated by further education and training, on individual workers' socio-economic outcomes such as earned income, occupational status and other alternative outcomes such as job satisfaction, life-long learning inclination, execution of citizen roles and general well-being. Finally, these factors are all subject to influences from the broader social and cultural settings such as: prevailing ideologies; political, social and economic objectives of a nation; social structures; government interventions and contemporary political and economic situations.

2.2 Determinants of participation in adult education and training

Following Figure 4, the review is organized around four levels of determinants:

- individual level variables;
- job characteristics;
- workplace environment; and
- macro-level factors.

2.2.1 Individual level factors

Evidence from empirical studies repeatedly points to three individual factors closely related to the probability of participation in employer-sponsored education and training: *age, gender, attained level of formal education* (Bérubé et al., 2001; Evans, 2003; Houkoop and Kamp, 1992; HRDC/OECD, 2000; Hum and Simpson, 2004; Keep, 1999; Kim and Merriam, 2004; McGivney, 2003; NIACE, 2002; OECD/Statistics Canada, 2005; Rees, 1997; Williamson, 2000). Racial and ethnic background is another factor but with the exception of a few studies from the USA this important factor is not well covered in the literature.

Age

Reflecting life span phases, age is generally the best predictor of participation in adult education after initial educational attainment (Bélanger and Valdiviselo, 1997). Thus, it is not surprising to find that both participation rate and duration vary by age. Several studies indicate that the share of older participants has been increasing over the last two decades. This is partly due to changes in provision, but also to the fact that the new generations of older people are better educated than previously (Van der Kamp, 1990; Statistics Canada, 2001).

Recent research tends to show that adults' readiness to take part in education remains fairly stable from early adulthood to the middle fifties. A sharp decrease in total participation occurs among those 55 years and older. The percentage of people receiving employer-sponsored education or training is almost identical (around 25%) for all ages up to those aged 55 to 64. However, participation in mainly self-sponsored education drops off at a considerably earlier age. While it might be beneficial for employers to support employees of any age in courses or programs, middle-aged employees appear to have less incentive than younger workers to invest in continuing education of a formal kind. Thus, even within a framework of lifelong learning, the major personal investment in education will continue to take place in the early stages of the life cycle. This makes sense economically, because of the longer time period during which individual and social benefits are expected to accrue (Tuckett and Sargant, 1996; NIACE, 2002; McGivney, 2004; HRDC/OECD, 2000).

Taken together, evidence provided by the research literature lends support to the inverted-U shape age-training profile hypothesis (Bowers and Swaim, 1994; Lynch, 1991). That is, when it comes to decisions on employer-sponsored adult education and training, it is the middle-aged employees who are usually in a more favorable position than older workers. Age, however, is not a factor that can be considered by itself but often has to be treated in conjunction with other factors such as performance, experience and perceived needs for upgrading or re-skilling.

Some studies reveal that differences within age-cohorts are much larger than between age-cohorts and that learning abilities are determined more by previous educational level and occupational status than by age (McGivney, 2003). The fact that the elderly are less likely to participate in education and training is often not because of aging, but, rather, is due to a constellation of conditions unfavourable to participation, with which old age is often compounded, such as a low level of initial schooling and few occupational possibilities (McGivney, 2003; OECD, 2005b).

Gender

From both human capital and “screening” perspectives, gender is one of the visible employee attributes on which employers can base training investment decisions as they attempt to reduce the “risks” when hiring employees. Since women are often perceived to work fewer hours than men and are more likely to leave the labor force for considerable periods of time, this suggests to employers that training investments in women are less likely to be recaptured through future productivity. Thus, this might result in lower employer-supported training levels for female employees, particularly in jobs involving highly job-specific training (Altonji and Spletzer, 1991). By the same token, employers are also more likely to invest their resources in training male as opposed to female workers, since employers generally believe that men will be more apt to have uninterrupted and long-term careers with their firms.

In general, empirical evidence appears to somewhat support both the human capital and “screening” perspectives. Thus, while gender differences in overall participation are quite small and women have a slight advantage (HRDC/OECD, 2000; Hum and Simpson, 2004; Kim and Merriam, 2004; NIACE, 2002), the majority of employer-sponsored training still goes to men (HRDC/OECD, 2000; Rees, 1997). Women must more often than men rely on alternate sources such as training programs without employer sponsorship, funded mainly through self-financing. A lower labour market participation rate, as well as a higher rate of part-time employment partly explains the situation. Further, Kalleberg (1992), Tuckett and Sargent (1996) and Williamson (2000) suggest that any gender difference in training (as measured by training times) appeared to be restricted to the sorting of men and women into differentially skilled jobs. When these factors are accounted for, there are small or no discernible gender differences in most OECD countries.

Formal educational background

Ever since Johnstone and Rivera’s classical study on participation in the early 1960s (Johnstone and Rivera, 1965), survey after survey has consistently found substantial correlations between measures of initial education and participation in adult education and training (Boudard, 2001; Tuckett and Sargent, 1996; Sargent, 1997; Field, 1999; Keep, 1999; Williamson, 2000; Berube et al, 2001; Desjardins, 2004). As with surveys of most types of adult education provision, studies on employer-sponsored education and training almost invariably reveal a strong positive relationship between initial formal educational attainment and access to employer training, particularly noticeable is a tendency for non-participation by adults at the lower end of the educational scale (Berryman, 1995; Dougherty, 1992; Kalleberg,

1992; Keep, 1999; Leeuwen and Dronkers, 1992; HRDC/OECD, 2000; Psacharopoulos and Velez, 1992 Sargant, 1997; Statistics Canada, 2001).

Evidence that educational attainment is a strong predictor of receiving employer-provided education and training is explained both by the investment rationale suggested in the human capital theory and the “credential-screening” approach. According to human capital theory, employers accentuate differences in educational attainment and achievement among employees. They prefer to train more educated workers, and studies show that employers invest heavily in training their best-educated and trained, and therefore considered most trainable, because it is assumed that the higher one’s level of general education, the more effective training will be. Thus, the probability of being trained increases significantly with the level of formal schooling, particularly at the post-secondary levels.

There is also evidence from studies that support “credential-screening” theory. Research suggests that highly educated persons more often enter an organization in higher-level positions that require more training. In addition, people who have already invested in their human capital—and employers who have selected such individuals—are more likely to find it in their best interest to make further human capital investments (Hum and Simpson, 2002; Kalleberg, 1992). Kalleberg (1992) also found that although more educated persons had jobs that required longer periods of training, once the skill levels of jobs was taken into account, there was no difference among people with differing levels of education in the probability of having had a formal course, or of feeling that they needed additional training. The fact that educated workers have higher stocks of both specific knowledge and general skills and knowledge means that they have a comparative advantage in jobs that require larger amounts of specific knowledge and provide many opportunities for training. Consequently, as Altonji and Spletzer (1991) point out, a positive link should exist between prior educational attainment and training at the workplace, but this link will be less strong with controls for occupation and skill levels.

In brief, empirical evidence consistently confirms a strong positive linkage between formal educational attainment and the probability of participation in adult and continuing education, employer-sponsored and otherwise. The only exception might be at the level of advanced post-secondary degrees. However, according to human capital theory and the “credential-screening” hypotheses, acquired educational attainment mainly serves as a “circumstantial” proof of one’s ability or capability to fulfill job requirements. Once sorted into different positions at the workplace, employees are further assessed for individual training needs by required skill levels or perceived skill demands of their positions. Hence, empirically, once skill levels or literacy demands at work or occupational classes are controlled for, the link between formal educational attainment and decisions on further education and training is expected to become less obvious (Desjardins, 2004).

2.2.2 Job characteristics

A central theme of research into the influence of job characteristics—which include occupational status, work roles, skill levels, and literacy demands at work—is concerned with whether employers’ training decisions are based on the type of job an employee holds, and the acquired level of educational attainment.

Level of skills

Research related to employer support for education and training indicates a clear and substantial relationship between occupational level and employer-supported education and training (Altonji and Spletzer, 1991; Berube et al., 2001; Hodson and Hooks, 1994; Houtkoop and Kamp, 1992; Hum and Simpson, 2002; INFED, 2006; HRDC/OECD, 2000). Participation rates are particularly high for white-collar employees, especially so-called knowledge workers and those in management positions (Carnevale and Goldstein, 1990; Hodson and Hooks, 1994; Hum and Simpson, 2002; OECD/Statistics Canada, 2005). In general, these studies suggest that workers who are already highly skilled receive large shares of training investments, while most medium- and low-skilled workers, particularly in blue-collar occupations, are not being trained at the same level. Job characteristics play a role in and beyond the positive relationship between education and formal employer training (Altonji and Spletzer, 1991). The findings suggest that at the workplace, employees with higher levels of education are often sorted into positions for which training is considered more important or worth the effort. It is interesting to note that a longitudinal study by Tuijnman (1989) found that the effect of job level on participation increased with advancing age, whereas the effect of initial education decreased (Tuijnman, 1989). Thus, Tuijnman and Fägerlind (1989) inferred that the direct effect of youth education on continuing education becomes mediated and reinforced by the occupational positions held.

If occupational class/position or level of job is just a proxy indicator of skills required at work, then measurements of literacy demands on the job may reveal more directly the nature of the job and associated training needs. It is therefore of interest to note that literacy skills have a direct relationship with participation in work-related adult education and training even after controlling for educational attainment (Boudard, 2001; HRDC/OECD, 2000). Several studies have found that while there is a general preparedness among the workers to take up training, the actual decision to do so was governed by a weighing of the demands of the workplace, an estimation of one’s own capabilities, and the expected benefits (HRDC, 2001; Keep, 1999). Further, there is a strong relationship between employer support for training and the level of literacy required on the job (HRDC, 2001; HRDC/OECD, 2000). The more demands are made on the use of literacy skills, the more likely it is that employers will invest in workers’ further education.

Length of work experience

Mincer (1989) discovered that training of all sorts increases with experience on the current job – although at a decreasing rate– as workers demonstrate their aptitude and commitment to a career or to an employer. The reason that length of time with the current employer is a factor for consideration is that employers are unlikely to be interested in training workers if they cannot recapture their investment (Mincer, 1988). Kalleberg (1992) also concludes that employees with more work experience, both within the organization and generally, will receive more job training. Kalleberg explains that this is because workers employed by a firm often discover that promotions come more quickly and wage increases are larger when they can demonstrate to employers that they are more productive in their jobs. Such demonstrations are possible either by actually acquiring work skills or by being certified as having acquired such skills. Thus, the prospect of receiving organizational rewards for improved work productivity, whether real gains or in the form of credentials, motivates employees to seek out training opportunities for reasons of personal advancement. The longer a worker has been with a firm, or in the labour force generally, the more opportunities he or she is likely to have had for formal job training, and the more compelling are the reasons for participating (Kalleberg, 1992).

Taken together, research findings suggest skills or literacy engagement at the workplace, whether measured directly or indirectly (using occupational status and length of work experience), has a more direct and stronger relationship with decisions of employer support for employees' further education and training. Further, occupational class or job level and measurements of literacy use on the job (which are the more differentiating indicators of job characteristics) are more powerful predictors of participation in employer-sponsored adult education and training than the attained level of formal education.

2.2.3 Work environment factors

Factors that denote organizational structure of the work environment include: the labour market segment of employment, size of the organization, main areas of production, use of technology in the production process, degree of market competition in the industrial or mercantile pursuits involved, and the extent to which workers are organized.

Workers' organization

At the workplace, unions are the main organizations representing employees in the relations with management and providing workers with a source of power and control in the employment relationship (Ball, 2002; Payne, 2001). The relationship between union membership and employer-sponsored education and training seems to vary (Kalleberg, *et al.*, 1996). Unions in industrial countries, therefore, often conduct programs that provide training for their members in particular crafts. They also bargain with management to establish job-training programs that enhance their members' skills and market capacity (Kalleberg, 1992; Payne, 2001). In addition, their jobs required longer training times, and they more often needed additional training (Kalleberg, 1992). Other studies, however,

suggest a negative relationship between unionization and training. Hum and Simpson (2002) found that Canadian unionized workers participated significantly less in training. Lillard and Tan (1992) found that union membership reduced the probability of company training for older men, but had no effect among women or younger men. In countries with a high level of unionization, particularly the Nordic, the labour movement has traditionally not only been strong advocates for workers' and employees' rights in general, but it has also been a driving force for many of the adult education reforms since the 1960s that have aimed at the redistribution of educational opportunities and education for democracy in the political, cultural and working life (Rubenson, in press).

Industrial Sectors

In the research literature on participation, sector of employment--in addition to firm size, and nature of job--is consistently regarded as one of the major factors associated with the likelihood of a worker receiving some support for education and training from the employer (Ball, 2002; Berube et al, 2001; Field, 1999; Hum and Simpson, 2002; Keep, 1999). What is embedded in the concept of "sector of economy" are the notions of ownership, the use of technology, the internal labour market, labour force qualification and competence and management structure. All these factors have been identified in the literature as contributing circumstances that exert influence on the extent to which employers are willing to invest in human resources development (Gorard et al, 2003; HRDC, 2001; Noble and Smith, 1996; HRDC/OECD, 2000; Payne, 2001).

Psacharopoulos and Velez (1992) found that workers in the public sector add more than 7 percentage points to the probability of being trained. Bartel and Lichtenberg (1996) related participation to the sectors of employment and explained that this relationship was largely due to the demands for better-educated employees by those sectors where employment is growing rapidly. Examples of this can be found in financial services, public administration, and professional services. This pattern reflects, in part, the effects of increased international trade and new technologies, and also the overall shift of employment from goods production to services, in industrial countries, which means an increase in the level of education and employer training.

Firm size is another contextual factor at the organizational level that has been consistently attributed to the likelihood of a worker receiving some support for education and training from the employer. This is often reflected in higher rates of participation in the large organizations than in small and medium-size firms (Keep, 1999; Berube et. al; 2001; HRDC, 2001; International Adult Literacy Survey, 2001; Hum and Simpson, 2002; Sussman, 2002; Houtkoop and Kamp, 1992).

Explanations as to why firm size matters are varied. Because employees in small firms must learn a wider variety of skills, and because small firms usually report hiring slightly less-educated employees than large firms one would assume that small firms would appear to have a greater need for training. On the contrary, most studies report that small firms spend less on training than large firms (Nash and Hawthorne, 1987). In the training literature, the most commonly identified factors attributed to higher training rates in large-size organization appear to be a high degree of formalization of training, "slack"

resources to spend on training, an ability to do training most economically, and a separate personnel department in charge of training. These are usually lacking in small and medium-size firms (Kalleberg, 1992). Dougherty (1992) points out that large companies tend both to have a greater need for trained workers and are in a better position to provide training. As well, large firms are more likely to be directly involved in marketing, research and development, all of which put demands on human resource development (Dougherty, 1992).

According to institutionalist theory, larger organizations are also more likely to have a specialized personnel office, which is likely to generate demands from professional personnel managers for the organization to behave in ways in which they have been socialized to think are appropriate, such as by creating job-training programs (Kalleberg, 1992). Hodson and Hooks (1994) point out, the extent and content of training is heavily influenced by an organization's established strategy for recruiting and managing its labor force. For example, skill-oriented training usually occurs in an enterprise moving toward a post-Fordist production regimen whereas team-oriented training often takes place in a firm that aims at establishing a Japanese-style production system.

In brief, investigations that look into the relationships between participation in adult education and training and the world of work suggest that a cluster of factors could be involved. Apart from demographic variables, such as age and gender, variables such as parental social status that influence youth educational attainment also correlate with indicators of participation in adult education. Many studies find substantial relationships between youth educational attainment and adult education and training. However, most meaningful antecedents of participation in work-related education and training perhaps are those pertinent to jobs and workplace settings. Prominent among these are: occupational status, skills or literacy demands at work, work experience, union organization, and sector of economy.

2.2.4 Macro-level factors

This is a topic that is not well covered in the participation literature but as Carnoy points out, there are crucial differences in what adult education attempts to do and can do in different social-political structures (Carnoy, 1995: p. 3). Some researchers have explored the Nordic adult education model and analysed how the political economic framework influences various policies affecting participation in adult education and training (Rubenson, in press; Tuijnman and Hellström, 2001). The conclusion is that the nature of the Nordic welfare state regime (Esping-Andersen, 1990) is the main explanatory factor for the high participation in adult education and training. Another distinguishable characteristic of Nordic adult education is that the ever-present law of inequality is less severe in this region than in other OECD countries. The explanation given is that the socio-political context has resulted in a broad acceptance of a full employment strategy where adult education and training plays a central role, a climate of industrial relations that promotes employee training and a high level of financial support to the individual, providers, NGOs and the social partners. In this context it is of interest to note that the International Literacy Survey (OECD, 2000) found that there is a strong relationship between economic inequality in a country on the one hand, and literacy and adult education participation inequalities, on the other hand.

Brown, Green and Lauder (2001) demonstrate how national high skills strategies and the accompanying human resources policies are linked to the prevailing political economy. While not exploring the topic as such, the OECD's Thematic Review of Adult Learning in 12 OECD countries (OECD, 2005a) indirectly provides clear examples of the impact of socio-economic factors on adult education and training.

2.3 Informal learning

2.3.1 *Definition of informal learning*

Driven by research on decision-making and the uses of technology at the level of the individual firm, economists reached the conclusion that education and learning must be increasingly viewed not only as an investment but also as a factor of production (Bartel and Lichtenberg, 1987; Welch, 1970;). In the late 1980s the literature began to stress the role of education in developing the workers' innovative capacity and adaptability to new technology. This line of research resulted in a broadening of the concept of lifelong learning that had primarily focused on formal and non-formal education but now also came to embrace informal learning; the latter results from daily life activities related to work, family or leisure and is closely related to the concepts of experience and practice. It is not structured (in terms of learning objectives, learning time or learning support) and typically does not lead to certification.

Informed by the new micro-economic perspective on human capital, policy discussions on the link between the economy and education and learning have come to pay special attention to the nature of informal learning at work (OECD, 1996). Within the European Employment Strategy, the member states have defined lifelong learning as "all purposeful learning activity undertaken on an ongoing basis with the aim of improving knowledge, skills and competence" (EC, 2000). The diffuse nature of adult learning makes it particularly challenging to develop a policy typology for this domain. The situation has become particularly problematic since the Copernican revolution that saw a shift from a preoccupation with adult education and training to the all-encompassing principal of adult learning. In the report *Lifelong Learning for All* (OECD, 1996), OECD embraced the notion that learning is not necessarily intentional and structured, nor that it takes place in formal or non-formal institutional settings (Tuijnman and Broström, 2002, p. 102). Similarly, the European Employment Strategy states that the member states have defined lifelong learning as "all purposeful learning activity undertaken on an ongoing basis with the aim of improving knowledge, skills and competence" (EC, 2000, p.6). The European Community (2000; 2001) describes the three learning setting as follows:

Formal learning: learning typically takes place in an education or training institution, is structured (in terms of learning objectives, learning time or learning support) and leading to certification. Formal learning is intentional from the learner's perspective.

Non-formal learning: learning that is not provided by an education or training institution and typically does not lead to certification. It is, however, structured (in terms of learning objectives, learning time or learning support). Non-formal learning may be provided in the workplace and through the activities of civil society organisations and groups. It can also be provided by organisations or through services that have been set up to complement formal systems, e.g., arts, music and sports classes. Non-formal learning is intentional from the learner's perspective.

Informal learning: learning resulting from daily life activities related to work, family or leisure. It is not structured (in terms of learning objectives, learning time or learning support) and typically does not lead to certification. Informal learning may be intentional but in most cases it is non-intentional (or incidental/random).

While policy documents overwhelmingly subscribe to definitions of adult learning that broadly correspond to those presented by the European Commission's policy documents, some scholars question the neat division into three categories or modes of learning. Eraut (2004) suggests one should think about informal and formal learning as a continuum rather than dichotomies while others even question the advisability of trying to seek clear definitional distinctions between the three concepts (Colley, Hodkinson and Malcolm, 2002). Further, from both a research and a policy perspective, situating outcomes of adult learning in the broader context of lifelong learning raises issues about the substitution and complementarity of various forms of adult learning over the lifespan and calls for measures that allow comparisons across formal, non-formal and informal learning settings. A key issue is how broadly adult learning is or should be understood in this context. It is uncommon to find any serious discussion on this topic in policy documents from intergovernmental organisations like the OECD, EU or UNESCO or in the research literature. The latter can broadly be grouped in two main categories, large scale surveys focusing on the extent of informal learning in the population and case studies of informal learning in specific contexts, primarily in the workplace.

2.3.2 Large-scale surveys of informal learning

Building on a rich Canadian research tradition in estimating the extent and distribution of self-directed learning projects (see Tough 1971, 1978) the research network for New Approaches to Lifelong Learning (NALL) conducted a national survey on Canadians' engagement in informal learning in 1998 (Livingstone, 1999b).

In a representative telephone survey 1,562 adults 18 and over were asked to talk about informal learning *from their own standpoints*. The survey reported participation in four types of informal learning: employment-related, community volunteer work-related, household work-related and other general interest-related. Respondents were asked about informal learning activities on several specific themes.

The interview started with the following information and question.

Everybody does some informal learning outside of formal classes or organized programs. You may spend a little time or a lot of time at it. It includes anything you do to gain knowledge, skill or understanding from learning about your health or hobbies, household tasks or paid work, or anything else that interests you. Please begin to think about any informal learning you have done during the last year outside of formal or organized courses.

First, let's talk about any informal learning activities outside of courses that have some connection with your current or possible future paid employment. This could be any learning you did on your own or in groups with co-workers, that is, any informal learning you consider to be related to your employment.

In subsequent sections of the interview schedule, respondents were asked about informal learning related to community work, to household work and to general interests. Four findings stand out in this study:

First, the data on informal learning provide a very different picture to the AETS findings on participation in formal or non-formal learning. With over 96.6% of Canadian adults involved in some form of explicit informal learning activities it would seem that almost everyone is included.

Second, the duration of informal learning activities far surpasses the time spent in organised learning activities. The mean hours per adult spent in organised forms of adult education, according to the 1998 AETS, is just over one hour per week compared to fifteen hours per week on informal learning activities.

Third, while every study conducted on participation in organised forms of adult education and training has found that social background and age strongly affect readiness to engage in adult education and training, the NALL survey provides quite a different story. Thus, those without a diploma or a high school diploma spent as much time as did those with a university education and total participation rates are over 90% for all groups. However, it is worth noting that when home related, employment- related and community activity are analysed separately the traditional pattern starts to re-emerge with lower engagement among older adults and those with lower educational attainment. However when the category “other” is added to the total these differences disappear.

Fourth, involvement in formal learning does not show the same sharp decline among middle aged and older adults as participation in organised forms of learning.

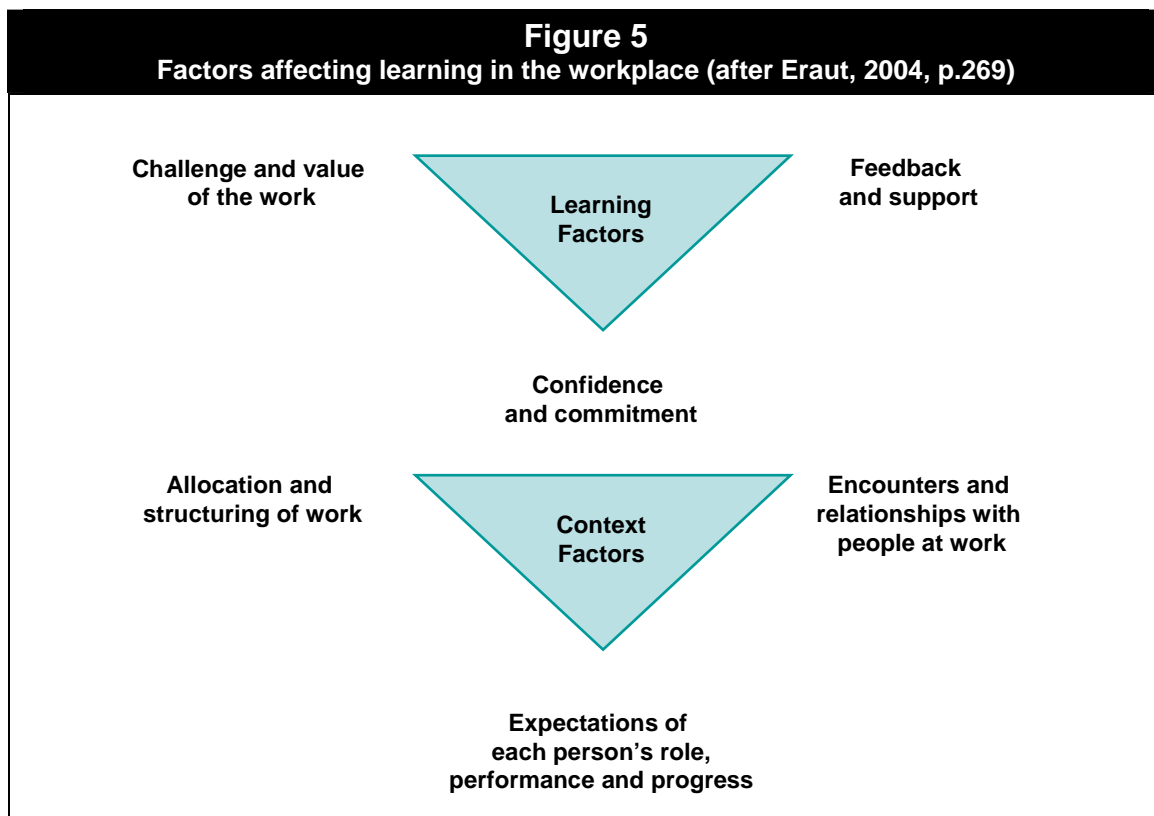
While supporting the NALL's findings that some form of informal learning is a universal activity, *Adult Literacy and Life Skills Survey* (ALLS) points to some interesting differences regarding who participates in what kind of activities (Desjardins, Rubenson and Milana, in press). Learning informally through either self or others' experiences is nearly universal, with little variation by level of education. By contrast, learning informally by using tools interactively, such as using literacy, numeracy, computers or

the Internet is strongly related to formal education, and very common among the most educated. This relationship supports the hypothesis that prior competencies formed via education and training are useful for further learning in some informal settings. Learning by engaging in various contexts such as attending meetings, lectures, seminars, going on guided tours or learning by being sent around in the organizations is also strongly related to education. This relationship occurs indirectly, since educational attainment facilitates access to opportunities, such as a good job, which in turn leads to learning by being mobile and experiencing exposure to a variety of contexts.

2.3.3 Case studies of workplace learning

Understanding the workplace as a site for learning has become urgent in the new economy and has resulted in a range of case studies focusing on conditions that enhance or hinder learning at work (Evans, Hodkinson, Rainbird and Unwin, 2006; Eurat, 2004).

Summarising the research on factors affecting learning in the workplace Eraut (2004, p 269) presents a model that is constructed around two triangles illustrating the work context for learning and the key factors that structures learning within that context (see Figure 5). Confidence has proven to be an important condition for seeking learning opportunities. According to Eraut there is a triangular relationship between challenge, support and confidence. The second triangle, context factors, draws attention to the findings that allocation and structuring of work is central to the extent to which employees learn at work. The structuring of work regulates opportunities for meeting, observing and working alongside



different groups of people. Thus, Volpe (1999) found that certain changes in the workplace resulted in breakdown of informal learning through the loss of formal and informal networks. Reardon (2004) reports how the structure of a new organization at a plastic-manufacturing plant made it very difficult for young new engineers to learn. Similarly, Boud and Middleton (2003) noted that the range of opportunities for informal learning increases as do the types of learning increase with seniority. Livingstone and Sawchuk (2005) claim that informal learning can be constrained by restrictive organisational structures e.g. neo-Taylorism and is affected by union strength. This helps explain why auto workers spent more time on informal learning than did workers in other sites. Garment workers who struggle under very hard working conditions and low degree of unionisation reported the lowest engagement in informal learning.

In summary, opportunities to learn new things through daily activities on the job vary with the characteristics and position of the job, which, in turn, exacerbates inequalities in adult learning. The findings strongly suggest that the determinants that govern participation in organized forms of adult learning also regulate the nature of the informal learning that is available to different segments of the population. Expressed differently, daily life tracks people into different curricula of informal learning. It is this process that Livingstone (2001) is referring to when he discusses worker control, paid/unpaid work and work-related learning, or when Billett (2004) conceptualises workplaces as learning environments.

3. Determinants of Participation in Formal Job-related Training: Insights from Adult Education and Training Surveys

The purpose of this chapter is to examine the factors underlying the observed trends and patterns in participation in job-related training during the period from 1993 to 2002, using the Adult Education and Training Surveys (AETS) conducted in 1993, 1997 and 2002. The objectives are to conduct multivariate analyses appropriate to identify and measure the key factors influencing the decisions on undertaking formal job-related training; these analyses will attempt to answer the following questions: 1) what is the relative importance of determinants of formal job-related training undertaken by Canadian adults and workers? And 2) what differences are evident over the period from 1993 to 2003? These two questions will be addressed by exploring the following four types of factors, as are discussed in the previous chapter on literature review, explaining adult learning participation and especially in the investigating relationships between world of work and further education and training activities related to job and workplace: individual level factors denoting individuals' ascriptive characteristics, job characteristics, workplace environment, and factors reflecting political, social and economic contexts.

However, it is apparent from an inspection of the AETS surveys that not all of the variables discussed in Chapter 2 are available for analysis. Nevertheless, a quite comprehensive list of individual and workplace factors captured on all the three AETS surveys were included in the predicting models of incidence of formal job-related training in order to discern the relative importance of key determinants. These variables include: age, sex, education attainment, province, labour force participation status, type of occupation at main job, part-time or full-time, job tenure, union membership, firm size, industry classification or type of industry, barriers to formal learning. Through examining and comparing the relative strengths (e.g., coefficients and odds ratios) of the factors influencing various learning or training decisions, the study is intended to shed some light on which factors are important in undertaking formal job skills development.

3.1 Extent of Participation in Formal Job-related Training

To help set up the context within which the data analysis is conducted for this section, Table 1 records the percentages of Canadian adults aged 25 to 64 involved in formal adult education and training by types of training during the period from 1993 to 2002. The data indicate that the majority of Canadian adults who undertake formal adult training are for job-related skills development. As is shown in the table, in 1993, 26.4% of Canadian adults participated in job-related training. This represents 77% of the 34.1% of those who undertook formal training activities in that year. In 2002, more than 80% of the Canadian adults (36.7%) who reported participation in formal training actually took job-related programs or courses during that period. It is also apparent that a vast majority (around 80%) of these job-related learning

activities as measured in all the three survey years, were undertaken in the format of training courses. For example, in 1993, 21% of Canadian adults took job-related training courses. This represents about 80% of the 26.4% of Canadian adults who reported undertaking job-related training activities in that year. The numbers also indicate that the increase in job-related training participation between 1997 and 2002 was largely attributable to the growth in the uptake of job-related training courses.

Table 1 Participation in formal job-related adult education and training by Canadian population aged 25 to 64, 1993, 1997, 2002 (Percentage)			
	1993 %	1997 %	2002 %
Participation in any type of formal training	34.1	31.2	36.7
Participation in job-related training	26.4	24.3	30.1
Took job-related programs	7.9	7.6	8.2
Took job-related courses	21.0	19.3	24.6
Took employer-sponsored job-related training	18.0	17.9	20.2
Source: Adult Education and Training Survey, 1994, 1998 and 2003, Statistics Canada.			
Note: Due to the fact that some adults took both job-related programs and courses, the percentage of those taking job-related programs and that of those taking job-related courses may add up to more than the total percentage of adults participating in job-related training.			

3.2 Factors related to participation in formal job-related training and changes of their influences on the participation

This section specifically investigates: 1) What influences do age, gender, level of formal education, level of occupation, length of employment, type of job, union membership, and industrial sector have on Canadian adults' participation in job-related programs or courses? 2) To what extent have the influences of these factors endured or changed in the past decade?

To seek answers to these two research questions, cross-sectional samples of Canadian adults as well as samples of Canadian employee population, defined as those who were aged from 25 to 64 and gainfully employed either full- or part-time during survey years, were drawn from the 1994, 1998 and 2003 AETS.

3.2.1 *Predicting probability of participation in job-related training: The general model*

Table 2 summarizes the results of the sequential logistic regression analysis, performed to assess prediction of membership in one of the two categories of outcome (participants, and non-participants in job-related training), first on the basis of four predictors of personal characteristics and then by addition of variables on barriers to formal training,

Table 2									
Summary statistics for evaluating the logistic regression models predicting probability of Canadian adults aged 25 to 64 participating in job-related education and training, 1993, 1997, 2002									
1993				1997			2002		
General adult population									
Model	Chi-sq.	R ² _C	R ² _N	Chi-sq.	R ² _C	R ² _N	Chi-sq.	R ² _C	R ² _N
1.	1766.1 (df=9)	0.113	0.165	2622.4 (df=9)	0.105	0.156	2892.1 (df=9)	0.131	0.186
2.	1893.9 (df=11)	0.120	0.176	2789.9 (df=11)	0.111	0.166	3026.9 (df=11)	0.137	0.194
3.	1967.9 (df=20)	0.125	0.183	2964.9 (df=20)	0.118	0.176	3073.6 (df=20)	0.139	0.197
Employee population									
4.	1118.2 (df=7)	0.082	0.117	1320.1 (df=7)	0.066	0.095	1330.2 (df=8)	0.090	0.123
5.	1416.5 (df=23)	0.102	0.146	1719.7 (df=22)	0.086	0.123	1819.5 (df=24)	0.120	0.165
6.	1936.6 (df=38)	0.137	0.196	2272.5 (df=37)	0.111	0.160	2131.1 (df=39)	0.140	0.191
7.	2028.9 (df=40)	0.143	0.205	2398.5 (df=39)	0.117	0.169	2214.8 (df=41)	0.145	0.198
8.	2131.4 (df=49)	0.150	0.214	2618.4 (df=48)	0.127	0.183	2260.6 (df=50)	0.147	0.202

<p>Summary statistics for evaluating the logistic regression models predicting probability of Canadian adults aged 25 to 64 participating in job-related education and training, 1993, 1997, 2002</p> <p>Table 2 (continued)</p>	
Notes:	
1. Variables included in Model 1 include such personal characteristics as: Age, Sex, Acquired Level of Formal Education and Labour Force Status.	
2. Model 2 includes all the variables in the first model plus variables indicating identified barriers to formal learning: institutional and situational barriers.	
3. Model 3 contains all the variables in the second model plus Province.	
4. Model 4 for employee population includes only Age, Sex, and Acquired Level of Formal Education.	
5. Model 5 includes all the variables in Model 4 plus Type of Job (part- or full-time job), Job Tenure, and Type of Occupation.	
6. Model 6 includes Union Membership, Type of Industry and Firm size in addition to all the variables included in Model 5.	
7. Included in Model 7 are Institutional and Situational Barriers in addition to all the variables included in Model 6. Model 8 includes Province in addition to Model 7.	
8. Model chi-square denotes the difference between the initial -2 log-likelihood, a statistic with none (zero) of the independent variables in the equation, and deviation chi-square for the full model, analogous to the error sum of squares in linear regression analysis. Model chi-square provides a test of the null hypothesis for the logistic model and if significant, rejects the null hypothesis and signifies that the information about the independent variables allows better predictions. All the Model chi-squares are statistically significant with $p < .0001$.	
9. Model chi-square denotes the difference between the initial -2 log-likelihood, a statistic with none (zero) of the independent variables in the equation, and deviation chi-square for the full model, analogous to the error sum of squares in linear regression analysis. Model chi-square provides a test of the null hypothesis for the logistic model and if significant, rejects the null hypothesis and signifies that the information about the independent variables allows better predictions. All the Model chi-squares are statistically significant with $p < .001$.	
10. All the Cox & Snell's R^2 s and Nagelkerke's R^2 s in the table are statistically significant with $p < .001$.	

job and workplace characteristics. Personal characteristics included age, sex, level of attained formal education and labour market participation.

Barriers to training included two combined variables: institutional and situational barriers. These two variables were derived from the respondents' answers to the survey questions regarding the reasons why they did not take the training they had needed or wanted to take. The responses were grouped into two variables based on the Cross (1981) classification of participation barriers: the institutional barrier variable denotes any of the experiences reported by respondents who were not able to take the training activities they needed or wanted due to the institutional practices and procedures that hindered their participation, for example, high fees, limited course offerings, lack of evening courses, or being unable to meet entrance requirements; the variable devoting to situational barriers was based on the answers of respondents who reported that their difficulties arose from their life circumstances, for example, lack of time, being too busy because of work, and burden from family responsibilities.

Job status variables included types of occupations, job tenure, job type (full-time, part-time). Variables that differentiate workplaces were union membership (unionized, non-unionized), firm size, and industrial sector (e.g., agriculture, manufacturing, construction, communications, financial services and educational, research, health, cultural and recreational services).

Presented in Table 2 are the summary statistics evaluating logistic regressions on the basis of the three models for the samples of the general adult populations (Models 1 to 3) and five models for the employee population samples (Models 4 to 8). Model 1 includes variables denoting such personal characteristics as: Age, Sex, Acquired Level of Formal Education and Labour Force Status. Model 2 contains all the variables included in the first model plus the variables indicating the identified barriers to formal learning: institutional and situational barriers. Model 3 further controls for the effect of Province in addition to all the variables contained in Model 2.

Model 4 is for the employee population, including only variables denoting Age, Sex, and Acquired Level of Formal Education. Model 5 takes account of Type of Job (part- or full-time job), Job Tenure, and Type of Occupation in addition to the personal characteristic variables included in Model 4. Model 6 further controls for the effects of Union Membership, Type of Industry and Firm size over and above all the variables already taken into account in Model 5. Added in Model 7 are the barrier-related variables: Institutional and Situational Barriers on top of all the variables included in Model 6. Model 8 further examines the possible provincial variations after controlling for all the variables in Model 7.

Comparisons of log-likelihood ratios for logistic regression with and without controls for job status and workplace variables showed significant improvement with the inclusion of job status and workplace predictors. As indicated by model chi-squares, the relationship between the dependent variable and the independent variables is statistically significant. Measures of the strength of association between the dependent variable and the independent variables, (R_N^2), ranging from .176 to .197 for general adult models and from .183 to .214 for employee samples, all statistically significant at the level of .001, indicating a statistically

significant and moderate effect size relationship between the dependent variable and its predictors.

For the convenience of discussion, estimated parameters of important variables as a result of these models are separately presented and discussed in the following sections – Sections 3.2.2 to 3.2.4. The tables in these sections include percentages of participants of formal job-related training activities, odds ratios on probability of participation, both unadjusted and adjusted. Unadjusted odds ratios are obtained from simple logistic regression models estimating the impact of a single predicting variable without controlling for any additional effects. Adjusted odds ratios are the results from the attempts to estimate the unique impact of the predictor under discussion by multiple logistic regressions that control for the effects of a variety of associated predicting variables. The adjusted odds ratios presented in the tables of the current chapter are the estimates obtained from the most comprehensive logistic regression models described above: that is, Model 3 for general adult populations and Model 8 for the employee population samples.

3.2.2 Impact of a described characteristics and achieved status on job-related education or training participation

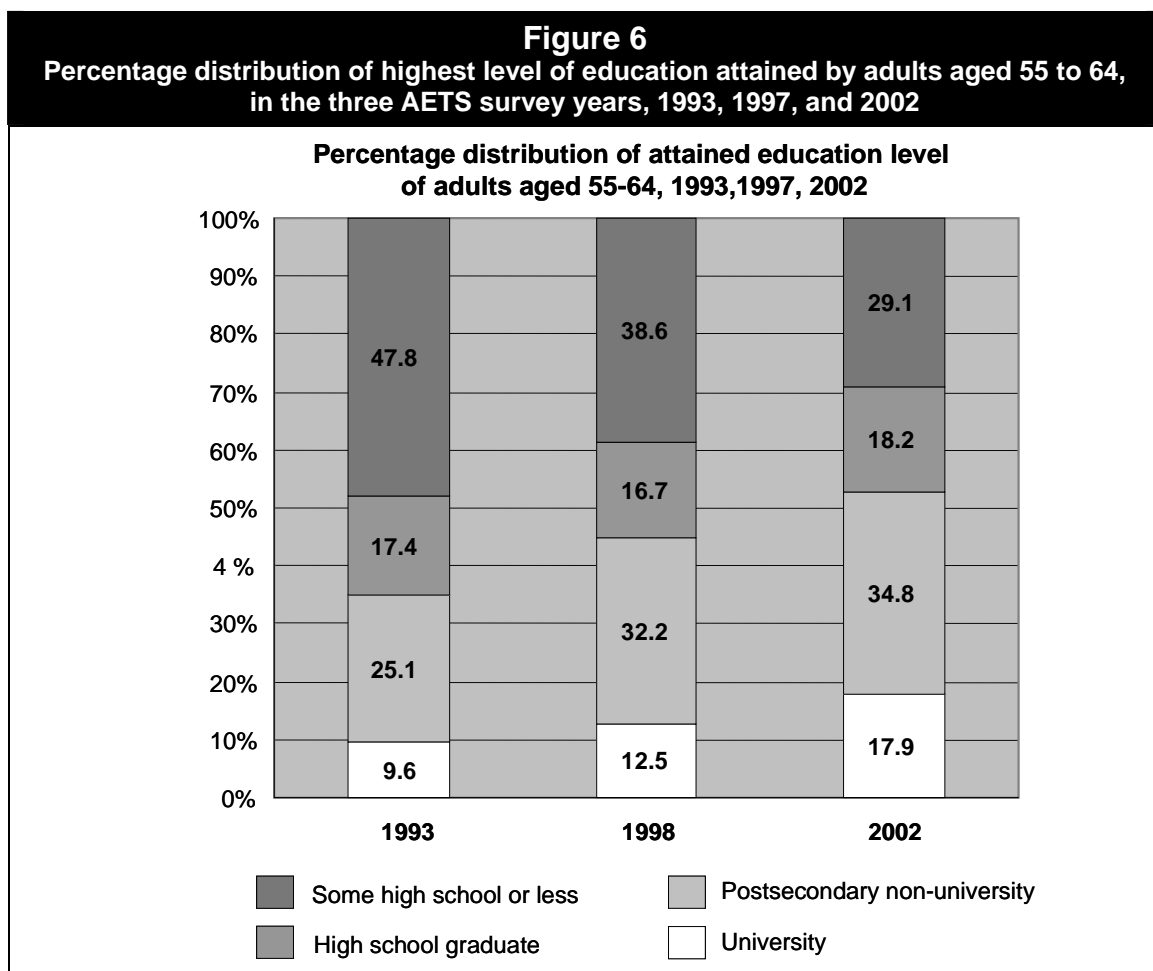
Age differences

As indicated in Table 3, the results show a significant relationship between age and the probability of participating in job-related education and training: the age effects remain significant even when occupational status, work experience and other job and demographic variables are controlled for.

Percentage and likelihood of adult population aged 25 to 64 undertaking job-related training by age group, 1993, 1997, 2002									
1993					1997			2002	
	Took job-related training	Unadjusted	Adjusted	Took job-related training	Unadjusted	Adjusted	Took job-related training	Unadjusted	Adjusted
	%	Exp(B)	Exp(B)	%	Exp(B)	Exp(B)	%	Exp(B)	Exp(B)
General population									
Age group									
Ages 55 to 64	8.8	1.00	1.00	8.4	1.00	1.00	14.4	1.00	1.00
Ages 25 to 34	31.8	4.82 ¹	2.84 ¹	30.6	4.79 ¹	2.85 ¹	39.5	3.87 ¹	2.39 ¹
Ages 35 to 44	30.6	4.57 ¹	2.68 ¹	27.3	4.07 ¹	2.52 ¹	32.0	2.80 ¹	1.84 ¹
Ages 45 to 54	24.5	3.36 ¹	2.30 ¹	23.7	3.37 ¹	2.25 ¹	29.8	2.51 ¹	1.73 ¹
Total	26.1			24.3			31.0		
Employee population									
Age group									
Ages 55 to 64	12.3	1.00	1.00	14.7 ¹	1.00	1.00	24.8	1.00	1.00
Ages 25 to 34	32.8	3.48 ¹	2.93 ¹	32.4	2.78 ¹	2.41 ¹	42.9	2.27 ¹	2.17 ¹
Ages 35 to 44	32.1	3.37 ¹	2.60 ¹	29.3	2.40 ¹	1.99 ¹	36.2	1.72 ¹	1.63 ¹
Ages 45 to 54	27.5	2.90 ¹	2.13 ¹	27.6	2.20 ¹	1.76 ¹	34.9	1.62 ¹	1.43 ¹
Total	28.8			28.3			36.4		
Notes:									
1. Percentages are proportions of respondents out of each category who reported to have participated in formal, job-related education or training.									
2. Unadjusted odds ratios are the results of simple, univariate linear logistic regression equations, i.e., without controlling for any other factors.									
3. Adjusted odds ratios are the results of the equations, designated as Model 3 for the general adult population analysis and as Model 8 for the employee sample analysis, that control for personal characteristics, job status variables and workplace factors as described in Table 2.									
4. A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).									

For both general adult and employee samples, the figures show that the adults aged 25 to 34 have almost always been the most likely to undertake further education or training for job purposes. However, changes in this pattern over this period are evident. Although the gap between youngest group (25 to 34) and the oldest (ages 55 to 64) remains strong, it is getting narrower due to the fact that the participation of the latter has been growing at a much higher rate than other age groups, at about 69% for the employee sample between 1997 and 2002. Expressed in odds ratios, workers aged 25 to 34 were almost 3.5 times more likely to get formal training than the oldest group in 1993, but this ratio was reduced to about 2 times (2.27) a decade later. Even with the effects of all other variables controlled for, the odds ratios dropped from a high of 3 times (2.93) to a low of 2 times (2.17). In contrast, increases in participation among other age groups were relatively moderate over the period: 24% for workers aged 35 to 44 and 26% for workers aged 45 to 54.

Partly due to the change in provision, but also to the fact that the new generations of older people are better educated than previously (See Figure 6, but also van der Kamp, 1990; Houtkoop & Kamp, 1992), many studies (e.g., Darkenwald & Merriam, 1982) report the increasing share of older participants in general further education and training since 1980s. The findings of this study show this is also the case with Canadian workers since 1993.



Gender differences

The results of estimating gender effects on probability of undertaking job-related training are shown in Table 4. Changes in gender differences are also evident over this ten-year period (1993 to 2002). As are shown in both unadjusted and adjusted odds ratios, in 1993, female Canadians were slightly less likely to participate in job-related training than their male counterparts, but the reverse is true in 2002. In fact, as is indicated in our summary table – Table 11, gender is one of the least important predictors of participation in formal training among the variables employed for this study across all the data sets we analyzed.

Table 4 Percentage and likelihood of adult population aged 25 to 64 undertaking job-related training by gender, 1993, 1997, 2002								
1993			1997			2002		
	Took job-related training	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training %	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training %	Unadjusted Exp(B)
General population								
Gender								
Male	27.1	1.00	1.00	24.4	1.00	1.00	30.0	1.00
Female	25.0	0.90 ¹	0.96 ¹	24.2	0.99 ³	1.09 ¹	30.2	1.01 ³
Total	26.1			24.3			31.0	
Employee population								
Gender								
Male	28.3	1.00	1.00	26.6	1.00	1.00	34.7	1.00
Female	29.4	1.05 ³	0.94 ³	30.2	1.20 ¹	1.04 ³	38.3	1.17 ¹
Total	28.8			28.3			36.4	
Notes:								
1. Percentages are proportions of respondents out of each category who reported to have participated in formal, job-related education or training.								
2. Unadjusted odds ratios are the results of simple, univariate linear logistic regression equations, i.e., without controlling for any other factors.								
3. Adjusted odds ratios are the results of the equations, designated as Model 3 for the general adult population analysis and as Model 8 for the employee sample analysis, that control for personal characteristics, job status variables and workplace factors as described in Table 2.								
4. A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).								

Effects of formal educational attainment

Research literature suggests a strong positive correlation between the acquired level of formal education and the likelihood of undertaking job-related further education and training. That is, the more formal education an adult has received, the more likely he or she will seek to benefit from investment in human resource development. It has also been pointed out that the major increase in the provision of employer-sponsored education and training that has taken place since the 1980s, has benefited mostly those at the higher end on the educational scale with the exception of those on the highest end, that is, people with graduate degrees. Some studies conclude that gaps between university degree holders and high school graduates were narrower than those between college-educated non-degree students and high school completers. This indicates that workers who have some college or university education, but did not take or finish degree programs are the most likely group to seek or be bestowed with employer support in their further education or training. Finally, in conformity with status attainment theory, the influence of formal education would be substantially reduced or even disappear, as reported by some studies, with the addition in the equation of controls for occupational status, the usual proxy for socio-economic status or skills level of jobs.

Table 5 presents the relationship between acquired highest level of formal education and probability of getting formal job-related education and training in terms of percentages and odds ratios. Both unadjusted ratios, and adjusted ratios by controlling the effects of gender, age, occupational status and other variables, are presented as well as comparisons between different levels of formal schooling. Those representing the lowest end on the educational scale (i.e., those with less than 9 years of schooling) were set as the reference category with odds as 1.

Table 5
Percentage and likelihood of adult population aged 25 to 64 undertaking job-related training by attained education level, 1993, 1997, 2002

1993			1997			2002		
	Took job-related training	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training %	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training %	Unadjusted Exp(B)
General population								
Education attainment								
Some high school or less	8.7	1.00	1.00	7.8	1.00	1.00	8.0	1.00
High school graduate	20.9	2.77 ¹	2.00 ¹	17.0	2.43 ¹	1.73 ¹	19.5	2.79 ¹
Postsecondary non-university	33.9	5.38 ¹	3.70 ¹	29.0	4.84 ¹	3.33 ¹	34.5	6.05 ¹
University	42.8	7.82 ¹	4.95 ¹	40.0	7.93 ¹	5.15 ¹	47.8	10.54 ¹
Total	26.1			24.3			31.0	
Employee population								
Education attainment								
Some high school or less	10.9	1.00	1.00	10.6	1.00	1.00	11.1	1.00
High school graduate	22.8	2.42 ¹	1.60 ¹	19.8	2.09 ¹	1.53 ¹	23.8	2.49 ¹
Postsecondary non-university	35.6	4.51 ¹	2.72 ¹	31.8	3.95 ¹	2.65 ¹	40.0	5.30 ¹
University	43.7	6.35 ¹	2.86 ¹	42.3	6.23 ¹	3.04 ¹	53.9	9.32 ¹
Total	28.8			28.3			36.4	

Notes:

- Percentages are proportions of respondents out of each category who reported to have participated in formal, job-related education or training.
- Unadjusted odds ratios are the results of simple, univariate linear logistic regression equations, i.e., without controlling for any other factors.
- Adjusted odds ratios are the results of the equations, designated as Model 3 for the general adult population analysis and as Model 8 for the employee sample analysis, that control for personal characteristics, job status variables and workplace factors as described in Table 2.
- A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).

From Table 5, it appears to be true that the higher an adult/employee's acquired level of education, the more likely he or she is to get further education or training for job purposes. The figures in the table also display an evident trend: the participation gaps between the highest end and lowest end on the education scale appear to be increasing rather than narrowing over the period from 1993 to 2002. During this period, there has been literally no increase in terms of proportions participating in job-related training for the adults who did not complete high school: in 1993, about 8.7% of adults in this category reported taking job-related training during the year; this rate dropped to 7.8 in 1997 and only edged back up to 8% by 2002.

For high school graduates and those who had post-secondary non-university education, the proportions that took job-related training dropped from 21% and 34% in 1993 to 17% and 29% in 1997 respectively. By 2002, the rates of participation only restored to the level close to that of 1993, reaching at 20% and 35%.

In contrast, the participation rate for university graduates has remained the highest among the groups of different levels of educational attainment throughout the period: about 43% of adults in this category took formal job training in 1993, and this rate was down to 40% in 1997, the year when there was a decrease in the overall participation, and rose up to a high of 48% by 2002, a nearly 12% increase over the year 1993.

Expressed in odds ratios, both unadjusted and adjusted, the expanding gaps in job-related training uptake among groups of different educational levels are perhaps more illustrative: in 1993, compared with adults having not completed high school, those with university degrees were about 8 times more likely to receive formal job-related training. The comparable odds ratio in 2002 increased to 10.5. Even after controlling the effects of all the personal characteristics variables (See Model 3, in Table 2), adults with university education remained 5 times as likely as those without high school completion to receive job-related training, in 1993. The comparable adjusted odds ratio shows that after a decade, university graduates were about 8 times (7.7) more likely to continue with further training for job purposes than those who had not finished secondary education.

The similar trends are observed with the employee population during the same time period. The figures in Table 5 show that Canadian workers with post-secondary and university education increased substantially their participation in job training whereas the rates of participation for workers with less formal education remained almost unchanged. Specifically, the job-related training rate for workers with university degrees went up to 54% in 2002, a rise of 23% over the year 1993. This was followed by workers with some post-secondary education, whose participation rate reached 40% in 2002, an increase of 12% from 36% in 1993. In contrast, almost the same proportion of the workers with less than high school, around 11%, took job-related training in both 1993 and 2002. Those with high school diplomas only registered 1% increase in the participation rate over the same period.

Using odds ratios as indicators of training gaps among workers with different levels of education, in 1993, high school graduates were about 2.4 times more likely than workers with less than high school to receive job-related training and this gap was almost the same by 2002, at a ratio of 2.5. By comparison, workers with post-secondary education and university degrees were respectively 4.5 times and 6.4 times more likely than

workers with less than high school to receive job-related training in 1993. A decade later, the comparable ratios rose up to 5.3 and 9.3 respectively. Even after controlling all the personal, job and workplace characteristics variables (See Model 5 in Table 2), workers with post-secondary non-university education and university graduates were respectively 3.6 times and 4.6 times more likely than workers with less than high school to participate in job-related further training.

In fact, as is shown in Table 11, among the series of participation determinants investigated in this study, the level of formal education attainment is the strongest predictor of participation in formal job-related training. The related implications are discussed later in this report.

Impact of labour force participation status

Table 6 displays part of analysis that explores the relationship between probability of participation in job-related training and labour market participation and whether this relationship has changed over the period, using general adult population samples.

It is not surprising that training for job or career purposes is closely related to the level of active labour market participation: adults who are working or actively seeking to enter the labour market are much more likely to seek job-related training. In addition, our trend analysis indicates that more and more training opportunities appear to be available at the workplace and thus are increasingly in favour of adults already employed. Thus, in 1993, the employees were the group with the highest participation rate at about 32%, followed by the unemployed adults, whose rate was at 19%. At the bottom were the adults outside of the labour force, with a participation rate of 11%. By 2002, both employed and unemployed groups had increased participation in job training, with their participation rates now standing at 35 and 22% respectively while the corresponding rate for the adults outside the labour force remained unchanged.

These changes are perhaps better reflected by the changes in odds ratios: in 1993, adults who were employed were about twice as likely as the adults outside the labour force to participate in job-related training, after controlling effects of all the other individual and workplace variables. By 2002, the difference in the likelihood of undertaking job-related training, as shown by the corresponding adjusted odds ratio, between an employed adult and an adult outside of the labour force rose up to 3 times.

Table 6 Percentage and likelihood of adult population aged 25 to 64 undertaking job-related training by labour force participation status, 1993, 1997, 2002									
1993					1997			2002	
	Took job-related training	Unadjusted	Adjusted	Took job-related training	Unadjusted	Adjusted	Took job-related training	Unadjusted	Adjusted
	%	Exp(B)	Exp(B)	%	Exp(B)	Exp(B)	%	Exp(B)	Exp(B)
General population									
Labour force status									
Not in the labour force	11.4	1.00	1.00	8.8	1.00	1.00	11.3	1.00	1.00
Employed	31.7	3.62 ¹	1.98 ¹	29.3	4.28 ¹	2.62 ¹	35.6	4.37 ¹	3.13 ¹
Unemployed	19.2	1.86 ¹	1.22 ¹	19.7	2.54 ¹	1.85 ¹	22.1	2.23 ¹	1.85 ¹
Total	26.1			24.3			31.0		
Notes: 1. Percentages are proportions of respondents out of each category who reported to have participated in formal, job-related education or training. 2. Unadjusted odds ratios are the results of simple, univariate linear logistic regression equations, i.e., without controlling for any other factors. 3. Adjusted odds ratios are the results of the equations, designated as Model 3 for the general adult population analysis and as Model 8 for the employee sample analysis, that control for personal characteristics, job status variables and workplace factors as described in Table 2. 4. A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).									

Effects of identified barriers to formal training

Table 7a presents the results of data analysis aimed at examining the relationship between probabilities of participation in formal job training activities and barriers to formal training as identified by the survey respondents.

Table 7a
Percentage and likelihood of adult population aged 25 to 64 undertaking job-related training by type of identified barriers to organized learning, 1993, 1997, 2002

1993				1997				2002			
	Took job-related training	Unadjusted	Adjusted	Took job-related training	Unadjusted	Adjusted	Took job-related training	Unadjusted	Adjusted	Took job-related training	Unadjusted
	%	Exp(B)	Exp(B)	%	Exp(B)	Exp(B)	%	Exp(B)	Exp(B)	%	Exp(B)
General population											
Institutional barrier											
Yes	36.7	1.00	1.00	35.4	1.00	1.00	43.2	1.00	1.00		1.00
No	23.4	0.53 ¹	0.74 ¹	22.0	0.51 ¹	0.82 ¹	27.1	0.49 ¹	0.68 ¹		0.68 ¹
Situational barrier											
Yes	38.2	1.00 ¹	1.00 ¹	37.6	1.00 ¹	1.00 ¹	41.4	1.00 ¹	1.00 ¹		1.00 ¹
No	22.6	0.47 ¹	0.72 ¹	21.6	0.46 ¹	0.72 ¹	28.3	0.56 ¹	0.87 ¹		0.87 ¹
Total	26.1			24.3			31.0				
Employee population											
Institutional barrier											
Yes	38.3	1.00	1.00	38.0	1.00	1.00	46.2	1.00	1.00		1.00
No	26.3	0.57 ¹	0.75 ¹	26.0	0.57 ¹	0.90 ³	33.8	0.59 ¹	0.70 ¹		0.70 ¹
Situational barrier											
Yes	40.4	1.00 ¹	1.00 ¹	40.5	1.00 ¹	1.00 ¹	45.9	1.00 ¹	1.00 ¹		1.00 ¹
Non	25.3	0.50 ¹	0.76 ¹	25.4	0.50 ¹	0.70 ¹	34.8	0.63 ¹	0.89 ²		0.89 ²
Total	28.8			28.3			36.4				

Notes:

1. Percentages are proportions of respondents out of each category who reported to have participated in formal, job-related education or training.
2. Unadjusted odds ratios are the results of simple, univariate linear logistic regression equations, i.e., without controlling for any other factors.
3. Adjusted odds ratios are the results of the equations, designated as Model 3 for the general adult population analysis and as Model 8 for the employee sample analysis, that control for personal characteristics, job status variables and workplace factors as described in Table 2.
4. A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05 (two-tailed tests).

Barriers to training included two combined variables: institutional and situational barriers. These two variables were derived from the respondents' answers to the survey questions regarding the reasons why they did not take the training they had needed or wanted to take. The responses were grouped into two variables based on the Cross (1981) classification of participation barriers: the institutional barrier variable denotes any of the experiences reported by respondents who were not able to take the training activities they needed or wanted due to the institutional practices and procedures that hindered their participation, for example, high fees, limited course offerings, lack of evening courses, or being unable to meet entrance requirements; the variable devoting to situational barriers was based on the answers of respondents who reported that their difficulties arose from their life circumstances, for example, lack of time, being too busy because of work, and burden from family responsibilities.

The results, in general, indicate those adults who reported experiencing both situational and institutional barriers tend to be more likely to participate in job-related training. This result may appear a bit surprising as one would expect training barriers to be deterrents to participation. This is mainly due to the design issues with the AETS prior to the 2003 AETS. As pointed out by Rubenson (2001), a limitation (with previous AETS) is that it concentrates almost exclusively on situational and institutional barriers and that barrier questions were only asked of respondents who identified unmet training needs. Therefore, the Table 7a results in effect illustrated a close relationship between participation and identification of training needs: training participants are more apt to identify unmet training needs and related barriers or conversely, adults knowing their training needs and related barriers are more apt to seek training opportunities.

Based on Rubenson's suggestions (2001), consideration was given in 2003 AETS to how to strengthen assessment of dispositional barriers and barrier questions were asked of all respondents regardless of their participation status. Table 7b presents the results of an analysis using the complete barrier information collected in the newly designed 2003 AETS. (Note: in Table 7a, barriers variables from the 2003 AETS were recoded to make them comparable to those in the 1994 and 1999 AETS). The results indicate an improved barrier questionnaire section in the 2003 AETS that appears to better capture the relationship between perceived participation barriers and the job-related training uptake.

Percentage and likelihood of adult population aged 25 to 64 undertaking job-related training by type of identified barriers to organized learning, 2002						
General population			Employee population			
	Took job-related training	Unadjusted	Adjusted	Took job-related training	Unadjusted	Adjusted
	%	Exp(B)	Exp(B)	%	Exp(B)	Exp(B)
Institutional barrier						
Yes	32.9	1.00	1.00	36.5	1.00	1.00
No	29.2	0.84 ¹	2.06 ¹	36.4	0.99 ³	2.04 ¹
Situational barrier						
Yes	21.0	1.00 ¹	1.00 ¹	27.5	1.00 ¹	1.00 ¹
No	33.9	1.93 ¹	4.66 ¹	39.9	1.75 ¹	4.93 ¹
Dispositional barrier						
Yes	2.3	1.00 ¹	1.00 ¹	2.7	1.00 ¹	1.00 ¹
No	49.0	40.54 ¹	85.77 ¹	59.6	54.09 ¹	111.35 ¹
Total	31.0			36.4		
Notes:						
1. Percentages are proportions of respondents out of each category who reported to have participated in formal, job-related education or training.						
2. Unadjusted odds ratios are the results of simple, univariate linear logistic regression equations, i.e., without controlling for any other factors.						
3. Adjusted odds ratios are the results of the equations, designated as Model 3 for the general adult population analysis and as Model 8 for the employee sample analysis, that control for personal characteristics, job status variables and workplace factors as described in Table 2.						
4. A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).						

The results indicate that among the three categories of barriers identified in Cross' work (1981), adults who experienced difficulties arising from their situation in life (for example, lack of time, because of work, family responsibilities) were much less likely to participate in formal job-related training than those who identified fees, lack of evening courses, entrance requirements, and limited course offerings as participation hindrances. However, the figures further indicate that the negative attitudes and dispositions towards formal training (dispositional barriers) were by far the most deterring factor for the Canadian adults and workers in the job-related training participation.

Provincial differences

This section is intended to explore the relationship between residing in a certain province and the likelihood of participating in formal, job-related training. Both general adult population sample and employee population sample were analyzed. The results – percentages and likelihood of participation expressed in adjusted and unadjusted odds ratios – are presented in Table 8.

Table 8
Percentage and Likelihood of adult population aged 25 to 64 undertaking job-related training by province, 1993, 1997, 2002

1993				1997				2002	
	Took job-related training	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training	Unadjusted Exp(B)	Adjusted Exp(B)
	%			%			%		
General population									
Province									
Newfoundland and Labrador	18.0	1.00	1.00	17.3	1.00	1.00	23.9	1.00	1.00
Prince Edward Island	25.8	1.59 ³	1.46 ³	20.4	1.22 ³	1.12 ³	26.7	1.17 ³	1.04 ³
Nova Scotia	24.5	1.47 ²	1.27 ³	27.2	1.77 ¹	1.55 ¹	31.1	1.43 ²	1.23 ³
New Brunswick	18.4	1.02 ³	0.92 ³	19.7	1.19 ³	1.12 ³	28.3	1.25 ³	1.17 ³
Québec	20.5	1.17 ³	0.97 ³	17.3	0.99 ³	0.83 ³	26.7	1.15 ³	0.95 ³
Ontario	27.2	1.69 ¹	1.30 ³	27.2	1.78 ¹	1.39 ¹	30.3	1.38 ¹	1.00 ³
Manitoba	29.4	1.88 ¹	1.52 ²	25.3	1.61 ¹	1.34 ³	35.3	1.73 ¹	1.41 ²
Saskatchewan	27.6	1.73 ¹	1.36 ³	27.3	1.78 ¹	1.46 ²	33.6	1.61 ¹	1.29 ³
Alberta	32.8	2.21 ¹	1.59 ¹	28.4	1.88 ¹	1.40 ²	31.7	1.47 ¹	1.10 ³
British Columbia	31.4	2.07 ¹	1.50 ²	26.8	1.74 ¹	1.33 ²	33.6	1.61 ¹	1.25 ³
Total	26.1			24.3			31.0		
Employee population									
Province									
Newfoundland and Labrador	20.2	1.00	1.00	22.6	1.00	1.00	29.3	1.00	1.00
Prince Edward Island	28.3	1.54 ³	1.54 ³	23.6	1.04 ³	1.22 ³	33.3	1.19 ³	1.15 ³
Nova Scotia	28.8	1.59 ²	1.41 ³	33.7	1.73 ¹	1.66 ¹	39.6	1.59 ¹	1.51 ²
New Brunswick	21.4	1.06 ³	0.96 ³	24.8	1.13 ³	1.14 ³	36.0	1.36 ³	1.42 ³
Québec	23.1	1.18 ³	0.97 ³	20.1	0.86 ³	0.78 ³	32.9	1.19 ³	1.12 ³
Ontario	29.6	1.66 ¹	1.37 ³	30.9	1.53 ¹	1.38 ²	36.3	1.38 ²	1.28 ³
Manitoba	32.0	1.85 ¹	1.60 ²	28.9	1.39 ²	1.38 ²	40.3	1.64 ¹	1.56 ²
Saskatchewan	29.8	1.68 ¹	1.55 ²	31.4	1.56 ¹	1.62 ¹	41.3	1.71 ¹	1.55 ²
Alberta	35.1	2.14 ¹	1.76 ¹	31.9	1.60 ¹	1.51 ¹	37.0	1.43 ²	1.34 ³
British Columbia	34.5	2.07 ¹	1.72 ¹	31.9	1.60 ¹	1.52 ¹	41.6	1.73 ¹	1.64 ¹
Total	28.8			28.3			36.4		

Notes:

1. Percentages are proportions of respondents out of each category who reported to have participated in formal, job-related education or training.
2. Unadjusted odds ratios are the results of simple, univariate linear logistic regression equations, i.e., without controlling for any other factors.
3. Adjusted odds ratios are the results of the equations, designated as Model 3 for the general adult population analysis and as Model 8 for the employee sample analysis, that control for personal characteristics, job status variables and workplace factors as described in Table 2.
4. A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).

Looking at general adult population's participation in job-related training in 1993, Alberta, British Columbia and Manitoba appeared to have the highest job-training uptake, with participation rates at 33, 31 and 29% respectively. Newfoundland and Labrador was the lowest with only 18% of adults participating in that year. Thus, using the unadjusted odds ratios, the odds of residents in these leading provinces receiving formal job training were around 2 times the odds of the residents in Newfoundland and Labrador. Even after controlling for all other variables in the model, the chances of an adult either in Alberta, or British Columbia or Manitoba being trained for a job was 1.5 times that of an adult in Newfoundland and Labrador.

In 1997, when the whole country experienced a downward in the formal adult training, Alberta continued to lead among all the provinces with a participation rate of 28%, followed by Saskatchewan, Ontario and Nova Scotia with a rate around 27%. With a 17% participation rate, both Newfoundland and Labrador and Quebec were the lowest. As indicated by adjusted odds ratios, these provincial differences were statistically significant even after controlling for the effects of all other factors in the model, with likelihood differences ranging from 1.4 to 1.6 times.

From 1997 to 2002, due to the disparate increase in the participation rates, some changes occurred in the provincial profile of distribution: with a 40% increase over 1997, Manitoba rose to become the province with the highest participation rate at 35%. British Columbia and Saskatchewan became the parallel runner-ups with around 34% of adults participating; both provinces enjoyed a 25% increase over 1997. It should be noted, however, that the largest growth was actually experienced in Quebec, where the participation rate increased by 54%, from 17% in 1997 to 27% in 2002. New Brunswick experienced the second largest growth over the same period, its participation rate rising from 20% to 28%, an increase of 44%. Newfoundland and Labrador and Prince Edward Island also experienced an over 30% increase in participation whereas the growth rates in Nova Scotia, Alberta and Ontario were less than 15% over the same period.

Turning to the working adult population, changes in the provincial profile of participation distribution are somewhat different than those summarized based on the analysis of general adult population sample. In 1993, Alberta, British Columbia and Manitoba were the leading provinces in terms of working adults receiving formal job training, with a participation rate over 30%. In contrast, the job-training rates for working adults in Newfoundland and Labrador and New Brunswick were the lowest among all the provinces, at around 20%.

In 1997, half of provinces, Alberta, British Columbia, Manitoba, Quebec, and Prince Edward Island, experienced a decrease in formal job training as compared with 1993 while the other half of provinces, such as Nova Scotia, New Brunswick, and Saskatchewan, registered a moderate increase. As a result, Nova Scotia became the leading province in offering formal job training with 34% of working adults participating. Following closely behind were Alberta, British Columbia, Saskatchewan, and Ontario, all with a participation rate above 30%. With as few as 20% of adult workers participating, Quebec replaced Newfoundland and Labrador to become the lowest among the provinces in formal job training.

From 1997 to 2002, all the provinces had substantially increased formal job training for working adults, with Quebec experiencing the largest growth: an increase of 64%, from 20% in 1997 to 33% in 2002. Three provinces, New Brunswick, Prince Edward Island and Manitoba enjoyed an increase of around 40%; the other three, Saskatchewan, Newfoundland and Labrador, and British Columbia had a 30% increase. The rest, Nova Scotia, Ontario, and Alberta, had increased by less than 20%. Thus, British Columbia and Saskatchewan were the leading provinces in providing job-related training with more than 41% of adult workers participating. Manitoba and Nova Scotia were the second best with a participation rate standing at around 40%, with Alberta, Ontario, and New Brunswick trailing closely behind with a participation rate of over 35%. Newfoundland and Labrador again appeared to be the lowest, but with participation rate at 29% as a result of 30% increase over 1997 figure as mentioned above.

It is also worth noting that the results of analyzing odds ratios – unadjusted and adjusted – for both general adult and working adult samples indicate that provincial differences in job-training participation were getting narrower, though only slightly, over the period from 1993 to 2002. For example, with respect to the general adult population sample, the odds of an Albertan receiving job-related training were more than 2 times the odds of a Newfoundlander in 1997. By 2002, the comparable ratio between Manitoba, then the highest province in participation, and Newfoundland and Labrador was reduced to 1.7 times. The same is also true with the employee sample analysis.

3.2.3 Impact of job characteristics – type of job, job tenure, and type of occupation

The literature indicates that job characteristics – variables regarding occupation classes, skills levels, literacy demands at work, degree of autonomy, degree of labor intensity, supervisory role, type of job – can play an important role in determining the uptake of job-related training (e.g. Tuijnman, 1989; Wong and Siegerist, 1989; Altonji and Spletzer, 1991; Houtkoop and Kamp, 1992; Hodson and Hooks, 1994; Rubenson, 1996; HRDC/OECD, 1997; and recent analyses of AETS and IALS data.). Given the data available across the AETS, this section will explore the relationship between the likelihood of participation in formal job training and a number of job characteristics such as type of job (full- or part-time job), length of work experience at current job and type of occupation, which is organized into 10 broad occupation groups based on Statistics Canada's standard occupation classification system.

Full- or part-time job

In general, part-time workers have fewer benefits than full-time employees, and the opportunity to formal, job-related training is no exception. As presented in Table 9, in 1993, the participation rate of formal job training for full-time employees was about 30% compared with 24% for part-time workers. In 1997, the gap between the two groups was narrower as the part-time employees enjoyed an increase of 11% over the period, rising from 24% in 1993 to 26% in 1997, while the participation rate for full-time employees remained almost unchanged. By 2002, about 38% of full-time employees received job-related training compared with 34% of part-time workers who did so in the same year; both groups experienced a 30% increase over 1997.

As part-time positions are more of a reality for women and workers of low socio-economic status, controlling for factors, such as age, gender and level of formal education and occupation, may be able to account for the differences in participation of formal job training. However, as is shown by the adjusted odds ratios in Table 9, the differences in the likelihood of participation between full- and part-time workers remained statistically significant even after those factors were taken into account except for the year 1997.

Table 9
Percentage and likelihood of adult employee population (ages 25 to 64) undertaking job-related training by job characteristics,
1993, 1997, 2002

Type of Job	1993			1997			2002		
	Took job-related training	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training %	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training %	Unadjusted Exp(B)	Adjusted Exp(B)
Type of Job									
Part-time	23.6	1.00	1.00	26.1	1.00	1.00	33.9	1.00	1.00
Full-time	29.7	1.34 ¹	1.14 ²	29.8	1.20 ¹	1.06 ³	38.3	1.21 ¹	1.21 ¹
Job tenure									
1 to 12 months	29.2	1.00	1.00	29.0	1.00	1.00	35.5	1.00	1.00 ³
1 to 5 years	30.1	1.04 ¹	0.84 ³	29.1	1.01 ³	0.98 ³	38.8	1.15 ²	1.04 ³
6 to 10 years	34.2	1.26 ¹	0.99 ³	30.3	1.07 ³	1.00 ³	37.0	1.27 ³	1.03 ²
11 to 20 years	32.9	1.19 ¹	0.98 ³	29.1	1.01 ³	1.07 ³	38.5	1.14 ²	1.09 ³
20 years and more	30.0	1.04 ³	1.17 ³	28.5	0.98 ³	1.20 ²	37.5	1.09 ³	1.18 ³
Type of occupation									
Manufacturing, construction, transportation & materials	20.8	1.00	1.00	19.2//	1.00	1.00	27.7	1.00	1.00
Managerial or administrative related	40.6	2.60 ¹	1.54 ¹	38.9	2.68 ¹	1.62 ¹	46.6	2.28 ¹	1.12 ³
Clerical & office operation	26.8	1.40 ¹	0.98 ³	26.2	1.49 ¹	1.04 ³	36.4	1.50 ¹	0.71 ³
Natural sciences, engineers and math	48.6	3.60 ¹	1.67 ¹	45.9	3.58 ¹	1.99 ¹	47.5	2.37 ¹	0.93 ³
Medicine & health	43.6	2.94 ¹	1.81 ¹	41.3	2.96 ¹	1.65 ¹	58.6	3.70 ¹	1.60 ²
Social sciences, religion, & teaching	43.7	2.95 ¹	1.62 ²	44.6	3.39 ¹	1.78 ¹	60.7	4.05 ¹	0.36 ³
Artistic, literacy, recreational related	24.2	1.20 ³	0.86 ³	22.1	1.19 ³	0.99 ³	37.5	1.57 ¹	0.79 ³
Sales & services	21.7	1.05 ³	1.03 ³	21.1	1.12 ²	1.11 ³	27.8	1.01 ³	0.68 ³
Primary	16.4	0.74 ¹	1.09 ³	15.4	0.77 ²	0.91 ³	28.7	1.05 ³	0.82 ³
Total	28.8			28.3			36.4		

Notes:

- Percentages are proportions of respondents out of each category who reported to have participated in formal, job-related education or training.
- Unadjusted odds ratios are the results of simple, univariate linear logistic regression equations, i.e., without controlling for any other factors.
- Adjusted odds ratios are the results of the equations, designated as Model 3 for the general adult population analysis and as Model 8 for the employee sample analysis, that control for personal characteristics, job status variables and workplace factors as described in Table 2.
- A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).

Length of work tenure

Length of work experience is included in the model to predict the participation in formal job training. The participation literature proposes that individuals with more work experience, especially within the same organization, will have more job-related training. From an employee's perspective, workers employed by a firm often discover that their ability to demonstrate their productivity to employers can have a positive impact on promotions and wage increases. Such demonstrations are possible either by actually acquiring work skills or by being certified as having acquired such skills. Such prospect of receiving organizational rewards often motivates employees to seek training opportunities (Kalleberg, 1992). On the other hand, employers tend to invest in younger but experienced workers (Vaughan and Berryman, 1989). They tend to invest less in employees during their first five years in the labour market because employers are more apt to lose their investment in employee turnover. In addition, employers also want to determine which employees are best suited for further human capital investment after having monitored their performances for several years.

However, this theoretical proposition may be more applicable in the case of early 1990s when the most job-related training was sponsored by employers and less so in more recent years. As shown in Table 9, the results indicate that, in 1993, workers with over 5 years to 20 years of work tenure were slightly more likely, usually by 3 to 5 percentages, than other categories to receive job-related training. Such was not the case in the late 1990s and early 2000s: the figures of 1997 and 2002 indicate that there were virtually no differences in terms of the odds of receiving job training among the workers with differing lengths of work experience with the same organization. It is also noteworthy that, as shown by the adjusted odds ratios, after controlling for age, gender, educational level and other factors, length of work experience within the same employer appears not to be a major criterion for training consideration.

Type of occupation

Occupation can be a proxy indicator of skills required at work, which have important impact above and beyond the effect of formal education attainment on job training decisions. As presented in Table 9, in 1993, the participation rate of formal job training went above 40% for the workers classified into the following four broad occupation categories: 1) natural sciences, engineering and math; 2) social sciences, religion and teaching; 3) medicine and health; and 4) managerial or administrative related. Of these four, the occupations related to natural sciences and engineering took the leading position with close to 50% of the workers taking some organized job training in that year as compared to 16% for the occupations related to primary industries. Using odds ratios to illustrate the occupational differences in the likelihood of participation, the odds of a natural scientist or an engineer or a mathematician to receive job-related training were almost 5 times ($3.60/0.74=4.86$) the odds of a worker in the primary industries. The odds of a doctor, a social scientist or a teacher to get trained for their jobs were also close to 4 times the odds of a worker in occupations based on natural resources. The adjusted odds ratios presented in Table 9 were obtained after controlling for all other factors in the multivariate equations, including age, gender, attained education, and a number of workplace characteristics such as

firm size and industry. The results indicate that occupations had a strong impact on participation of organized job training, above and beyond all those controlling variables, reflecting perhaps the unique impact of skills required in particularly the four leading occupations as mentioned above. According to the adjusted odds ratios, health professionals were the group most likely to seek job-related training, with their odds standing at 1.8 times the odds of workers with occupations related to manufacturing, construction and transportation. The corresponding odds ratios for the other three occupations were a little more than 1.5 times.

The results presented in this table also indicate that this trend held true in 1997, with the same four leading occupations dominating the job training market. The only exception was that, as revealed by the odds ratios, natural scientists and engineers were the most likely group of workers to receive formal job training, with or without controlling for all the other factors in the adjusted model.

The year 2002 saw different paces of growth among the occupation groups with respect to job-related training. As compared with the 1997 figures, occupations related to natural resources and occupations related to artistic, literacy and recreational fields experienced the largest increase at 86 and 70% respectively, with the former groups rising from 15% in 1997 to 29% in 2002, and the latter from 22% to 38%. Other low-participating occupations such as manufacturing and construction, sales and services, and clerical and office, also recorded substantial increases ranging from 32% to 44%. Among the usual four leading groups, only two occupation groups – medicine and health and social science related – kept up expanding on job training activities at a rate around 40%, thus changed the topography of occupation distribution in terms of job training participation: by 2002, the usual four leading occupational groups continued to lead the job training market, but the ranking among the four changed as social sciences and health professions became the frontrunners with a participation rate around 60%. Natural sciences and managerial fields trailed closely behind with their participation rates a little under 50%.

It is noteworthy that the differences among the historically low- and high-participating occupation groups, as a result of disparate growth paces, were in most cases, reduced considerably by 2002. For example, as expressed in unadjusted odds ratios, the odds of the highest performing group, social sciences, to receive job-related training were 4 times the odds of the lowest performing group, manufacturing, construction, transportation and materials. The corresponding ratio in 1993, as we remember, was about 5 times. It is also interesting to note that, as indicated by adjusted odds ratios of 2002, the unique impact of occupation as mentioned previously appeared to disappear after controlling for all the other factors in the model, particularly the attained education level. This finding suggests that at the workplace, employees with higher levels of education are more often than before sorted into positions for which training is considered more important or worth the investment. The only exception seems to be the medical and health related jobs, indicating the unique demands of skills training required of a broader spectrum of workers within the field.

3.2.4 *Impact of workplace characteristics – union, firm size and industrial sector*

Three factors that denote organizational structure of the work environment – union, the size of the organization and main areas of production – were included in the analysis of the relationship between formal job training participation and workplace characteristics. Their unique effects were also tested by controlling for individual level variables including personal and job characteristics.

Union membership

At the workplace, unions are the main organizations representing employees in the relations with management and providing workers with a source of support in the employment relationship. They also bargain with management to establish job-training programs that enhance members' skills and market capacity. Thus, as the data presented in Table 10 indicate, during the period from 1993 to 2002, union members across the board have been more likely to get organized job-related training than non-unionized workers. However, this relationship or union effect appeared to be slightly on the decrease over the period. In 1993, 35% of union members reported having some formal job training as compared with 26% of employees non-unionized, a difference of about 10%. In 1997, the participation rate for non-union members slightly rose by almost 1% while the union members fell by 7%. By 2002, both union members and non-members experienced a substantial growth of more than 30% in job-training participation on the basis of 1997 figures. Consequently the gap in participation between the two groups was reduced by almost 2%, from 10% in 1993 to 8% in 2002.

Table 10 Percentage and likelihood of adult employee population (ages 25 to 64) undertaking job-related training by workplace characteristics, 1993, 1997 and 2002									
	1993			1997			2002		
	Took job-related training %	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training %	Unadjusted Exp(B)	Adjusted Exp(B)	Took job-related training %	Unadjusted Exp(B)	Adjusted Exp(B)
Union membership									
Non member	25.8	1.00	1.00	26.5	1.00	1.00	35.4	1.00	1.00
Union member	35.4	1.58 ¹	1.16 ²	32.8	1.35 ¹	1.40 ¹	43.3	1.40 ¹	0.93 ³
Firm size									
Less than 20	19.4	1.00	1.00	20.4	1.00	1.00	25.8	1.00	1.00
20 to 99	26.6	1.51 ¹	1.34 ¹	26.2	1.39 ¹	1.29 ¹	32.1	1.36 ¹	1.32 ¹
100 to 500	35.1	2.25 ¹	1.77 ¹	36.1	2.21 ¹	1.93 ¹	37.8	1.75 ¹	1.54 ¹
More than 500	43.5	3.21 ¹	2.39 ¹	37.0	2.30 ¹	1.73 ¹	44.0	2.26 ¹	1.78 ¹
Type of industry									
Agriculture	13.6	1.00	1.00	12.9	1.00	1.00	22.9	1.00	1.00
Other primary	29.8	2.70 ¹	1.62 ²	28.1	2.66 ¹	1.63 ¹	38.3	2.10 ¹	1.58 ³
Manufacturing	25.0	2.11 ¹	1.44 ³	22.8	2.01 ¹	1.17 ³	24.4	1.10 ³	1.10 ³
Construction	16.1	1.22 ³	1.16 ³	16.9	1.38 ²	1.11 ³	26.0	1.19 ³	1.15 ³
Utilities	51.1	6.67 ¹	3.20 ¹	40.0	4.50 ¹	2.27 ¹	52.5	3.76 ¹	2.28 ¹
Transportation	24.8	2.09 ¹	1.43 ³	30.8	3.02 ¹	1.73 ¹	31.9	1.59 ²	1.29 ³
Trade	22.4	1.83 ¹	1.12 ³	19.3	1.62 ¹	0.88 ³	28.1	1.33 ³	1.08 ³
Finance, insurance and real estate	41.5	4.50 ¹	2.26 ¹	39.1	4.36 ¹	1.76 ¹	48.0	3.14 ¹	2.04 ¹
Education, health and welfare	37.1	3.75 ¹	1.66 ²	40.0	4.54 ¹	1.64 ²	51.9	3.65 ¹	1.58 ³
Business and services	22.7	1.87 ¹	1.28 ³	23.4	2.08 ¹	1.02 ³	31.5	1.56 ²	1.07 ³
Public administration	47.2	5.69 ¹	2.63 ¹	45.1	5.59 ¹	2.57 ¹	55.4	4.20 ¹	2.44 ¹
Total	28.8			28.3			36.4		

Notes:

1. Percentages are proportions of respondents out of each category who reported to have participated in formal, job-related education or training.
2. Unadjusted odds ratios are the results of simple, univariate linear logistic regression equations, i.e., without controlling for any other factors.
3. Adjusted odds ratios are the results of the equations, designated as Model 3 for the general adult population analysis and as Model 8 for the employee sample analysis, that control for personal characteristics, job status variables and workplace factors as described in Table 2.
4. A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).

In odds ratios, union members were nearly 1.6 times more likely than non-union workers to get job training in 1993. By 2002, the same odds ratio decreased slightly to 1.4. Upon controlling for other factors in the estimation model, the effects of union membership on participation were adjusted down slightly and remained statistically significant in 1993 and 1997. However, in 2002, the same effects were reduced to statistically non-significant, a sign that unions' successes in achieving a role in formal skills development decisions could be getting more limited over the time.

Firm size

Explanations as to why firm size matters are varied. Literature indicates factors implicated in the relationship between firm size and training participation rates include high degree of formalization of training, "slack" resources devoted to training, economic scale of training, organizational complexity leading to the needs of more complex administrative skills or technology sophistication, more direct involvement in R & D and marketing, and horizontal decision-making processes. Although AETS surveys may not have captured information exactly reflecting those factors, this section attempts to include other available variables, such as employees' occupation and educational level, industrial sector, as proxies, for example, for degree of technology, type of organizational culture in the multivariate analyses. The purpose is to ascertain the effects of firm size on probability of training participation while controlling for the effects of these proxy variables.

Table 10 displays the rates of participation and odds ratios by four categories of firm size in the years 1993, 1997 and 2002. In general the results tell us both "good" news and "bad" news regarding the relationship between firm size and job-training participation. The data from all these three years clearly indicate a strong positive relationship between the size of workplace and chances of getting trained for job skills. This is reflected in the higher rates of participation in large organizations than in small and medium-size firms. And the "bad" news is that this pattern holds throughout the period under study, as shown by the adjusted odds ratios, even after controlling for a large number of variables denoting individual level and workplace factors in the model. This also shows that the variables employed to account for the firm size differences have only limited success in explaining why firm size matters in formal skills development participation.

However, the "good" news is that the gaps in training due to the firm size have been on the decrease over the period. For instance, as expressed in odds ratios, in 1993, an employee working in a firm with more than 500 employees was 3.2 times more likely than an employee with a firm of fewer than 20 employees and 2.3 times more likely than a worker with a firm under 100 employees, to receive formal job training. By 2002, the corresponding odds ratios were reduced to 2.3 and 1.7 respectively. This is probably mainly due to the fact that increasingly more workers in the small and medium size enterprises are seeking organized training for skills development in recent years. In fact, as the data indicate, over the period of 1997 to 2002, it was the small and medium size firms, which experienced considerably large growth in job-training participation, at a rate of over 20%. In contrast, in 2002, firms with 100 to 500 employees appeared to experience the least growth during the same period, with a 5% increase over year 1997.

Industrial sector

In the participation literature, sector of economy is consistently regarded as one of the major determinants of formal job-related education and training. In a nutshell, the ownership of an enterprise, changing rates of employment, level of technology adopted, level of labour force qualification and competence, management structure, market orientation of the service, among other things, are often mentioned as contributing circumstances influencing the extent to which investment is made in developing skills (Nash and Hawthorne, 1987; Psacharopoulos and Velez, 1992; OECD, 1997).

In this study, the concept of economic sector is dealt with by including industrial sectors in the analysis. Industrial sectors, considered as a meso-level concept of the economic sector, are examined to see how the extent of formal job training participation is related to characteristics of a particular sector such as the nature of production or service, level of technology adopted and skill demands and impact of restructuring of the economy.

Several general conclusions can be drawn from the results displayed in Table 10. First, as shown by the results from the multivariate analysis, industrial sector was a significant predictor for the probability of participating in formal job-related training, even after statistical adjustment for all other variables in the models.

Second, throughout the period from 1993 to 2002, four industrial sectors – public administration, utilities, finance-insurance-real estate, and education-health-welfare – have been leading sectors in the job-training market, although the ranking order among the four have been somewhat varied over time.

Third, the expansion of formal job-related training since the late 1990s has affected nearly all the sectors at varying degrees with discrepancies between sectors subsequently on the decline. Specifically, in 1993, with more than 50% of its workers having participated in job-related training in that year, utilities took the lead position, followed by public administration and finance-insurance-real estate, with their participation rates at 47 and 42% respectively. With a 37% participation rate, education-health-welfare sector took the fourth prize. At the lowest level were agriculture and construction, both with a participation rate well under 20%; the corresponding participation rates for the remaining sectors ranged from 22% to 30%.

In 2002, all sectors experienced growth at varying degrees as compared with the level of 1997, with the largest growth witnessed in the agricultural sector, which experienced a 78% increase rate. Construction and trade also increased substantially participation in job training at rates of 54% and 46% respectively. In the meantime, the usual leading sectors did not stop but grew at a substantial pace as well, ranging from 23 to 31%. As a result, the four top sectors continued to lead but this time with public administration as the forerunner with a participation rate of 55%. It was followed by utilities and education-health-welfare, both with a participation rate beyond 50%. Finance-insurance-real estate became the fourth sector with a 48% job-training rate. Despite the huge expansion in terms of job-related training activities experienced in the late 1990s, training gaps among industrial sectors were still far from dissipating. Agriculture, construction, manufacturing and trade were still low-participating sectors with their job training rates under 30%.

To use odds ratios to illustrate changes experienced in the sectoral gaps in training, in 1993, the odds of a worker in the utilities sector to receive job related training were nearly 6.7 times the odds of a worker in the agriculture, 5.5 times the odds of a construction worker and 3.6 times the odds of a worker in trade. Even after controlling for the effects of all other variables in the model, the corresponding odds ratios were 3.2, 2.8, and 2.9, all statistically significant at the level of 0.1. However, by 2002, a worker in utilities was 3.8 times (adjusted ratio = 2.3) more likely than an agricultural worker to get trained for job purposes (as compared with 6.7 a decade earlier). The corresponding odds ratios between utilities, construction and trade were 3.2 and 2.8 respectively (as compared with 5.5 and 3.6 in 1993). The adjusted ratios for these two relationships were respectively 2.0 and 2.1).

3.3 Summaries: relative importance of determinants in formal job-related training

Table 11 summarizes the relative importance of explanatory variables included in this study to examine their impact on the likelihood for a Canadian adult or Canadian worker to participate in formal training activities for job or career purposes.

The summary table is based on the results of multivariate logistic regressions employed to predict the probability of undertaking job-related training activities by Canadian adults aged 25 to 64. (These logistic regressions are designated as Model 3 for the general adult population and Model 8 for the employee population – see Table 2; as pointed out above, these models are also the adjusted regressions that produce the adjusted odds ratios reported from Table 3 to Table 10). In Table 11, the explanatory variables are listed in order of their effect size measured by the odds ratios. According to Garson (1998 and 2006)¹, the ratio of odds ratios is the ratio of relative importance of the independent variables in terms of effect on the dependent variable's odds.

The purpose of this section was to examine the factors underlying the observed trends and patterns in participation in job-related training during the period from 1993 to 2002, using the Adult Education and Training Surveys (AETS) conducted in 1993, 1997 and 2002. The objectives were to employ appropriate multivariate analyses to identify and measure the key factors influencing the decisions on undertaking formal job-related training; these analyses focused around the following two major questions: 1) what is the relative importance of determinants of formal job-related training undertaken by Canadian adults and workers? And 2) what differences are evident over the period from 1993 to 2003?

¹ <http://www2.chass.ncsu.edu/garson/PA765/logistic.htm>.

Table 11 Summary of determinants of participation in formal job-related training by Canadian adults, in order of effect size, 1993, 1997, 2002						
	General population			Employee population		
Order of effect size	1993	1997	2002	1993	1997	2002
1.	Level of education	Level of education	Level of education	Industry sector	Level of education	Level of education
2.	Age	Age	Labour force status	Age	Industry sector	Industry sector
3.	Labour force status	Labour force status	Age	Level of education	Age	Age
4.	Province	Province	Province	Firm size	Type of occupation	Firm size
5.	Barriers	Barriers	Barriers	Type of occupation	Firm size	Province
6.	Sex	Sex	Sex	Province	Province	Type of occupation
7.				Barriers	Barriers	Barriers
8.				Job tenure	Union	Type of job
9.				Union	Job tenure	Job tenure
10.				Type of job	Type of job	Union
11.				Sex	Sex	Sex

The results from the analysis of AETS data show that:

- Over the period from 1993 to 2002, more than 80% of the formal training activities were undertaken by Canadian adults for job and career related purposes. More than 80% of these activities were in the format of short courses.
- Among the series of participation determinants investigated in this study, the level of formal education attainment is the strongest predictor for participation in formal job-related training. And the training gaps among groups of different educational levels are expanding rather than narrowing.
- The training gaps among age groups are still wide but getting narrower due to the increased participation by older age groups in recent years. This change is partly due to the increased provision, but also because the new generations of older people are better educated than previously.
- Female Canadians are now slightly more likely to participate in job-related training than their male counterparts, but sex is no longer an important predictor for participation in formal training.
- Training for job or career purposes is closely related to the level of active labour market participation: working adults are more likely than the unemployed and adults outside the labour force to receive job-related training and the gaps are growing.
- Western provinces continue to be the forerunners in formal training market. However, provincial differences are getting narrower, though only slightly, due to recent expansion in formal training activities experienced across the provinces, especially those provinces historically with low participation rates.
- Four historically leading occupational groups – social sciences, health professions, natural sciences and managerial fields – continue to lead the job training market, but the differences among the historically low- and high-participating occupation groups have been, in most cases, reduced considerably in recent years.
- Union members are still more likely than non-union workers to get job training but there is a sign that unions' successes in achieving a role in formal skills development decisions are getting more limited over the time.
- Chances of getting trained for job skills are still positively correlated with the size of organization. However, the “good” news is that the gaps in training due to the firm size have been on the decrease in recent years.
- Industrial sector continues to be a strong predictor for participating in formal job-related training. Four industrial sectors – public administration, utilities, finance-insurance-real estate, and education-health-welfare – have been leading sectors in the job-training market, but the expansion of formal job-related training since the late 1990s has affected nearly all the sectors at varying degrees with discrepancies between sectors subsequently on the decline.

4. Determinants of Participation in Self-Directed Learning: Insights from the 2003 Adult Education and Training Survey

In the 2003 Adult Education and Training Survey (AETS), respondents were asked to recall if they had taken up during the four weeks preceding the survey any self-directed activities either for the purpose of developing job skills or gaining job-related knowledge. These activities included: seeking advice from someone knowledgeable, using the Internet or other software, observing someone performing a task, consulting books or manuals, or teaching themselves different ways of doing certain tasks (Peters, 2004). The resultant data indicate that, while the number of Canadian adults participating in formal job related-training has been steadily on the rise over the years, a greater number of them in the meantime seek to improve their skills through self-directed learning activities: in 2002, 55% of Canadian adults (aged 25 to 64) were engaged in some form of self-directed training as defined above, as compared with 30% of the same population taking some formal training in that year (Peters, 2004).

The fact that so many Canadians are engaged in self-directed training to improve their knowledge and skills raises some important questions that could have a far-reaching implication on learning policies. That is, do Canadian adults undertake informal training to substitute or complement formal training? Do they actively “choose” or decide to develop skills informally out of their intrinsic learning initiative or due to job necessity? Can this type of learning adequately address the eminent needs of skills development faced by Canadian workers?

While the 2003 AETS did not collect direct information regarding these questions, insights can be gained into these key issues by looking at the profiles of self-directed learners in terms of their ascribed and acquired personal characteristics, their family and workplace circumstances, as well as their access to skills development opportunities, all of which have been identified, as shown in Chapter 2, in adult education research literature as key determinants of learning participation. These profiles can in turn shed some important light on the reasons why so many Canadians “choose” to learn their job skills through self-directed activities. Thus, in exploring the determinants (both facilitating and inhibiting factors) of self-directed training, we will also consider the following four analytical categories of factors as summarized in the literature review on learning participation:

1. **individual level** – variables denoting individuals’ ascriptive characteristics such as age, gender and race, and achieved status such as educational attainment;
2. **job characteristics** – variables regarding occupation classes, skill levels, literacy demands at work, degree of autonomy, degree of labour intensity, supervisory role, type of job (full- or part-time; permanent or contractual);

3. **workplace environment** – indicators such as rates of technical change, firm size, main areas of production, use of technology, degree of market competition and the extent to which workers are organized, composition of the workforce, and internal labour markets; and
4. **macro-level factors** – those factors that reflect political, social and economic objectives of a nation; social structure; government interventions and contemporary political and economic situation.

4.1 Differentiating self-directed learners: adults who combine both formal and informal training vs. adults who take only self-directed training

As implicated in the above arguments, adults who develop their skills through self-directed training are likely widely varied in their motivations, learning needs, and, not the least importantly, their capability of managing their learning situations. The importance of making such distinctions is also borne out by the data from the 2003 AETS: of all the self-directed learners, half of them (51%) also reported having participated in some form of organized adult training at some point during 2002 with the other half (49%) implying that self-directed training was the only format of skills development they undertook in that year. This suggests that some adults – most likely those combining both formal and informal training – may engage in self-directed activities to complement their learning through other forms of training or vice versa; whereas others – most likely the non-participants of formal training – may engage in self-directed training as an alternative to formal skills development.

Table 12 presents the results of a descriptive analysis of the adult population separated into four groups based on their reported learning engagement in 2003 AETS – adults who took both formal and self-directed training, adults who took only formal training, adults who took only self-directed training, and adults who took neither of them. The table reports percentage distributions that profile the groups in terms of age, sex, education attainment and labour market participation.

Table 13 presents the results of a similar descriptive analysis with the adult employee population that profiles the groups in terms of their job and workplace characteristics.

Table 12 Percentage distribution of adult population aged 25 to 64, separated into 4 groups according to their engagement in training activities, by age, gender, education and labour force status, 2002						
	Weighted number of adults	Took both formal & self-directed training	Took formal training only	Took self-directed training only	Took neither	Total
		%	%	%	%	%
Age group						
Ages 25 to 34	4,310,029	36.4	9.2	28.6	25.8	100.0
Ages 35 to 44	5,164,732	30.1	8.5	29.8	31.6	100.0
Ages 45 to 54	4,604,288	27.9	7.6	28.1	36.4	100.0
Ages 55 to 64	3,141,583	14.8	8.1	18.6	58.5	100.0
Gender						
Male	8,586,188	27.9	7.2	30.9	34.0	100.0
Female	8,634,444	28.7	9.6	23.1	38.7	100.0
Education attainment						
Some high school or less	2,751,973	7.0	5.2	23.2	64.6	100.0
High school graduate	3,433,611	18.3	7.6	29.6	44.6	100.0
Postsecondary non-university	7,362,636	31.8	9.3	28.5	30.4	100.0
University	3,671,501	46.5	9.5	24.5	19.5	100.0
Labour force status						
Employed	12,838,408	33.7	8.0	30.6	27.8	100.0
Unemployed	1,020,613	20.5	8.0	32.8	38.8	100.0
Not in the labour force	3,361,613	10.1	10.0	11.7	68.3	100.0
Total	17,220,630	28.3	8.4	27.0	36.3	100.0

Table 13 Percentage distribution of adult employee population aged 25 to 64, separated into 4 groups according to their engagement in training activities, by type of job, occupation, union membership, type of industry and firm size, 2002						
	Weighted number of adults	Took both formal & self-directed training %	Took formal training only %	Took self-directed training only %	Took neither %	Total %
Type of job						
Full-time	9,149,479	35.6	8.4	29.8	26.1	100.0
Part-time	1,430,502	32.6	9.3	27.6	30.5	100.0
Permanent	9,356,789	35.6	8.6	29.0	26.8	100.0
Not permanent	813,723	33.0	9.4	32.6	25.0	100.0
Broad type of occupation						
Professional, managerial	4,848,757	47.6	9.7	27.0	15.7	100.0
Clerical, sales, service	3,882,645	26.1	8.7	29.6	35.5	100.0
Blue collar worker	2,971,199	20.9	7.5	32.5	39.0	100.0
Union membership						
Union member	3,578,650	39.5	10.2	24.2	26.1	100.0
Non-union member	6,591,862	33.1	7.8	32.1	27.0	100.0
Type of Industry						
Agriculture	138,553	26.1	3.5	23.3	47.1	100.0
Other primary	236,000	31.8	8.9	23.0	36.3	100.0
Manufacturing	2,017,436	22.7	7.7	34.8	34.8	100.0
Construction	586,333	24.3	5.6	33.4	36.7	100.0
Utilities	115,831	45.4	10.1	22.8	21.6	100.0
Transportation	618,969	26.2	11.2	26.4	36.3	100.0
Trade	1,565,734	27.0	7.3	31.1	34.6	100.0
Finance, insurance and real estate	694,125	43.1	10.2	27.8	18.9	100.0
Education, health and welfare	2,401,536	47.8	10.5	22.2	19.5	100.0
Business and services	2,555,328	29.4	8.8	34.4	27.5	100.0
Public administration	772,737	51.5	10.3	20.2	18.0	100.0
Firm size						
Less than 20	1,706,094	25.0	7.4	36.0	31.5	100.0
20 to 99	1,568,752	30.1	7.7	31.8	30.4	100.0
100 to 500	1,579,940	34.4	9.1	30.0	26.5	100.0
More than 500	5,315,726	40.5	9.2	26.2	24.1	100.0
Total	11,873,157	33.5	8.9	29.2	28.4	100.0

These descriptive analyses allow us to take a preliminary look at the differences in terms of individual and workplace characteristics among the adults and adult workers who undertook different paths of training to acquire or improve their job related skills.

The data indicate that, among other things, the profile of adults who combined both formal and informal training is different from that of adults who reportedly took only self-directed training. One point of departure would be, as the data imply, that the characteristics of the group of adults who took both formal and self-directed training are most likely synchronize with those of formal training participants – whose characteristics have been amply dealt with in the adult learning literature. For example, it is clear that the higher the educational attainment, the more likely an adult will partake in both formal and informal training. In contrast, such relationship does not seem to be as apparent with the group of adults who took only self-directed training activities. These adults, who comprise 49% of the self-directed learners, can arguably range widely from those who opt for self-directed learning as a preferable choice to those who are “forced” to take this alternative route due to their family or workplace situations and/or their access to other learning opportunities. Therefore, in this study we will focus our data analysis on the characteristics of adults who implied that self-directed training had been the only way for their skills development. Such analyses would probably render most intriguing results that can be helpful in the design of learning policies. Specifically, our investigation will centre on the following research questions:

1. What are the general characteristics of adults who reported participating only in self-directed training?
2. To what extent could the following factors – major socio-economic demographic characteristics, family and workplace situations, perceived barriers to formal learning – all these factors taken together – explain the variance of the probability of turning to self-directed learning? As well, to what extent does each of these variables contribute towards the explanation of the participation probability?
3. To what extent do these factors differ in terms of their influence on learning decisions as we compare the two groups: adults who combine both formal and informal training and those who take only self-directed training?

4.2 Determinants of self-directed training – research hypotheses

Based on the above discussion and given the information available in the 2003 AETS, we will investigate the relationships between the likelihood of uptake of self-directed training and the following number of factors identified in the literature as significant antecedents to adult learning participation.

4.2.1 Descriptive variables: age, gender, immigrant status and acquired education level

Age

Age is an indicator of an individual's life stage or phase. Therefore, when readiness to learn or learning engagement is explained as an action of personal agency and is determined by a person's learning ability and educational needs at a certain life stage, age becomes an important explanatory variable in the equation predicting the probability of participating in various forms of adult education and training. The general conclusion has been that age is negatively correlated with participation; that is, the younger the person is the more likely he or she will seek the opportunity to participate in learning activities. On the other hand, the fact that there are fewer older participants is explained by either declining ability to learn or a decrease in the learning needs associated with aging.

It is hypothesized in the case of self-directed training, especially with job-related skills development as the training objective, a similar relationship between age and uptake of self-directed training will exist; that is, the younger the person is the more likely he or she will seek to learn by him or herself. However, it is also predicted that age will become less significant, as some studies on formal learning participation reveal that differences within age-cohorts are much larger than between age-cohorts and learning abilities are determined more by acquired educational level, perceived needs for upgrading or re-skilling than by age alone.

Gender

Recent research findings support the conclusion that gender has become much less of a factor in explaining participation in adult education and training. In some cases, women are even slightly over-represented, compared to men. However, evidence from the research literature is inconclusive: the gender gap is either non-existent or negligible in some studies whereas in other cases, the gap still exists, at least as reflected in terms of qualitative nature of training received, if not in terms of numbers receiving training. As the 2003 AETS indicates, use of the Internet or computer software is the third most popular way to engage in self-directed learning (Peter, 2004). The gender gap that exists in the use of high technology, among other factors, may have an impact on the uptake of self-directed job training: thus we hypothesize that women are less likely than men to learn job skills through self-directed activities.

Immigrant status

Immigrant status may also play a role in the decision for participation in self-directed training. Particularly with new immigrants, the need to learn a new language or languages and to adapt themselves to new cultures and the new labour market as they settle down in the adopted homeland could be challenging. Without being speedily embraced into the labour market, which is often closely related to formal training opportunities, recent immigrants may be most likely to resort to learning on their own as the only way to improve job skills.

By the same token, this relationship will become less potent the longer someone has been living in Canada. However, as migrants from third world countries and non-white ethnic groups account for an increasingly larger proportion of new Canadian immigrants, the relationship between the racial or ethnic background and learning participation as identified in the literature may also apply in the case of self-directed training. In the context of adult formal training, non-white employees are often less likely than white employees to receive employer-sponsored training. Thus, it is suspected that immigrants in general are more likely to train by themselves as compared to the Canadian-born population.

Attained education level

Attained education level is another major factor researchers have identified in explaining why some adults are more likely than others to be engaged in further education. Empirical evidence consistently confirms a strong positive linkage between formal education attainment and the probability of participation in adult and continuing learning. The only exception might be at the level of advanced post-secondary degrees – some studies conclude that the relationship between graduate degrees and participation in adult learning becomes negative.

However, according to human capital theory, acquired educational attainment mainly serves as “circumstantial” proof of one’s ability or capability to fulfill job requirements. Hence, empirically, once skill levels or literacy demands at work or occupational classes enter the equation, the link between formal educational attainment and decisions on further learning--formal or informal--is expected to become less obvious. We expect that self-directed learning is no exception and should follow a similar pattern.

4.2.2 *Labour market participation variables – employment status, type of job, type of occupation, job tenure*

Work is a key factor in explaining adult learning participation, and this is especially true in the investigation of the relationship between the world of work and self-directed learning for skills development. As studies conducted to ascertain similar relationships have revealed, we expect a cluster of factors, related to labour market participation and demands of skill levels, will be influential in determining the uptake of self-directed learning above and beyond the effects of aforementioned ascriptive characteristics.

Employment status

Employment status is an important variable denoting labour market participation, particularly when analysing the general adult population. It is hypothesized that employed adults and adults who actively seek to enter the labour market will be much more likely than those deemed “not in the labour force” to be engaged in self-directed training.

Type of job

Type of job refers to whether a job an adult holds is a full- or part-time position and whether the position is permanent or contractual. These could be important indicators of labour market attachment in the eyes of employers. If employers tend to invest in full-time and permanent employees by supporting them to take up further skills development, those who are deemed less worthy of such investment will have to turn to skills development on their own. Hence the speculation is that adults holding part-time or contractual position will more likely than full-time or permanent staff to draw on self-directed skills development.

Type of occupation

As discussed in the research literature, human capital theory hypothesizes that the rationale of investment would dictate that job-related training decisions are based on the skills requirements of the workplace. In general, research indicates that workers who are already highly skilled continue to receive large shares of training investments, while most medium- and low-skilled workers are not being trained at the same level. Barring direct information on skills and literacy demands at work, we will employ a broad-category occupation variable as a proxy indicator to denote skills requirements: 1) blue collared; 2) clerical, sales and services and 3) professional and managerial positions. Thus it is predicted that skills requirements and level of access to formal training would likely place more onuses on the blue-collared workers, than on other types of workers, to seek skills development on their own.

Job tenure

For employers, job tenure or length of work experience in the current job is another important signal of a worker's skill level and his or her level of commitment to an employer. Research on participation in work-related training differentiates work experience into two categories: 1) length of experience with the same employer, and 2) length of labour market experience in general. The longer a worker has been with a firm, or in the labour force generally, the more opportunities he or she is likely to have had for formal job training. This is because as workers demonstrate their aptitude and commitment to a career or to an employer, the employer is likely to be more interested in training them since employers can be surer that they will recapture their investment. However, with a view to this hypothesis regarding the negative relationship between formal and informal training, this means job tenure will be negatively correlated with self-directed training: the longer the tenure a worker has in his or her current job, the more likely this worker will receive formal training while the less likely he or she is to develop skills on his or her own.

4.2.3 *Family circumstances – marital status, family size, family type and presence of young children*

This study will also explore the impact of family circumstances: whether or not the load of family duties an adult is responsible for will positively or negatively affect her decision to undertake self-directed learning. One possible way to measure family responsibilities is the time spent on unpaid work, which is the most variable element in time use allocation. The literature on time use indicate age (including the quadratic term of age), the youngest child age, the total number of children, gender, marital status, working full- or part-time, educational level and spousal employment status, all contribute significantly to the prediction of time spent on unpaid work. Since time crunch issues can be serious hindrances to the participation in formal training, people who are faced with these challenges will probably more likely utilize self-directed training, as it could be ad hoc and less structured. Hence, it is hypothesized that adults who are married, with a large size-, dual-earner-family, and families with young children will more likely experience the time crunch problem and thus be more inclined to learn job skills through ad hoc self-initiatives.

4.2.4 *Workplace environment - union membership, type of industry, firm size*

Union or collective membership

At the workplace, unions are the main organizations representing employees in the relations with management and providing workers with a source of power and control in the employment relationship, which can impact on the access to formal training opportunities at work. Thus workers outside of union or collective organization membership would tend to be more limited in their access to those formal skills development activities and therefore have to initiate their learning activities instead.

Type of industry

In the research literature on participation, sector of employment, in addition to firm size and nature of the job, is consistently regarded as a major factor associated with the likelihood of workers receiving support to undertake formal continuing education or training. Captured in the variable of industry type are the notions of ownership, the use of technology, internal labour market, labour force qualifications and competence, management structure, and market orientation of the service. All these factors have been identified in the literature as contributing factors that impact on the level of willingness of employers to invest in human resources development and for workers to seek formal training to improve their skills. Businesses that are expanding, embracing new technologies, or undergoing structural changes will all likely increase the level of training among their employees. Therefore, in these industry sectors it can be expected to find more employees seeking formal training,

more employees combining both formal and informal training and fewer left on their own to upgrade or update their knowledge and skills.

Firm size

Firm size is another contextual factor at the organizational level that has been consistently attributed to the likelihood of a worker receiving formal training. This is often reflected in higher rates of participation in the large organizations than in small and medium-size firms. The most commonly identified factors attributed to higher training rates in large-size organisations appear to be a high degree of formalization of training, “slack” resources for training budgets, economic scale, organizational structures in charge of training. Such factors are usually lacking in small and medium-sized companies. On the other hand, employees in small firms, who must often operate with a wider variety of skills and thus would have a greater need for training, tend to rely on their own initiatives to master their job skills given the limited formal training opportunities.

4.2.5 Formal training inclination and expectation – past history of participation and future participation anticipation

Participation in formal training in previous years

Adult education theory generally suggests that the likelihood of participation in further education and training is not only positively correlated with achieved level of formal education but also enhanced by early experiences of adult education. That is, adults’ current involvement in adult education and training can at least be partly explained by their previous experiences of similar activities.

Although in most of our arguments, we expect the likelihood of receiving formal training is negatively related to that of uptake of substitutional self-directed training, it might also be possible that the decision to undertake self-directed learning activities is made as a preference and the foundation for self-direction capacity is laid by previous experiences of formal training. In the 2003 AETS, respondents were asked if they had taken any formal training in the previous 5 years from 1997 to 2001. It will thus be interesting to see if these previous experiences are correlated with the current uptake of skills training including self-directed activities.

Future training expectation

In the 2003 AETS, respondents were also asked whether they expect to participate in formal training in the next three years. The answers included the following categories: 1) very likely; 2) somewhat likely; 3) not very likely; and 4) not likely at all. What is reflected in this variable can be the individuals' assessment of their future career plans and an understanding of the skills associated with these career paths. Thus we expect participation in training, whether it be formal or informal, will be both positively related to the future training expectation.

4.2.6 *Identified learning barriers to formal training opportunities – institutional, situational and dispositional barriers*

The extent to which Canadian adults turn to self-directed learning because of difficulties accessing formal training is explored with three combined barrier variables, so to examine the likelihood of participating in self-directed learning as the only way for skills development. These three variables are derived from the data based on the Cross (1981) classification of participation barriers: 1) situational barriers (those arising from one's situation in life – e.g. lack of time, because of work, family responsibilities, etc.); 2) institutional barriers (practices and procedures hindering participation – e.g. fees, lack of evening courses, entrance requirements, limited course offerings, etc.); 3) dispositional barriers (attitudes and dispositions towards learning).

In literature, barriers such as lack of time due to responsibilities in daily life and high costs of formal training have been verified as dominant reasons for not pursuing education and training. By the same argument as we made above, we expect that the adults who reported having these barriers to formal training would be much more likely to rely on their own initiatives for skills development.

4.2.7 *Variation among provinces*

Peters (2004) reported that in Canada, provincial participation patterns in self-directed learning mirrored patterns observed for formal training: the highest rates for informal training were found in provinces with the highest rates for formal training. However, given the above argument and our distinction between substitutional informal training and complementary informal training, our speculation is that the opposite relationship would exist between formal training and self-directed learning reported as the only way for skills development: That is, the highest rates for self-directed training used as substitution for formal training will be found in provinces with the lowest rates for formal training.

4.3 Research design and procedures

4.3.1 Data and samples

To conduct the data analysis for the purpose of addressing the research questions as identified above, the data of the 2003 Adult Education and Training Survey (AETS) was used as it is thus far the only one in the AETS series that collects information on the participation in self-directed learning by Canadian adults. Furthermore, as the focus of analysis is on the relationship between self-directed learning and skills development of Canadian labour force, the sample was limited to the adults who were active or potentially active in the labour market. Adults over 64 years were excluded in this study. As well, in order to investigate the participation in self-directed learning in relation to family structures, employment, workplace characteristics, and participation motivations as well as barriers to formal training, two sub-samples – one for the general adult population and the other for employee population – were drawn from the survey data.

4.3.2 Design and methods for analysis

Two criterion variables regarding the participation of self-directed training were used for regression models and were created based on the reported training participation patterns, i.e., 1) the adults who participated in both formal and self-directed learning and 2) the adults who reported having participated in self-directed training only. The purpose was to facilitate the comparisons between these two groups of self-directed learners in terms of socio-demographic characteristics (e.g. age, gender, and education achievement), work situations (e.g. occupation, industry, and firm size), and barriers to formal training. Specifically, these include: age, sex, education attainment, province, labour force participation status, type of occupation, part-time or full-time, job tenure, union membership, permanent or temporary job, firm size, industry classification or type of industry, type of sector, barriers, intention for future training, past training (97 to 01).

Since the criterion variables created were both dichotomous, logistic regressions were constructed to estimate the overall contributions as well as each individual independent variable's relative importance in predicting the memberships of these two outcome variables. Two separate models were run with both the general adult population sample and employee population sample: the first model was to predict the likelihood of being an adult who took self-directed training only and the second, the likelihood of being an adult who combined both formal and informal training. Interpretation of the results was focused on coefficients for logit and odds ratio of each explanatory variable in the model. The odds ratio is also a measure of effect size. The ratio of odds ratios of the predictors is the ratio of relative importance to the predictor variables in terms of effect on the dependent or criterion variable's odds.

4.3.3 Description of key variables

For a detailed description of the measurement scales of the variables employed in the logistic regressions, please refer to Tables 14a and 15a in Appendix 1.

4.4 Results

4.4.1 Summary statistics of logistic regression model predicting probability of participation in self-directed training

Tables 14 and 15 summarize the results of the sequential logistic regression analyses performed to assess prediction of participation in job-related self-directed training. Specifically, Table 14 presents the summary statistics evaluating the logistic regressions predicting the likelihood of being adults who took only self-directed training for skills development and the likelihood of being adults who combined both formal and informal training, for the general adult population, on the basis of 5 embedded models. Table 15 presents the summary statistics evaluating the similar logistic regressions for the employee population, on the basis of 4 embedded models aimed at testing the predicting power of variables related to job and workplace characteristics.

Model chi-squares are presented to indicate whether the relationship between the dependent variables and the independent variables is statistically significant. Measures of the strength of association between the dependent and independent variables, Cox & Snell's R-squared and Nagelkerke's R-squared are presented to signal the effect-size relationship between the outcome variables and their predictors.

Glancing through Table 14, it is noticeable that, first, Model 1 to 3, which include variables denoting personal characteristics, educational level, immigrant status, family circumstances, only explained about 7% of the variance, indicating a significant but small effect size relationship between the likelihood of participation in self-directed training only and these independent variables. Second, there appeared a huge increase in the explained variance when the variables about training history, training expectations, and barriers to formal training entered the equation. However, only 20% of the variance was explained by the full model as compared with more than 50% of the variance explained by the model predicting adults who combined both formal and informal training. The same is also true with the models for employee population (see Table 15). This indicates that learners who choose to learn job skills on their own are much more heterogeneous than other types of learners and thus hard to predict.

Table 14
Summary statistics for evaluating the logistic regression models predicting probability of Canadian adults (aged 25 to 64) participating in self-directed training, 2002

	Participated in self-directed training only			Participated in both formal and self-directed training		
	Chi-sq.	Cox & Snell's R ²	Nagelkerke's R ²	Chi-sq.	Cox & Snell's R ²	Nagelkerke's R ²
1. Described and acquired personal characteristics only	1007.3 (df=10)	0.041	0.059	3257.5 (df=10)	0.126	0.181
2. Model 1, plus income, immigrant status & activity limitation	1123.3 (df=18)	0.045	0.066	3638.7 (df=18)	0.140	0.201
3. Model 2 plus family circumstance	1169.7 (df=32)	0.047	0.069	3824.1 (df=32)	0.146	0.210
4. Model 3 plus training history, future training and barriers to formal learning	3637.6 (df=41)	0.140	0.203	10776.5 (df=41)	0.360	0.517
5. Model 4 plus province	3687.62 (df=50)	0.142	0.206	10802.2 (df=50)	0.361	0.518

Notes:

1. Variables included in the Ascribed and acquired personal characteristics only model are: Age, Gender, and Acquired Level of Formal Education, Labour Force Status.
2. The second model includes all the variables in the first model plus variables of: Household Income, Immigrant Status, and Activity Limitation.
3. Model 3 contains Marital Status, Size of Economic Family, Type of Economic Family and Presence of Young Children, in addition to all the variables included in both Model 1 and Model 2.
4. Model 4 contains Took Training (1997 to 2001), Future Training Expectation, Institutional and Dispositional Barriers, in addition to all the variables included in Models 1 to 3.
5. Model 5 contains Province in addition to all the variables included in Models 1 to 4.
6. Model chi-square denotes the difference between the initial $-2 \log$ -likelihood, a statistic with none (zero) of the independent variables in the equation, and deviation chi-square for the full model, analogous to the error sum of squares in linear regression analysis. Models chi-square provides a test of the null hypothesis for the logistic model and significant, rejects the null hypothesis and signifies that the information about the independent variables allows better prediction. All the Model chi-squares are statistically significant with $p < .001$.
7. All the Cox & Snell's R^2 and Nagelkerke's R^2 in the table are statistically significant with $p < .001$.

<p>Table 15</p> <p>Summary statistics for evaluating the logistic regression models predicting probability of Canadian employees (aged 25 to 64) participating in self-directed training, 2002</p>						
Models	Participated in self-directed training only			Participated in both formal and self-directed training		
	Chi-sq.	Cox & Snell's R ²	Nagelkerke's R ²	Chi-sq.	Cox & Snell's R ²	Nagelkerke's R ²
1. Described and acquired personal characteristics only	106.3 (df=7)	0.007	0.011	1254.0 (df=7)	0.084	0.116
2. Model 1, plus job characteristics	182.7 (df=16)	0.013	0.018	1598.2 (df=16)	0.106	0.146
3. Model 2 plus workplace context	374.4 (df=30)	0.026	0.037	1918.2 (df=30)	0.126	0.173
4. Model 3 plus training history, future training and barriers to formal learning	1681.3 (df=33)	0.111	0.158	5234.7 (df=33)	0.307	0.422
Notes:						
1. Variables included in the Ascribed and acquired personal characteristics only model are: Age, Gender, and Acquired Level of Formal Education.						
2. The second model includes all the variables in the first model plus variables describing job characteristics: Full- or part-time, Permanent or contractual, Tenure of current job, Type of occupation.						
3. Model 3 contains Union membership, Type of industry and Firm size, in addition to all the variables included in both Model 1 and Model 2.						
4. Model 4 contains Institutional, Situational and Dispositional Barriers, in addition to all the variables included in Models 1 to 3.						
5. Model chi-square denotes the difference between the initial -2 log-likelihood, a statistic with none (zero) of the independent variables in the equation, and deviation chi-square for the full model, analogous to the error sum of squares in linear regression analysis. Model chi-square provides a test of the null hypothesis for the logistic model and if significant, rejects the null hypothesis and signifies that the information about the independent variables allows better predictions. All the Model chi-squares are statistically significant with p<.001.						
6. All the Cox & Snell's R ² s and Nagelkerke's R ² s in the table are statistically significant with p<.001.						

4.4.2 *Characteristics of adults who participated only in self-directed learning for job skills*

For the convenience of discussion, estimated parameters of important variables from uncontrolled regressions and the full model estimates are presented in the following tables – Table 16 (general adult population) and Table 18 (employee population). For categorical or ordered variables, tables include percentages of participants, unstandardized coefficients and odds ratios, both unadjusted and adjusted. Table A3 (general adult population) and Table A4 (employee population) in the Appendix present the results from the regression analyses concerning the likelihood of participation in both formal and informal training for job skills development. The results are drawn on in the following discussion for comparative purposes.

Table 16 Likelihood of adult population aged 25 to 64 undertaking only self-directed training activities, by socio-economic characteristics, 2002						
	Participated in self-directed training only	Unadjusted		Adjusted		
	%	B	Exp(B)	B	Exp(B)	
Age group						
Ages 55 to 64	18.6		1.00		1.00	
Ages 25 to 34	28.6	0.56	1.75 ¹	0.15	1.16 ¹	
Ages 35 to 44	29.8	0.62	1.86 ¹	0.13	1.14 ²	
Ages 45 to 54	28.1	0.53	1.71 ¹	0.15	1.17 ¹	
Sex						
Female	23.1		1.00		1.00	
Male	30.9	0.40	1.49 ¹	0.38	1.46 ¹	
Education attainment						
Some high school or less	23.2		1.00		1.00 ¹	
High school graduate	29.6	0.33	1.39 ¹	0.22	1.24 ¹	
Postsecondary non-university	28.5	0.28	1.32 ¹	0.22	1.25 ¹	
University	24.5	0.07	1.07 ³	0.07	1.08 ³	
Labour force status						
Not in the labor force	11.7		1.00		1.00	
Employed	30.6	1.20	3.33 ¹	1.10	3.01 ¹	
Unemployed	32.8	1.30	3.69 ¹	1.00	2.72 ¹	
Household income group						
\$80,000 or more	24.9		1.00		1.00	
Not stated	21.1	-0.22	0.80 ¹	0.08	1.09 ³	
Less than \$5,000	28.5	0.18	1.20 ³	0.84	2.31 ¹	
\$5,000 to less than \$10,000	24.7	-0.01	0.99 ³	0.54	1.71 ¹	
\$10,000 to less than \$15,000	22.9	-0.11	0.89 ³	0.30	1.35 ¹	
\$15,000 to less than \$20,000	26.0	0.05	1.06 ³	0.19	1.21 ²	
\$20,000 to less than \$30,000	30.3	0.27	1.31 ¹	0.33	1.39 ¹	
\$30,000 to less than \$40,000	30.8	0.29	1.34 ¹	0.34	1.40 ¹	
\$40,000 to less than \$50,000	29.2	0.22	1.24 ¹	0.21	1.23 ¹	
\$50,000 to less than \$60,000	28.8	0.20	1.22 ¹	0.17	1.19 ¹	
\$60,000 to less than \$80,000	28.5	0.18	1.20 ¹	0.15	1.16 ¹	
Year of immigration						
Born in Canada	26.5		1.00		1.00	
1998 to 2003	33.6	0.76	2.15 ¹	0.77	2.15 ¹	

Likelihood of adult population aged 25 to 64 undertaking only self-directed training activities, by socio-economic characteristics, 2002						
	Participated in self-directed training only		Unadjusted		Adjusted	
	%	B	Exp(B)	B	Exp(B)	
1993 to 1997	36.6	0.90	2.45 ¹	0.68	1.97 ¹	
1983 to 1992	27.3	0.47	1.59 ¹	0.13	1.14 ³	
Before 1983	28.3	0.52	1.68 ¹	0.29	1.33 ²	
Not a landed immigrant or permanent resident	9.9	-0.77	0.46 ²	-0.63	0.53 ³	
Activity limitation						
No	27.8		1.00			
Yes	21.2	-0.36	0.70 ¹	-0.06	0.94 ³	
Marital status						
Married or common-law	27.0		1.00		1.00	
Widowed	18.6	-0.48	0.62 ¹	-0.10	0.90 ³	
Separated or divorced	26.1	-0.05	0.95 ³	-0.15	0.86 ³	
Single never married	28.2	0.06	1.06 ³	-0.07	0.94 ³	
Size of economic family						
One	26.8		1.00		1.00	
Two	24.1	-0.14	0.87 ¹	-0.07	0.93 ³	
Three	27.0	0.01	1.01 ³	-0.10	0.90 ³	
Four	29.7	0.14	1.15 ¹	-0.02	0.98 ³	
Five or more	29.1	0.11	1.12 ²	-0.01	0.99 ³	
Economic family type						
Husband-wife dual earner	29.2		1.00		1.00	
Husband-wife single earner	26.4	-0.14	0.87 ¹	0.15	1.16 ¹	
Husband-wife non-earner	16.4	-0.75	0.47 ¹	0.10	1.11 ³	
Single parent family, parent employed	31.7	0.12	1.12 ³	0.24	1.27 ²	
Single parent family parent not employed	23.4	-0.30	0.74 ¹	0.65	1.92 ¹	
Unattached individual/other family types	26.1	-0.15	0.86 ¹	0.06	1.06 ³	
Presence of children 0 to 5						
No	26.5		1.00		1.00	
Yes	29.7	0.16	1.17 ¹	-0.03	0.97 ³	
Took training 97 to 01						
No	26.9		1.00		1.00	
Yes	27.1	0.01 ³	1.01	0.02	1.02 ³	

Likelihood of adult population aged 25 to 64 undertaking only self-directed training activities, by socio-economic characteristics, 2002						
	Participated in self-directed training only	Unadjusted		Adjusted		
	%	B	Exp(B)	B	Exp(B)	
Will train next 3 years						
Not likely at all	19.5		1.00			1.00
Very likely	27.2	0.44	1.55 ¹	0.41		1.51 ¹
Somewhat likely	37.7	0.92	2.50 ¹	0.78		2.19 ¹
Not very likely	33.3	0.72	2.06 ¹	0.52		1.69 ¹
Not stated	22.5	0.18	1.20 ³	0.33		1.39 ²
Institutional barrier to formal learning						
No	24.2		1.00			1.00
Yes	37.5	0.63	1.88 ¹	0.62		1.86 ¹
Situational barrier to formal training						
No	23.5		1.00			1.00
Yes	34.9	0.56	1.75 ¹	0.71		2.04 ¹
Dispositional barrier to formal training						
No	20.7		1.00			1.00
Yes	36.3	0.78	2.19 ¹	1.15		3.15 ¹
Province						
Newfoundland and Labrador	26.9		1.00			1.00 ³
Prince Edward Island	25.8	-0.05	0.95 ³	-0.20		0.82 ³
Nova Scotia	25.3	-0.08	0.92 ³	-0.06		0.94 ³
New Brunswick	24.5	-0.12	0.88 ³	-0.12		0.89 ³
Québec	24.2	-0.14	0.87 ³	-0.10		0.91 ³
Ontario	29.8	0.14	1.15 ³	0.14		1.15 ³
Manitoba	28.1	0.06	1.06 ³	0.09		1.09 ³
Saskatchewan	27.2	0.02	1.02 ³	0.02		1.02 ³
Alberta	25.6	-0.06	0.94 ³	-0.14		0.87 ³
British Columbia	25.5	-0.07	0.93 ³	-0.12		0.89
Total	27.0					

Note: A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).

Age

The hypothesis regarding the age effect in the case of self-directed learning is that age is negatively correlated with participation: the younger person is the more likely he or she will seek the opportunity to participate in self-directed learning activities. As is shown in Table 16 and Table A3, while this is true with adults who combined formal and informal training, the age difference among those who took self-directed training is small except with the eldest age group (age 55 to 64). The odds ratios indicate that all the other age groups are almost 2 times as likely to train themselves as compared with the eldest age group.

Gender difference

While recent research findings support the conclusion that gender has become much less of a factor in explaining participation in adult education and training, this does not seem the case with adults who seek to train themselves on their own: even after controlling for all the other variables in the equation, the odds of a male taking only self-directed training is 1.5 times that of a female. Looking at the percentages of male and female's use of self-directed training methods as shown in Table 17, we find that men tended to be more likely than women to "teach yourself" "consult books/manuals and use internet or software for self-training". These gender gaps in the use of training methods, among other factors, may have an impact on the uptake of self-directed job training, resulting in women being less likely than men to learn job skills through self-directed activities.

Table 17 Methods of self-directed training by sex (general adult population, percentage), 2002			
Methods of self-directed learning	Male	Female	Total
Teach yourself	45.8	38.8	42.3
Consult books/manuals	41.0	35.3	38.1
Use the internet/software	29.9	24.7	27.3
Seek advice	27.1	26.9	27.0
Observe someone	24.7	23.5	24.1

Attained education level

For adults who combined both formal and informal training, attained education level is found to be positively linked to the probability of participation: the higher the education level, the more likely a person was to take both formal and informal training. In contrast, such is not the case with adults who took self-directed training as an alternative to formal training. The analysis with the general adult population shows that high school graduates and those with some postsecondary education were more likely than both university graduates and high school dropouts to seek self-training as a choice (See Table 16). The results from the employee population analysis indicate that the relationship between education level and participation only in self-training is a negative one and becomes insignificant in the full model in which a number of other variables are controlled for.

Immigrant status

The analysis confirms that immigrant status plays a fairly strong role in the decision for participation in self-directed training. Compared with adults born in Canada, recent immigrants entering the country between (1998 to 2002) and between (1993 to 1997) were 2 times as likely to learn job skills on their own, even after controlling for all other effects in the full model. The results also confirm that this relationship becomes less potent as the period of immigration increases but remains significant: immigrants who entered the country before 1983 were still 1.3 times likely to rely on their own initiative to improve skills than those native-born.

Employment status

Employment status proves one of the most important variables in predicting self-directed skills training when analysing the general adult population. Even after everything else is controlled for, employed adults and adults who actively look for jobs were much more likely than (almost 3 times as much as) those deemed “not in the labour force” to be engaged in self-directed training.

4.4.3 Self-directed training and job characteristics and workplace context

Job characteristics

Perhaps this is one of the biggest surprises in the findings with respect to the overall impact of job factors on the decision of uptake of self-directed training. It was hypothesized that due to their disadvantageous position in terms of access to formal training at the workplace, adults holding part-time, contractual and blue collar position and those who have worked little time in their current job will much more likely than full-time or permanent staff, professionals, and workers with long tenures to draw on self-directed skills development. While the coefficients and odds ratios generally point to the directions as predicted – for instance, the longer the job tenure one has, the less likely a worker took self-directed training as the only way to learn skills – overall, the impacts of all these variables are small, as indicated by the model summary statistics in Table 15 as well as the coefficients and odds ratios presented in Table 18.

Table 18

Likelihood of adult employee population aged 25 to 64 undertaking only self-directed learning activities, by occupation and workplace characteristics, 2002

		Unadjusted		Adjusted	
	%	B	Exp(B)	B	Exp(B)
Age groups					
Ages 55 to 64	25.3		1.00		1.00
Ages 25 to 34	28.6	0.17	1.18 ¹	-0.04	0.96 ³
Ages 35 to 44	31.0	0.29	1.33 ¹	0.10	1.11 ³
Ages 45 to 54	29.4	0.21	1.23 ¹	0.13	1.14 ³
Sex					
Female	26.3		1.00		1.00
Male	32.0	0.28	1.32 ¹	0.30	1.34 ¹
Education attainment					
Some high school or less	31.3		1.00		1.00
High school graduate	32.3	0.05	1.05 ³	0.13	1.14 ³
Postsecondary non-university	29.1	-0.10	0.90 ²	0.09	1.10 ³
University	25.5	-0.29	0.75 ¹	-0.06	0.94 ³
Type of job (1)					
Part-time	27.6		1.00		1.00
Full-time	29.8	0.11	1.11 ²	0.17	1.18 ¹
Type of job (2)					
Not permanent	32.6		1.00		1.00
Permanent	29.0	-0.17	0.85 ¹	-0.25	0.78 ¹
Job tenure					
1 to 12 months	33.5		1.00		1.00
13 to 36 months	31.5	-0.09	0.91 ³	-0.03	0.97 ³
37 to 60 months	30.2	-0.15	0.86 ²	-0.11	0.89 ³
61 to 120 months	30.6	-0.14	0.87 ²	-0.07	0.93 ³
121 to 239 months	26.1	-0.36	0.70 ¹	-0.26	0.77 ¹
240 mths or more (20 yrs)	26.2	-0.35	0.70 ¹	-0.28	0.76 ¹
Type of occupation					
Blue collar worker	32.5		1.00		1.00
Professional, managerial	27.0	-0.27	0.77 ¹	0.19	1.20 ¹

Table 18 (continued)
Likelihood of adult employee population aged 25 to 64 undertaking only self-directed learning activities, by occupation and workplace characteristics, 2002

		Unadjusted		Adjusted	
		B	Exp(B)	B	Exp(B)
Clerical, sales, service	%	-0.14	0.87 ¹	0.08	1.08 ³
Union membership					
Not member	32.1		1.00		1.00
Union member	24.2	-0.39	0.68 ¹	-0.13	0.88 ¹
Type of industry					
Agriculture	23.3		1.00		1.00
Other primary	23.0	-0.02	0.98 ³	-0.15	0.86 ³
Manufacturing	34.8	0.56	1.76 ¹	0.46	1.59 ²
Construction	33.4	0.50	1.64 ¹	0.29	1.34 ³
Utilities	22.8	-0.03	0.97 ³	0.11	1.12 ³
Transportation	26.4	0.16	1.17 ³	0.00	1.00 ³
Trade	31.1	0.40	1.49 ²	0.29	1.34 ³
Finance, insurance and real estate	27.8	0.23	1.26 ³	0.23	1.26 ³
Education, health and welfare	22.2	-0.06	0.94 ³	0.05	1.05 ³
Business and services	34.4	0.54	1.72 ¹	0.42	1.52 ³
Public administration	20.2	-0.18	0.83 ³	-0.03	0.97 ³
Firm size					
Less than 20	36.0		1.00		1.00
20 to 99	31.8	-0.18	0.83 ¹	-0.18	0.84 ¹
100 to 500	30.0	-0.27	0.76 ¹	-0.15	0.86 ²
More than 500	26.2	-0.46	0.63 ¹	-0.22	0.80 ¹
Institutional barrier to formal learning					
No	26.5		1.00		1.00
Yes	38.2	0.54	1.71 ¹	0.59	1.81 ¹
Situational barrier to formal training					
No	24.7		1.00		1.00
Yes	40.0	0.71	2.03 ¹	0.94	2.56 ¹
Dispositional barrier to formal training					
No	22.0		1.00		1.00
Yes	39.7	0.84	2.33 ¹	1.29	3.62 ¹
Note: A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).					

Union or collective membership

It was hypothesized that compared with workers belonging to unions or collective agreements, workers outside of union or collective organization membership would tend to be more limited in their access to those formal skills development activities and therefore have to initiate their learning activities instead. The analysis confirmed this hypothesis: 32 % of non-union members took self-directed training only as compared with 24% of union members who did so. Expressed in odds ratios, non-union members were almost 1.5 times as likely to resort to self-directed training as union members.

Firm size

It was hypothesized in this study a negative relationship between the firm size and reliance on self-directed training for skills development. The implication is that, given the limited access to formal training, the employees in small firms, who often need a wider variety of skills, tend to rely on their own initiative to master their job skills. The results also confirmed this hypothesis – adults working in firms with less than 20 employees were 1.6 times more likely than those working in 500-strong firms to learn job skills on their own – this relationship remains significant, but with a small effect size after controlling for all other variables in the full model.

Type of industry

The results indicate that manufacturing, construction, business and services, and trades are the four industrial sectors where there were the highest proportions of employees who had taken only self-directed training without having benefited from formal training in the year 2002. It was hypothesized above that there will be a negative relationship between employers' willingness to provide training and that workers being left on their own to upgrade skills, would formal training participation rates turn out to be among the lowest in these sectors?

Table 19
Percentages of employees participating in formal training and self-directed training by industry sector, 2002

Type of industry	Weighted	Formal training	Self-directed training only	Non-participants	Total
Agriculture	138,553	29.6	23.3	47.1	100.0
Other primary	236,000	40.7	23.0	36.3	100.0
Manufacturing	2,017,436	30.4	34.8	34.8	100.0
Construction	586,333	29.9	33.4	36.7	100.0
Utilities	115,831	55.6	22.8	21.6	100.0
Transportation	618,969	37.3	26.4	36.3	100.0
Trade	1,565,734	34.2	31.1	34.6	100.0
Finance, insurance and real estate	694,125	53.3	27.8	18.9	100.0
Education, health and welfare	2,401,536	58.3	22.2	19.5	100.0
Business and services	2,555,328	38.1	34.4	27.5	100.0
Public administration	772,737	61.8	20.2	18.0	100.0
		r=-0.66			

As indicated in Table 19, the answer is yes, and the correlation coefficient between the two participation rates – “formal training” and “self-directed training only” is around –0.66.

4.4.4 Self-directed training and family circumstances – Marital status, family size, family type and presence of young children

Turning to the analysis on the general adult population, findings in the time-use research suggest that adults with more family responsibilities will be more inclined to learn job skills through ad hoc self-initiatives. This may be due to the fact that these adults are more likely to be married, have a large size family, a dual-earner-family, and/or a family with young children, and therefore are more likely to experience the time crunch problem, which has an impact on the uptake of formal training.

As shown in Table 16, *marital status* is not a significant predictor for participation in self-directed learning – adults in the categories of “married”, “separated or divorced” and “never married single” appear to have the similar propensity to pick up skills on their own, except for the “widowed”. Widows or widowers are much less likely to learn on their own as compared with other categories, but this effect disappears when variables such as age and gender are controlled for. The same with *the size of family* – the unadjusted numbers seemed to support the notion of the likelihood of undertaking self-directed training increasing with family size, but the differences were rendered non-significant once other variables were taken into account. The only family factor among the tested that may have an impact on the uptake of self-directed training is the “type of economic family”: “dual earners” and “single parent earners” were more likely than other family types to engage in self-directed training. However, this effect seemed to be mixed with that of the employment status. The relationship

changed once the effect of employment status was controlled – the odds became in favour of “single non-earner parent family”: the odds someone from a single non-earner parent family undertook self-directed training were almost 2 times (1.92) the odds that someone from a dual-earner family did.

4.4.5 *Self-directed training and previous experiences of formal training or future participation anticipation*

Participation in formal training during 1997 to 2001

The 2003 AETS data showing that adults who combined formal and informal training again confirmed what is described as “positive serial correlations” between current formal training experiences and previous ones – about 48% of them also reported taking formal training during the period of 1997 – 2001. (See Table 16). With a view to this strong relationship between training experiences, the study tested if previous experiences with formal training are correlated with the current uptake of self-directed activities. The data indicate that the relationship was almost “zero”: adults who took training during 1997 to 2001 were almost as likely to engage in self-guided training as those who did not.

Future training expectation

In the 2003 AETS, respondents were asked to indicate how likely they expect to participate in formal training in the next three years. What is reflected in this information can be an understanding of skills requirements associated with their assessment of their future career paths. As was expected, the results of analysis indicate that future training expectations are both positively related to participation in both formal and informal training activities, although the former relationship is much stronger than the latter one. Respondents who believed they were “very likely” to be trained again in the next 3 years were 20 times more likely to be the participants of current-year training than those who firmly believed that they would not receive training again in the next three years. By comparison, the former group was more than 2 times likely to take self-directed training initiatives than the latter group.

4.4.6 *Self-directed training and identified learning barriers – institutional, situational and dispositional barriers to formal training needed or wanted*

As shown in Table A3, the evidence from the analysis on the relationship between the perceived training barriers and the participants who combine both formal and informal training again corroborated with the prevalent findings in the literature: those who

identified having situational barriers were 2 times less likely to combine both formal and informal training, whereas those who reported having dispositional barriers, the odds ratio was about 8 times even after all the other factors were taken into account. The opposite is true in the case of self-directed training taken by non-participants of formal training – the perceived barriers, especially the dispositional barrier, turned out to be strong predictors of whether an adult had undertaken self-directed training. Those who reported having experienced institutional and situational barriers were about 2 times more likely to learn skills on their own than those who responded “nay”. Adults who expressed non-positive attitudes or dispositions towards formal training also appeared over 3 times more likely to rely on their own initiatives to improve skills than those who did not have such attitudes to training.

Variation among provinces

Although we hypothesized that the highest rates for self-directed training used as substitution for formal training will be found in provinces with the lowest rates for formal training, the results of our analysis did not render any strong evidence to confirm that – none of the differences among provinces were found statistically significant. Small variations did exist among provinces with regard to the proportions of adults who combined both formal and informal training. As is shown in the model summary statistics in Table 14, the contribution of this provincial difference towards the explained variance of the full model is very small and tends to disappear when the model is adjusted to take into account other variables entering the equation.

4.5 Summary of major findings in relation to hypotheses and results concerning determinants of self-directed training

Table 20 summarizes the hypotheses concerning the antecedents to the participation in self-directed training made prior to the data analyses, as well as the results from these analyses that either have confirmed or rejected such prior reasoning.

For example, based on the literature reviewed, it was hypothesized in this study that there would be a strong relationship between identified barriers to formal training and the uptake of self-directed training as the only way to improve job skills. The results of data analysis confirmed this hypothesis and further proved that barriers to formal training actually are among the strongest predictors of the likelihood of being an adult who took only self-directed training in 2002. Another example is that it was estimated that the youngest age group would be most likely to engage in self-directed training like many other sorts of training, the findings from the data analysis rejected this hypothesis and indicated that the differences among age groups were very small except for the eldest age group (55 to 64).

Table 20 Summary of major findings – hypotheses and results re: self-directed training determinants						
Independent variables	Hypotheses			Results		
	Who most likely	Strength of association	Confirmation	Who most likely	Strength of association	Order of strength
Age group	Ages 25 to 34	moderate	no	Ages 45 to 54	weak	
Sex	Male	moderate	Yes	Male	moderate	9
Education attainment	University	moderate	no	Postsecondary non-university	moderate	14
Labour force status	Employed	strong	Yes	Employed	strong	2
Year of Immigration	1998 to 2003	strong	Yes	1998 to 2003	strong	4
Marital status	Married or common-law	moderate	no	Single never married	very weak	
Size of economic family	Five or more	moderate	no	Four	very weak	
Economic family type	Husband-wife dual earner	moderate	no	Single parent family parent not employed	moderate	6
Presence of children 0 to 5	Yes	moderate	no	Yes	very weak	
Took training 1997 to 2001	Yes	strong	no	Yes	very weak	
Will train next 3 years	Very likely	strong	no	Somewhat likely	strong	3
Institutional barrier	Yes	strong	Yes	Yes	moderate	7
Situational barrier	Yes	strong	Yes	Yes	strong	5
Dispositional barrier	Yes	strong	Yes	Yes	strong	1
Province	Newfoundland and Labrador	moderate	no	Ontario	very weak	
Type of job	Part-time	moderate	no	Full-time	weak	
Type of job	Not permanent	moderate	yes	Not permanent	weak	12
Job Tenure	1 to 12 months	strong	no	1 to 12 months	weak	10
Broad type of occupation	Blue collar worker	strong	no	Blue collar worker	weak	11
Union membership	Non-union member	moderate	yes	Non-union member	weak	
Type of Industry	Business and services	strong	no	Manufacturing	moderate	8
Firm size	Less than 20	strong	no	Less than 20	weak	13

Also presented in Table 20 is the order of relative importance of 14 variables, based on their effect sizes estimated in terms of ratios of odds ratios. Not surprisingly, as indicated in the table, variables such as dispositional barriers to formal training, labour market status, future training expectations, year of immigration, and situational training barriers are found to be the top five important variables in terms of their power of explanation regarding who among Canadian adults are most likely to engage in self-directed studies to address their unmet learning needs.

4.6 Discussions: Implications and future research

A major conclusion of this section is that learners engage in self-directed training for various reasons. The results of the analyses indicate that at least it is important to recognize the concept of informal learning taken to complement or substitute formal training, as the implications for learning policies would be quite different.

The discourse of self-directed learning has focused on the learner's management of the learning situation and the characteristics of a self-directed learner. The learners act as agents in the learning situation, considering their own needs and interest in learning special content in relation to the framework of the educational programme. The results of this study indicate that it is imperative to examine self-directed learning using a holistic approach that encompasses both individual and structural processes – another major conclusion from this study is that learning barriers emerge as major predictors that may explain why a large proportion of (at least around 5 million according to the 2003 AETS data) Canadian adults turn to self-guided training as an essential vehicle to address their skill needs.

Further research investigating the content and outcomes of self-directed training by adults engaged in different learning patterns can shed more light on the nature of self-directed skills training. In considering informal learning or self-directed training as a viable means for skills development, educators, learners, as well as public policy makers must take into account that self-directed learners are widely varied in their capabilities in managing learning situations and may have various obstacles to overcome. One could infer from this study that many individuals who are engaged in self-directed learning are perhaps facing severe access issues with respect to other types of training opportunities. Therefore, it would be a huge error in excluding this group of people from the scope of policy. Moreover, we cannot simply expect more and more adults to take up the route of self-directed training and be able to meet their emerging skill needs without any support.

5. Conclusion and Policy Implications

5.1 Main findings

The purpose of this paper was to examine: a) the factors underlying the observed trends and patterns in participation in job-related training during the period from 1993 to 2002, using the Adult Education and Training Surveys (AETS) conducted in 1993, 1997 and 2002 and b) the extent and determinant of informal learning as reported in the 2003 AETS.

The main findings are as follows:

- An increase in participation rate in adult education and training from 34.1 % in 1993 to 36.7% in 2003 does not reflect the rhetoric about the critical role of knowledge and skills in sustaining Canada's economic competitiveness and prosperity.
- According to the 2003 AETS close to two out of every three Canadian adults engage in some form of informal learning.
- Those with low educational attainment rely almost exclusively on informal learning while the well educated engage in both organised and informal learning which suggests that informal learning does not compensate for lack of participation in organised learning activities.
- The analyses suggest that some inequalities are increasing while others are somewhat diminishing under the so called knowledge economy.
- The finding supports the suggestion in the literature that employers are increasingly paying more attention to a worker's capacity to learn. Educational attainment therefore takes on an even stronger role not only as a hiring criterion but also in the decision on who will receive training. Consequently the established link between initial education and continuing education is further strengthened in the knowledge economy.
- The results speak to the central role that work plays in the construction of adult readiness to engage in adult learning. Almost 4 out of every 5 learners report to participate in training for job and career reasons. Further, slightly more than half of the participants have been engaged in employer-sponsored job-related training.
- The availability of training opportunities at work remain strongly related to job and workplace characteristics although some moderate improvements have been noted.

5.2 Implications

Public funding

The findings confirm that governments face major challenges in extending adult learning to disadvantaged groups. Public intervention in the training market can be justified by the fact that the low skilled are at risk of being routinely excluded from the labour market. As pointed out by the OECD (2005) such an intervention can be justified both on social and economic grounds. According to the OECD a public strategy should focus on increasing incentives to invest in adult learning, through tax and institutional arrangements that favour cost sharing among individuals, firms and governments – known as co-financing schemes.

While recognizing the need for developing co-financing schemes in Canada, comparative data on participation reveal that public funding can have a substantial impact on the participation of those least likely to enroll in AET opportunities (OECD, 2000; 2005b). At the same time there is evidence to suggest that unless there is earmarked funding for target groups, even AET initiatives/programmes with pronounced ambitions to reach the disadvantaged, actually provide a service that corresponds better to the demands of the advantaged. This is a result of existing funding regimes not compensating for the increased costs involved in recruiting the disadvantaged. In a time when government policies seek to increase efficiency through the adoption of a more market-oriented approach and outcomes-based funding, there is a growing likelihood that AET initiatives/programmes will go after those easiest to recruit and most likely to succeed (Rubenson, forthcoming).

Based on a review of comparative research on participation Desjardins, Rubenson and Malik (forthcoming) point to the important role the voluntary sector can play in delivering adult education and training to groups that traditionally have had a low participation. However, the integration of the volunteer sector into a comprehensive adult education and training policy requires direct state to be successful.

The need for theoretical and methodological development of informal learning

The analyses of informal learning highlight the problem of the state of theory and difficulties in estimating involvement in informal learning. Since the middle of the 1990s policy documents as well as scholarly articles have strongly argued for the importance of addressing not only participation in organized forms of adult education and learning but also take account of informal learning. While there is no doubt that informal learning plays a significant role in human capital development there are problems using existing surveys to empirically estimate the scope of this contribution. Further, they are not helpful in analysing the extent to which modes of informal learning can be a substitute for formal education. Surveys which estimate the extent of informal learning through the approach applied in the 2003 AETS more or less find that this is a universal phenomenon. It is therefore not surprising that we found that those who participate in organized forms of adult education and training are engaged in informal learning to the same extent as those not participating in organized modes of adult learning. If informal learning is a universal activity it is important to reconsider the issue that Betcherman, McMullen and Davidman (1998, p. 46) raise in connection with workplace training. Their point is that

the distribution of organized training varies, but informal training is more or less even across firms.

Further, the literature review suggested that, e.g., educational attainment and work factors play a central role in what kind of informal learning contexts are available. This suggests that the same form of tracking that goes on in informal education occurs in informal learning. In other words, while some groups have access to rich informal curricula others are left with rather sparse curricula. In order to draw far reaching policy conclusions based on the distribution of informal learning in Canadian society there is a need for research that can yield detailed information on the actual knowledge, competencies and skills that people have gained from their informal learning activities.

Link public policies and private strategies to the long arm of the job

The data point to the necessity to anchor a Canadian strategy on lifelong learning in the world of work. A limitation of the AETS is that it does not contain direct information on the skills and competencies that are being used to perform the actual job. However, the literature review suggests that the availability of training opportunities at work are strongly related to the demand structure: the more skills being used the more likely the employee is to train (see e.g. Desjardins, Rubenson and Milana, forthcoming; Illeris, 2004a). As predicted by the valence expectancy framework adults who cannot see that participation in adult education and training will have any positive outcomes, particularly in relation to their work situation, but also life in general, are highly unlikely to participate. A shift from an economic and human resource strategy based on a low skill/low wage equilibrium to one that organises work according to a high skills equilibrium (Brown, Green and Lauder, 2001) will most likely change low skilled workers perception of the value of participating in adult education and training. As Rubenson (forthcoming) argues, the very high and more equal participation in adult education and training in the Nordic Countries is related to a national high skills strategy. These findings support the institutional theoretical perspective on participation in adult education and training. It also suggests that the present Canadian lifelong learning strategy that is primarily anchored in a youth initiative will need to be complemented with an adult learning initiative that recognises the significant role of the work context. It needs to simultaneously affect the supply side of skills and the demand of these skills in the production process.

Table A1 Percentage distribution of adult population aged 25 to 64 according to their engagement in training activities, by socio-economic characteristics, 2002						
	Weighted number of adults	Took both formal & self-directed learning	Took formal learning only	Took self-directed learning only	Took neither	Total
		%	%	%	%	%
Age group						
Ages 25 to 34	4,310,029	36.4	9.2	28.6	25.8	100.0
Ages 35 to 44	5,164,732	30.1	8.5	29.8	31.6	100.0
Ages 45 to 54	4,604,288	27.9	7.6	28.1	36.4	100.0
Ages 55 to 64	3,141,583	14.8	8.1	18.6	58.5	100.0
Sex						
Male	8,586,188	27.9	7.2	30.9	34.0	100.0
Female	8,634,444	28.7	9.6	23.1	38.7	100.0
Education attainment						
Some high school or less	2,751,973	7.0	5.2	23.2	64.6	100.0
High school graduate	3,433,611	18.3	7.6	29.6	44.6	100.0
Postsecondary non-university	7,362,636	31.8	9.3	28.5	30.4	100.0
University	3,671,501	46.5	9.5	24.5	19.5	100.0
Labour force status						
Employed	12,838,408	33.7	8.0	30.6	27.8	100.0
Unemployed	1,020,613	20.5	8.0	32.8	38.8	100.0
Not in the labour force	3,361,613	10.1	10.0	11.7	68.3	100.0

Table A1 (continued) Percentage distribution of adult population aged 25 to 64 according to their engagement in training activities, by socio-economic characteristics, 2002						
	Weighted number of adults	Took both formal & self-directed learning	Took formal learning only	Took self-directed learning only	Took neither	Total
		%	%	%	%	%
Household income group						
Not stated	2,177,439	16.7	9.0	21.1	53.2	100.0
Less than \$5,000	153,093	24.1	7.1	28.5	40.4	100.0
\$5,000 to less than \$10,000	453,233	13.6	8.0	24.7	53.7	100.0
\$10,000 to less than \$15,000	687,346	18.0	7.5	22.9	51.6	100.0
\$15,000 to less than \$20,000	779,311	20.5	6.9	26.0	46.6	100.0
\$20,000 to less than \$30,000	1,612,454	19.0	5.8	30.3	44.9	100.0
\$30,000 to less than \$40,000	2,044,646	22.1	8.2	30.8	38.9	100.0
\$40,000 to less than \$50,000	1,931,722	28.5	7.8	29.2	34.4	100.0
\$50,000 to less than \$60,000	1,737,240	31.2	8.7	28.8	31.3	100.0
\$60,000 to less than \$80,000	2,329,451	35.6	9.7	28.5	26.2	100.0
\$80,000 or more	3,314,694	43.6	9.2	24.9	22.3	100.0
Year of immigration						
1998 to 2003	570,434	31.3	7.2	33.6	28.0	100.0
1993 to 1997	509,783	20.9	6.5	36.6	36.0	100.0
1983 to 1992	712,335	23.2	9.0	27.3	40.5	100.0
Before 1983	1,737,272	24.4	7.2	28.3	40.1	100.0
Not a landed immigrant or permanent resident	91,888	33.6	8.5	9.9	48.0	100.0
Born in Canada	13,159,123	29.8	8.5	26.5	35.1	100.0
Not stated	439,798	11.0	10.9	19.1	59.1	100.0

Table A1 (continued) Percentage distribution of adult population aged 25 to 64 according to their engagement in training activities, by socio-economic characteristics, 2002						
	Weighted number of adults	Took both formal & self-directed learning	Took formal learning only	Took self-directed learning only	Took neither	Total
		%	%	%	%	%
Activity limitation						
No	15,073,872	30.1	8.6	27.8	33.5	100.0
Yes	2,146,761	16.0	6.6	21.2	56.3	100.0
Marital status						
Married or common-law	12,249,048	27.5	8.2	27.0	37.3	100.0
Widowed	277,047	11.4	6.0	18.6	64.0	100.0
Separated or divorced	1,624,095	28.0	7.5	26.1	38.5	100.0
Single never married	3,069,250	33.3	9.9	28.2	28.6	100.0
Not stated	1,192					
Size of economic family						
One	2,761,859	31.5	9.0	26.8	32.7	100.0
Two	4,919,230	26.8	9.0	24.1	40.1	100.0
Three	3,532,961	27.6	9.1	27.0	36.3	100.0
Four	3,912,617	30.8	7.5	29.7	32.0	100.0
Five or more	2,093,965	24.2	6.5	29.1	40.3	100.0
Economic family type						
Husband-wife dual earner	7,527,984	34.8	7.9	29.2	28.1	100.0
Husband-wife single earner	3,730,148	20.6	8.5	26.4	44.6	100.0
Husband-wife non-earner	1,287,939	7.9	9.7	16.4	66.0	100.0
Single parent family, parent employed	747,680	34.5	8.3	31.7	25.6	100.0
Single parent family parent not employed	289,980	15.3	7.9	23.4	53.4	100.0
Unattached individual/other family types	3,632,635	29.7	8.9	26.1	35.3	100.0

Table A1 (continued) Percentage distribution of adult population aged 25 to 64 according to their engagement in training activities, by socio-economic characteristics, 2002						
	Weighted number of adults	Took both formal & self-directed learning	Took formal learning only	Took self-directed learning only	Took neither	Total
		%	%	%	%	%
Presence of children 0 to 5						
No	14,413,043	28.3	8.2	26.5	37.0	100.0
Yes	2,807,590	28.3	9.2	29.7	32.8	100.0
Took training 97 to 01						
No	9,747,882	13.2	7.9	26.9	52.1	100.0
Yes	7,472,749	48.1	9.1	27.1	15.8	100.0
Will train next 3 years						
Very likely	5,034,187	53.4	8.2	27.2	11.2	100.0
Somewhat likely	3,466,773	25.2	8.0	37.7	29.1	100.0
Not very likely	2,981,995	13.8	8.2	33.3	44.7	100.0
Not likely at all	4,699,521	5.3	7.0	19.5	68.3	100.0
Not stated	286,608	11.9	15.8	22.5	49.9	100.0
Not applicable	751,549	82.3	17.7			100.0
Institutional barrier to formal learning						
No	13,592,998	26.7	9.3	24.2	39.8	100.0
Yes	3,627,633	34.2	5.0	37.5	23.3	100.0
Situational barrier to formal training						
No	11,917,369	29.9	10.2	23.5	36.5	100.0
Yes	5,303,265	24.7	4.4	34.9	36.0	100.0

Table A1 (continued) Percentage distribution of adult population aged 25 to 64 according to their engagement in training activities, by socio-economic characteristics, 2002						
	Weighted number of adults	Took both formal & self-directed learning	Took formal learning only	Took self-directed learning only	Took neither	Total
		%	%	%	%	%
Dispositional barrier to formal training						
No	10,246,797	42.9	11.1	20.7	25.3	100.0
Yes	6,973,836	6.9	4.3	36.3	52.5	100.0
Province						
Newfoundland and Labrador	304,428	20.9	6.8	26.9	45.4	100.0
Prince Edward Island	75,181	25.7	7.7	25.8	40.8	100.0
Nova Scotia	514,738	27.3	9.9	25.3	37.5	100.0
New Brunswick	417,853	25.1	8.3	24.5	42.1	100.0
Québec	4,188,665	26.1	10.1	24.2	39.6	100.0
Ontario	6,687,605	28.6	6.7	29.8	34.9	100.0
Manitoba	572,899	31.9	8.4	28.1	31.7	100.0
Saskatchewan	483,537	29.7	9.2	27.2	33.8	100.0
Alberta	1,693,907	28.7	8.9	25.6	36.8	100.0
British Columbia	2,281,817	31.9	9.5	25.5	33.1	100.0
Total	17,220,630	28.3	8.4	27.0	36.3	100.0

Table A2 Percentage distribution of adult employee population aged 25 to 64 according to their engagement in training activities, by occupation and workplace characteristics, 2002						
	Weighted number of adults	Took both formal & self-directed learning	Took formal learning only	Took self-directed learning only	Took neither	Total
		%	%	%	%	%
Type of job						
Full-time	9,149,479	35.6	8.4	29.8	26.1	100.0
Part-time	1,430,502	32.6	9.3	27.6	30.5	100.0
Permanent	9,356,789	35.6	8.6	29.0	26.8	100.0
Not permanent	813,723	33.0	9.4	32.6	25.0	100.0
Job tenure						
1 to 12 months	1,597,893	34.5	6.7	33.5	25.3	100.0
13 to 36 months	1,886,327	35.4	8.6	31.5	24.6	100.0
37 to 60 months	1,430,723	36.6	7.9	30.2	25.2	100.0
61 to 120 months	1,865,737	33.2	9.6	30.6	26.6	100.0
121 to 239 months	2,252,890	35.8	9.1	26.1	29.0	100.0
240 mths or more (20 yrs)	1,546,410	35.8	9.0	26.2	29.1	100.0
Broad type of occupation						
Professional, managerial	4,848,757	47.6	9.7	27.0	15.7	100.0
Clerical, sales, service	3,882,645	26.1	8.7	29.6	35.5	100.0
Blue collar worker	2,971,199	20.9	7.5	32.5	39.0	100.0
Union membership						
Union member	3,578,650	39.5	10.2	24.2	26.1	100.0
Non-union member	6,591,862	33.1	7.8	32.1	27.0	100.0
Type of industry						
Agriculture	138,553	26.1	3.5	23.3	47.1	100.0
Other primary	236,000	31.8	8.9	23.0	36.3	100.0
Manufacturing	2,017,436	22.7	7.7	34.8	34.8	100.0
Construction	586,333	24.3	5.6	33.4	36.7	100.0
Utilities	115,831	45.4	10.1	22.8	21.6	100.0

Percentage distribution of adult employee population aged 25 to 64 according to their engagement in training activities, by occupation and workplace characteristics, 2002						
	Weighted number of adults	Took both formal & self-directed learning	Took formal learning only	Took self-directed learning only	Took neither	Total
		%	%	%	%	%
Transportation	618,969	26.2	11.2	26.4	36.3	100.0
Trade	1,565,734	27.0	7.3	31.1	34.6	100.0
Finance, insurance and real estate	694,125	43.1	10.2	27.8	18.9	100.0
Education, health and welfare	2,401,536	47.8	10.5	22.2	19.5	100.0
Business and services	2,555,328	29.4	8.8	34.4	27.5	100.0
Public administration	772,737	51.5	10.3	20.2	18.0	100.0
Firm size						
Less than 20	1,706,094	25.0	7.4	36.0	31.5	100.0
20 to 99	1,568,752	30.1	7.7	31.8	30.4	100.0
100 to 500	1,579,940	34.4	9.1	30.0	26.5	100.0
More than 500	5,315,726	40.5	9.2	26.2	24.1	100.0
Institutional barrier to formal learning						
No	9,139,801	32.4	10.0	26.5	31.0	100.0
Yes	2,733,356	37.2	5.1	38.2	19.5	100.0
Situational barrier to formal learning						
No	8,395,983	34.6	10.8	24.7	29.9	100.0
Yes	3,477,174	30.8	4.4	40.0	24.7	100.0
Dispositional barrier to formal learning						
No	7,046,317	51.5	12.5	22.0	14.0	100.0
Yes	4,826,841	7.3	3.7	39.7	49.3	100.0
Total	11,873,157	33.5	8.9	29.2	28.4	100.0

Table A3 Percentage and likelihood of adult population aged 25 to 64 undertaking both formal and self-directed training activities, by socio-economic characteristics, 2002					
	Participated in both formal & self-directed learning	Unadjusted		Adjusted	
	%	B	Exp(B)	B	Exp(B)
Age group					
Ages 55 to 64	14.8		1.00		1.00
Ages 25 to 34	36.4	1.20	3.30 ¹	-0.12	0.88 ³
Ages 35 to 44	30.1	0.91	2.48 ¹	-0.13	0.88 ³
Ages 45 to 54	27.9	0.80	2.23 ¹	-0.11	0.89 ³
Sex					
Female	28.7		1.00		1.00
Male	27.9	-0.04	0.96 ³	-0.14	0.87 ¹
Education attainment					
Some high school or less	7.0		1.00		1.00 ¹
High school graduate	18.3	1.09	2.97 ¹	0.49	1.64 ¹
Postsecondary non-university	31.8	1.82	6.20 ¹	0.78	2.17 ¹
University	46.5	2.45	11.55 ¹	1.18	3.26 ¹
Labour force status					
Not in the labor force	10.1		1.00		1.00 ¹
Employed	33.7	1.51	4.53 ¹	0.94	2.56 ¹
Unemployed	20.5	0.83	2.29 ¹	0.56	1.76 ¹
Household Income group					
\$80,000 or more	43.6		1.00		1.00
Not stated	16.7	-1.35	0.26 ¹	-0.73	0.48 ¹
Less than \$5,000	24.1	-0.89	0.41 ¹	-0.25	0.78 ³
\$5,000 to less than \$10,000	13.6	-1.59	0.20 ¹	-0.83	0.44 ¹
\$10,000 to less than \$15,000	18.0	-1.26	0.28 ¹	-0.72	0.49 ¹
\$15,000 to less than \$20,000	20.5	-1.10	0.33 ¹	-0.45	0.63 ¹
\$20,000 to less than \$30,000	19.0	-1.19	0.30 ¹	-0.55	0.57 ¹
\$30,000 to less than \$40,000	22.1	-1.00	0.37 ¹	-0.48	0.62 ¹
\$40,000 to less than \$50,000	28.5	-0.66	0.51 ¹	-0.19	0.83 ¹
\$50,000 to less than \$60,000	31.2	-0.54	0.58 ¹	-0.29	0.75 ¹
\$60,000 to less than \$80,000	35.6	-0.33	0.72 ¹	-0.25	0.78 ¹
Year of Immigration					
Born in Canada	29.8		1.00		1.00
1998 to 2003	31.3	1.31	3.69 ¹	0.68	1.98 ¹
1993 to 1997	20.9	0.76	2.14 ¹	0.24	1.27 ³
1983 to 1992	23.2	0.89	2.45 ¹	0.53	1.70 ¹
Before 1983	24.4	0.96	2.62 ¹	0.74	2.09 ¹
Not a landed immigrant or permanent resident	33.6	1.41	4.11 ¹	0.61	1.84 ²
Activity limitation					
No	30.1		1.00		
Yes	16.0	-0.82	0.44 ¹	-0.11	0.90 ¹
Marital status					
Married or common-law	27.5		1.00		1.00
Widowed	11.4	-1.08	0.34 ¹	-0.05	0.96 ³

Table A3 (continued) Percentage and likelihood of adult population aged 25 to 64 undertaking both formal and self-directed training activities, by socio-economic characteristics, 2002					
	Participated in both formal & self-directed learning	Unadjusted		Adjusted	
	%	B	Exp(B)	B	Exp(B)
Separated or divorced	28.0	0.02	1.02 ³	0.32	1.37 ¹
Single never married	33.3	0.27	1.31 ¹	0.12	1.13 ³
Size of economic family					
One	31.5		1.00		1.00
Two	26.8	-0.23	0.80 ¹	-0.15	0.86 ³
Three	27.6	-0.19	0.83 ¹	-0.11	0.89 ³
Four	30.8	-0.03	0.97 ³	-0.13	0.88 ³
Five or more	24.2	-0.37	0.69 ¹	-0.24	0.79 ²
Economic family type					
Husband-wife dual earner	34.8		1.00		1.00
Husband-wife single earner	20.6	-0.73	0.48 ¹	-0.17	0.85 ¹
Husband-wife non-earner	7.9	-1.83	0.16 ¹	-0.68	0.51 ¹
Single parent family, parent employed	34.5	-0.02	0.98 ³	-0.24	0.79 ³
Single parent family parent not employed	15.3	-1.08	0.34 ¹	-0.44	0.65 ³
Unattached individual/other family types	29.7	-0.24	0.79 ¹	-0.33	0.72 ¹
Presence of children 0 to 5					
No	28.3		1.00		1.00
Yes	28.3	0.00	1.00 ³	-0.34	0.71 ¹
Took training 97 to 01					
No	13.2		1.00		1.00
Yes	48.1	1.81	6.10 ¹	0.82	2.28 ¹
Will train next 3 years					
Not likely at all	5.3		1.00		1.00
Very likely	53.4	3.02	20.50 ¹	1.83	6.25 ¹
Somewhat likely	25.2	1.79	6.02 ¹	1.13	3.09 ¹
Not very likely	13.8	1.05	2.87 ¹	0.68	1.98 ¹
Not stated	11.9	0.88	2.41 ¹	0.64	1.90 ¹
Institutional barrier to formal learning					
No	26.7		1.00		1.00
Yes	34.2	0.36	1.43 ¹	-0.08	0.92 ³
Situational barrier to formal training					
No	29.9		1.00		1.00
Yes	24.7	-0.26	0.77 ¹	-0.71	0.49 ¹
Dispositional barrier to formal training					
No	42.9		1.00		1.00
Yes	6.9	-2.32	0.10 ¹	-2.08	0.13 ¹
Province					
Newfoundland and Labrador	20.9		1.00		1.00 ¹
Prince Edward Island	25.7	0.27	1.31 ¹	0.19	1.20 ³
Nova Scotia	27.3	0.35	1.42 ¹	0.06	1.07 ³

Table A3 (continued) Percentage and likelihood of adult population aged 25 to 64 undertaking both formal and self-directed training activities, by socio-economic characteristics, 2002					
	Participated in both formal & self-directed learning	Unadjusted		Adjusted	
	%	B	Exp(B)	B	Exp(B)
New Brunswick	25.1	0.24	1.27 ³	0.10	1.11 ³
Québec	26.1	0.29	1.34 ¹	0.26	1.30 ³
Ontario	28.6	0.42	1.51 ¹	0.08	1.08 ³
Manitoba	31.9	0.57	1.77 ¹	0.20	1.22 ³
Saskatchewan	29.7	0.47	1.60 ¹	0.05	1.05 ³
Alberta	28.7	0.42	1.52 ¹	0.01	1.01 ³
British Columbia	31.9	0.57	1.77 ¹	0.28	1.32 ³
Total	28.3				
Note: A superscripted "1" denotes statistically significant at the level of .01; a superscripted "2" denotes statistically significant at the .05 level and a "3" denoting statistical significance above the level of .05(two-tailed tests).					

Table A4
Percentage and likelihood of adult employee population aged 25 to 64 undertaking both formal and self-directed training activities, by occupation and workplace characteristics, 2002

	Participated in both formal & self-directed learning	Unadjusted		Adjusted	
	%	B	Exp(B)	B	Exp(B)
Age group					
Ages 55 to 64	23.69		1.00		1.00
Ages 25 to 34	38.89	0.72	2.05 ¹	0.44	1.56 ¹
Ages 35 to 44	33.37	0.48	1.61 ¹	0.28	1.32 ¹
Ages 45 to 54	32.15	0.42	1.53 ¹	0.20	1.22 ¹
Sex					
Female	35.5		1.00		1.00
Male	31.6	-0.17	0.84 ¹	0.00	1.00 ³
Education attainment					
Some high school or less	8.9		1.00		1.00
High school graduate	21.9	1.06	2.87 ¹	0.77	2.16 ¹
Postsecondary non-university	36.3	1.77	5.85 ¹	1.20	3.33 ¹
University	51.4	2.38	10.85 ¹	1.55	4.69 ¹
Type of job					
Part-time	32.6		1.00		1.00
Full-time	35.6	0.13	1.14 ¹	0.10	1.10 ³
Not permanent	33.0				1.00
Permanent	35.6	0.12	1.12 ³	0.39	1.48 ¹
Job tenure					
1 to 12 months	34.5		1.00		1.00
13 to 36 months	35.4	0.04	1.04 ³	-0.15	0.86 ²
37 to 60 months	36.6	0.09	1.10 ³	-0.03	0.97 ³
61 to 120 months	33.2	-0.06	0.95 ³	-0.09	0.91 ³
121 to 239 months	35.8	0.06	1.06 ³	0.04	1.04 ³
240 mths or more (20 yrs)	35.8	0.06	1.06 ³	0.23	1.26 ¹
Broad type of occupation					
Blue collar worker	20.9				1.00
Professional, managerial	47.6	1.29	3.63 ¹	0.56	1.75 ¹
Clerical, sales, service	26.1	0.34	1.41 ¹	0.04	1.04 ³
Union membership					
Non-union member	33.1		1.00		1.00
Union member	39.5	0.27	1.32 ¹	-0.10	0.90 ³
Type of industry					
Agriculture	26.1		1.00		1.00
Other primary	31.8	0.28	1.32 ³	-0.60	0.55 ²
Manufacturing	22.7	-0.18	0.83 ³	-1.18	0.31 ¹
Construction	24.3	-0.10	0.91 ³	-0.72	0.49 ¹
Utilities	45.4	0.86	2.36 ¹	-0.50	0.61 ³
Transportation	26.2	0.00	1.00 ³	-0.90	0.41 ¹
Trade	27.0	0.05	1.05 ³	-0.90	0.41 ¹

Table A4 (continued) Percentage and likelihood of adult employee population aged 25 to 64 undertaking both formal and self-directed training activities, by occupation and workplace characteristics, 2002					
	Participated in both formal & self-directed learning	Unadjusted		Adjusted	
	%	B	Exp(B)	B	Exp(B)
Finance, insurance and real estate	43.1	0.76	2.15 ¹	-0.61	0.54 ²
Education, health and welfare	47.8	0.95	2.59 ¹	-0.55	0.58 ²
Business and services	29.4	0.16	1.18 ³	-1.09	0.34 ¹
Public administration	51.5	1.10	3.01 ¹	-0.42	0.66 ³
Firm size					
Less than 20	25.0		1.00		1.00
20 to 99	30.1	0.25	1.29 ¹	0.22	1.25 ¹
100 to 500	34.4	0.45	1.57 ¹	0.28	1.33 ¹
More than 500	40.5	0.71	2.04 ¹	0.41	1.50 ¹
Institutional barrier to formal learning					
No	32.4		1.00		1.00
Yes	37.2	0.21	1.23 ¹	-0.08	0.92 ³
Situational barrier to formal learning					
No	34.6		1.00		1.00
Yes	30.8	-0.17	0.84 ¹	-0.77	0.46 ¹
Dispositional barrier to formal learning					
No	51.5		1.00		1.00
Yes	7.3	-2.60	0.07 ¹	-2.76	0.06 ¹
Total	33.5				

Bibliography

- Altonji, J. G., & Spletzer, J. R. (1991). "Worker characteristics, job characteristics, and the receipt of on-the-job training." *Industrial and Labor Relations Review*, 45, 58-79.
- Baran, J.; Bérubé, G.; Roy, R. and Salmon, W. (2000). *Adult education and training in Canada: Key knowledge gaps*. Ottawa: Applied Research Branch, Human Resources Development Canada.
- Bartel, A. and F. Lichtenberg. 1987. "The comparative advantage of educated workers in implementing new technology." *The Review of Economics and Statistics* 69(1): 1-11.
- Becker, G. (1964). *Human capital: A theoretical and empirical analysis with special reference to education*. New York: Columbia University Press.
- Bélanger, P., & Valdivieso, S. (Eds.), (1997). *The emergence of a learning society. Who participates in adult learning?* Oxford: Pergamon Press.
- Berryman, S.E. (1995). *The role of literacy in the wealth of individuals and nations*. Philadelphia: National Centre on Adult Literacy, University of Pennsylvania.
- Bérubé, G., Salmon, W., Tuijnman, A. (2001). *A report on adult education and training in Canada*. HRDC, Ottawa. Retrieved on February 12, from <http://www.hrsdc.gc.ca/en/cs/sp/hrsd/prc/publications/research/2001-002531/page12.shtml>
- Betcherman, G., McMullen, K. and Davidman, K. (1998). *Training for the new economy: A synthesis report*. Ottawa: Canadian Policy Research Network.
- Billett, S. (2004). "Workplace participatory practices. Conceptualising workplaces as learning environments." *The Journal of Workplace Learning*, 16(6), 312-320.
- Bills, D.B. (1988). "Educational credentials and promotions: does schooling do more than you get you in the door?" *Sociology of Education*, 61, 52-60.
- Blaug, M. (1976). "The empirical status of human capital theory: a slightly jaundiced survey." *Journal of Economic Literature*. September, 827-855.
- Boud, D. and Middleton, H. (2003). "Learning from others at work: communities of practice and informal learning." *Journal of Workplace Learning* 15 (5), 194-203.
- Boudard, E. (2001). *Literacy proficiency, earnings and recurrent training: a ten country comparative study*. Stockholm: Institute of International Education, Stockholm University.
- Bourdieu, P. "Cultural reproduction and social reproduction." In J. Karabel, & A.G. Halsey (Eds.), *Power and ideology in education*. New York: Oxford University Press, 1977.

- Bourdieu, P., & Passeron, J-C. (1977). *Reproduction in education, society and culture* (R. Nice translator). London: Sage Publications.
- Bowers, N. & Swaim, P. (1994). "Recent trends in job training." *Contemporary Economic Policy*, 12, 79-88.
- Brown, P., Green, A. and Lauder, H. (2001). *High skills: globalization, competitiveness, and skill formation*. Oxford: Oxford University Press.
- Carnevale, A. P., & Goldstein, H. (1990). "Schooling and training for work in America: An overview." In L. Ferman, L, et al., (Eds), *New developments in worker training: A legacy for the 1990s. Industrial Relations Research Association Series*. Madison, Wisconsin.: Industrial Relations Research Association.
- Carnoy, M. (1995). "Foreword: How should we study adult education." In C.A. Torres, (Ed.), *The politics of non-formal education in Latin America*. New York: Praeger.
- Carré, P. (2000). "Motivation in adult education: From engagement to performance." In *Proceedings of the 41st Annual Adult Education Research Conference*. Vancouver: University of British Columbia, pp. 66-70.
- The Conference Board of Canada. (2005). *The skills factor in productivity and competitiveness. How Canada's Sector Councils are helping address the skills and labour needs of employers*. Ottawa: The Conference Board of Canada.
- Cross, K.P. (1981). *Adults as learners*. San Francisco: Jossey-Bass.
- Darkenwald, G. and Mirriam, S. (1982). *Adult education: foundations of practice*. New York: Harper & Row.
- Desjardins, R. (2004). *Learning for well being. Studies using the international adult literacy survey*. Stockholm: Institute of International Education, Stockholm University.
- Desjardins, R. Rubenson, K. and Milana, M. (in press). *Unequal chances to participate in adult learning: International perspectives*. Paris: UNESCO IIEP Fundamentals of Educational Planning Series.
- Dougherty, C. (1992). "Evaluation of the economic and labour market effects of continuing education and training: practice and policy issues." *International Journal of Educational Research*. 17, 549-563.
- Eraut, M. (2004). "Informal learning in the workplace." *Studies in Continuing Education*, 26(2), 247-273.
- Esping-Andersen, G. (1990). *Three worlds of welfare capitalism*. Cambridge: Polity Press.
- Esping-Andersen, G. (1996). "Positive-sum solutions in a world of trade offs?" In G. Esping-Andersen, (Ed.), *Welfare states in transition: National adaptations in global economies*. Oxford: Pergamon Press.

- European Commission. (2000). *A memorandum on lifelong learning*. Luxembourg: Office for Official Publications of the European Commission.
- European Commission (2001) *Communication: Making a European Area of Lifelong Learning a Reality*, Luxembourg: European Communities, <http://www.europa.eu.int/comm/education/life/index.htm>, accessed November 2003.
- Evans, K., Hodgkinson, P., Rainbird, H. and Unwin, L. (2006). *Improving workplace learning*. London: Routledge.
- Evans, N. (2003). *Making Sense of Lifelong Learning*. Lond and New York: Routledge.
- Farkas, G., England, P., & Barton, M. (1988). "Structural effects on wages: sociological and economic views." In Farkas, G. & England, P. (eds), *Industries, Firms, and Jobs: Sociological and Economic Approaches*. (pp.93-112). New York: Plenum.
- Field, J. (1999). "Schooling, networks and the labor market: Explaining participation in lifelong learning in Northern Ireland." *British Educational Research Journal*. 25(4), pp. 501-516.
- Gorard, S., Selwyn, N., Madden, L. (2003). "Logged on to learning? Assessing the impact of technology on participation in lifelong learning." *Int. j of Lifelong Education*, 22(3), 281-296.
- Helms-Jørgensen, C. & Warring, N. (2003). "Learning in the workplace - the interplay between learning environments and biographical learning trajectories." In: H. Salling-Olsen, (Ed.), *Adult Education and the Labour Market VII*, Volume B. Roskilde: Roskilde University Press.
- Hodson, R., & Hooks, G. (1994). "Training in the workplace: continuity and change." *Sociological Perspectives*. 37, 97-118.
- Holzer, H. (1996). *What employers want: Job prospects for less-educated workers*. New York: Russell Sage Foundation.
- Hosmer, D.W., and Lemeshow, S. (1989). *Applied logistic regression*. New York: John Wiley and Sons.
- Houtkoop, W., & Kamp, M.V.D. (1992). "Factors influencing participation in continuing education." *International Journal of Educational Research*. 17, 537-548.
- HRDC. (2002). *Achieving excellence: Investing in people, knowledge, and opportunity*. Retrieved April 27, 2005, from <http://www.innovationstrategy.gc.ca>
- HRDC. (2001). *Self-employment, skill development and training in Canada*. Retrieved January 16, 2006, from <http://www.hrsdc.gc.ca/en/cs/sp/hrsd/prc/publications/research/2001-000017/IW-01-12-1E.pdf>

- HRDC. (2001). *Adult education participation in North America*. Retrieved January 26, 2006, from http://www.hrsdc.gc.ca/en/cs/sp/hrsd/prc/publications/research/2001-000126/adult_lit.pdf
- HRDC/OECD. (2000). *Literacy in the information age*. Ottawa and Paris: HRDC and OECD.
- Hum, D. and Simpson, W. (2002). "Adult training in Canada: Snapshots from the nineties." *Education Quarterly Review*. 8(2), 26-32.
- Hum, D. and Simpson, W. (2004). "What are Canadians doing after school: An analysis of post-school training activity." In J. Gaskell and K. Rubenson (Eds), *Educational outcomes for the Canadian workplace. New frameworks for policy and research*. Toronto: University of Toronto Press.
- Illeris, K. (2004a). "A model for learning in working life." *The Journal of Workplace Learning*. 16(8), pp 431-441.
- Illeris, K. (2004b). "Lifelong learning and the low skilled." *International Journal of Lifelong Learning*. 25(1), pp. 15-28.
- INFED. (2006). *Participation in learning projects and programmes*. Retrieved January 26, 2006, from <http://www.webarchive.org.uk/pan/13238/20060117/www.infed.org/biblio/b-partln.htm>
- International Adult Literacy Survey*, HRDC. (2001). Adult education participation in North America. [Electronic version]. http://www.hrsdc.gc.ca/en/cs/sp/hrsd/prc/publications/research/2001-000126/adult_lit.pdf
- Jonstone, J.W.C., & Rivera, R. J. (1965). *Volunteers for Learning. A Study of the Educational Pursuits of American Adults*. Chicago: Aldine.
- Kalleberg, A.L. (1992). "Job training in Norway: organizational and individual differences." *International Journal of Educational Research*. 17, pp. 565-579.
- Kalleberg, A.L., Knoke, D., Marsden, P.V., & Spaeth, J.L.(1996). *Organizations in America: Analyzing their structures and human resource practices*. Thousand Oaks: Sage Publications.
- Keep, E. (1999). Employer attitudes towards adult training. Retrieved February 3, 2006, from http://www.abpi.org.uk/education/NTO/NTO_Documents/pdfs/SkillForesightchapter5Emplo.PDF#search='Employer%20attitudes%20towards%20adult%20training'
- Kim, A., Merriam, S. (2004). "Motivations for learning among older adults in a learning in retirement institute." *Educational Gerontology*. 30 (4), pp. 441-455.
- Knowles, M. (1970). *The modern practice of adult education: Andragogy versus pedagogy*. New York: Association Press.

- Knowles, M. (1980). *The modern practice of adult education: From pedagogy to andragogy*. Englewood Cliffs: Cambridge.
- Leeuwen, S. V., & Dronkers, J. (1992). "Effects of continuing education: a study on adult education, social inequality, and labor market position." *International Journal of Educational Research*. 17, 609-624.
- Lillard L. A., & Tan, H. W. (1992). "Private sector training: who gets it and what are its effects." *Research in Labor Economics*. 13, 1-62.
- Livingstone, D. W. (1999a). *The education-job gap: Underemployment or economic democracy*. Toronto: Garamond Press.
- Livingstone, D.W. (1999b). "Exploring the icebergs of adult learning: Findings of the first Canadian survey of informal learning practices." *Canadian Journal for the Study of Adult Education*. 13(2), pp. 49-72.
- Livingstone, D.W. (2001). "Worker control as missing link in relation between paid/unpaid work and work-related learning." *The Journal of Workplace Learning*. 13(7/8), pp. 308-317.
- Livingstone, D.W. (2005). "Expanding conception of work and learning: Recent research and policy implications." in A. Cummings, N. Basica, A. Datnow, A., K. Leithwood, and D.W. Livingstone (Eds.), *International Handbook of Educational Policy Series: Springer International Handbooks of Education*. Vol. 13. Retrieved February 3, 2006, from http://wall.oise.utoronto.ca/resources/Livingstone_Springerbook_ch52.pdf.
- Livingstone, D. W. and Sawchuk, P. H. (2005). "Hidden knowledge: Working-class capacity in the "knowledge-based economy." *Studies in the Education of Adults* 37 (2), 110-122.
- Lynch, L. (1991). *The impact of private sector training on race and gender wage differentials and the career patterns of young workers*. Final report submitted to the Department of Labor, Bureau of Labor Statistics.
- Martin, I. (2003). "Adult education: Lifelong learning and citizenship: Some ifs and buts." *International Journal of Lifelong Learning*. 22(6), pp. 566-579.
- McGivney, V. (2003). *Adult learning pathways*. London: NIACE.
- McGivney, V. (2004). "Understanding persistence in adult learning." *Open Learning*, 19 (1), pp. 33-46.
- McIntyre, J., Brown, A., & Ferrier, F. (1996). *The economics of ACE delivery*. Sydney: BACE.
- Mincer, J. (1988). *Job training, wage growth, and labour turnover*. NBER Working Paper 2690, August.

- Mincer, J. (1989a). *Labour market effects of human capital and of its adjustment to technological change*. Working paper, Institute on Education and Economy, February.
- Mincer, J. (1989b). "Human capital and the labour market: a review of current research." *Educational Researcher*, 27.
- Nash, N.S., & Hawthorne, E.M. (1987). *Formal recognition of employer-sponsored instruction: Conflict and collegiality in postsecondary education*, ASHE-ERIC Higher Education Report No. 3. Washington, D.C.: Association for the Study of Higher Education.
- NIACE. (2002). *Older people and learning-some key statistics*. London: NIACE.
- Noble, C., & Smith, A. (1996). *Enterprise training in Australia: Industry profiles and case studies*. Australia: Office of Training and Further Education.
- Nordhaug, D. (1991). *The shadow educational system: Adult resource development*. Oslo: Universitetsforlaget.
- OECD. (1996). *OECD Economic Surveys – Sweden: Implementing the OECD Jobs Strategy*. Paris: OECD.
- OECD. (2005a). *Promoting adult learning*. Paris: OECD.
- OECD/Statistics Canada. (2005b). *Learning a living. First results of the Adult Literacy and Life Skills Survey*. Paris/Ottawa: OECD/Statistics Canada.
- Payne, J. (2001). "Lifelong learning: a national trade union strategy in a global economy." *Int. j. of Lifelong Education*, 20(5), 378-392.
- Pedersen, J.-J. (2006). "The economic imperative for lifelong learning in Europe: Challenges from demographic trends 1995-2045." In S. Elers (Ed.), *Milestones: Towards lifelong learning systems*. Copenhagen: Danish University of Education Press.
- Peters, V. (2004). *Working and training: First results of the 2003 Adult Education and Training Survey*. Statistics Canada.
- Psacharopoulos, G., & Velez, E. (1992). "Does Training Pay, Independent of Educational?" *Some Evidence from Colombia*. *International Journal of Educational Research*, 17, 581-591.
- Rees, T. (1997). "A widening gender gap in the labour market." *Adults Learning*, 9 (2), 25-27.
- Reich, M., et al. (1975). "A theory of labour market segmentation." In M. Carnoy (Ed), *Schooling in a corporate society*. New York: McKay.
- Reardon, R. F. (2004). "Informal learning after organizational change." *Journal of Workplace Learning* 16 (7/8), 385-395.

- Richards, J. R. (2000). "The social contract in the knowledge society." In K. Rubenson and H. Schuetze (Eds.), *Transition to the knowledge society. Policies and strategies for individual participation and learning*. Vancouver: UBC Institute for European Studies.
- Riddell, C. (2004). "Education, skills and labour market outcomes: Exploring the linkages in Canada." In J. Gaskell and K. Rubenson (Eds.), *Educational outcomes for the Canadian workplace. New frameworks for policy and research*. Toronto: University of Toronto Press.
- Rubenson, K. (in press). "The Nordic model of lifelong learning." *Compare*.
- Rubenson, K. (1996). "Adult education research." In: A. Tuijnman (1996). *International Encyclopaedia of Adult Education and Training*. Paris, France: OECD.
- Rubenson, K. and Xu, G. (1997). "Barriers to participation in adult education and training: Towards a new understanding." In: p. Bélanger and A. Tuijnman (Ed.), *New patterns of adult learning: A six-country comparative study*, Oxford: Pergamon Press.
- Rubenson, K. (2001). *Measuring motivation and barriers in the AETS: A critical review*. R-01-9-2E. Ottawa: Human Resources Development Canada Research Paper.
- Sargant, N. (1997). *The learning divide*. London: NIACE.
- Smith, J. P., & Welch, L. R. (1986). *Closing the Gap: Forty Years of Economic Progress for Blacks*. Rand Report: R-3330-DOL, February 1986, pages 163, Statistics Canada, 2001.
- Statistics Canada (2001). *A report on adult education and training in Canada: Learning a living*. Ottawa: Statistics Canada and HRDC.
- Statistics Finland (2000). *Adult education survey 2000*. Helsingfors: Statistics Finland.
- Sussman, D. (2002). "Barriers to job-related training." *Perspective*. 75(1), 5-12.
- Tan, H. W. (1988). "Technical change, earnings and long-term jobs." *Review of Economics and Statistics*.
- Thurow, L. C. (1975). *Generating inequality: Mechanisms of distribution in the U.S. economy*. New York: Basic books. Torres, 1990.
- Torres, C.A. (1996). "Adult education for development." In Tuijnman, A. (Ed), *International Encyclopaedia of Adult Education and Training*. 2nd Edition. (pp. 213-221). Paris: OECD.
- Tough, A. (1971). *The Adult's Learning Projects: a Fresh Approach to Theory and Practice in Adult Learning*. Toronto: OISE Press.
- Tough, A. (1978). "Major Learning Efforts: Recent Research and Future Direction." *Adult Education*, 28:4, 250-263.

- Tuijnman, A. (1989). *Recurrent education, earnings, and well-being: A fifty-year longitudinal study of a cohort of Swedish men*. Stockholm, Sweden: Almqvist & Wiksell International.
- Tuijnman, A. and Hellström, Z. (2001). *Curious minds - Nordic adult education compared*. Köpenhamn: Nordic Council.
- U.S. Department of Education (1998). *Adult education participation decisions and barriers: Review of conceptual frameworks and empirical studies*. Working Paper No. 98-10. Washington D.C.: National Center for Education Statistics: Office of Educational Research and Improvement.
- van der Kamp, M. (1990). "Education for old adults in Europe: A common problem, different solutions?" In A. Wellings (ed.), *Towards 1992. Education of adults in the New Europe*. SCUTREA, University of Sheffield.
- Vaughan, R. J., & Berryman, S.E. (1989). *Employer-Sponsored Training: Current status, future Possibilities*. Paper presented at the Conference on Employer-Sponsored Training (Alexandria, VA, December 1-2, 1989). Columbia University, New York, NY. Institute on Education and the Economy.
- Vignoles, A., Galindo-Rueda, F. and Feinstein, L. (2004). "The labour market impact of adult education and training: a cohort analysis." *Scottish Journal of Political Economy*, 51(2), pp. 266-280.
- Volpe, M. (1999). "Learning informally in the aftermath of downsizing." In V.J. Marsick and M. Volpe (eds). *Informal learning on the job*. Los Angeles: AHRD, Barton Rouge, pp. 10-21.
- Welch, F. (1970). "Education in production." *Journal of Political Economy* 78(1), pp. 35-59.
- Williamson, A. (2000). "Gender issues in older adults' participation in learning viewpoints and experiences of learners in the University of the Third Age." *Educational Gerontology*, 26(1), 49-66.
- Woodhall, M. (2001). "Human capital: Educational aspects." In N.J. Smelser and P. Baltes (Eds.), *International encyclopaedia of the social and behavioural sciences*, pp. 6951-6955. Oxford: Elsevier.