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And Further Education: Findings Of 1998, 2004, 2010,
And 2016 Surveys Of The Employed Canadian Labour
Force

D. W. Livingstone and Milosh Raykov

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THE GROWING GAP BETWEEN POST-SECONDARY SCHOOLING AND FURTHER EDUCATION: FINDINGS OF 1998, 2004, 2010, AND 2016 SURVEYS OF THE EMPLOYED CANADIAN LABOUR FORCE

D. W. Livingstone
University of Toronto

Milosh Raykov
University of Malta

Abstract

This article summarizes the findings of a 2016 national survey of the formal schooling, further education, and job-related informal learning of the employed Canadian labour force and compares the results with those of prior national surveys conducted in 1998, 2004, and 2010. The major finding is an unprecedented growing gap between increasing post-secondary school completion and decreasing participation in further education. This gap may have begun in a recessionary labour market but may now be driven by the increasing underemployment of the qualifications of post-secondary graduates who find little added benefit to further education in their jobs. The incidence of job-related informal learning may also be declining. Age and economic class differences in schooling and further education appear to be narrowing in this context. Implications of the growing gap between advanced schooling and further education as well as the increasing incidence of underemployment are discussed.

Résumé

Cet article résume les résultats d'un sondage national, effectué en 2016, sur la scolarité formelle, la formation continue et les apprentissages informels reliés à l'emploi de la main-d'œuvre canadienne employée et compare ces résultats à ceux de sondages nationaux menés en 1998, 2004 et 2010. Le résultat principal est un écart croissant sans précédent entre un taux d'obtention de diplôme d'études secondaires à la hausse et une participation à la formation continue à la baisse. Il se peut que cet écart soit apparu au moment où le marché de l'emploi était en récession, mais qu'il soit maintenant alimenté par la hausse du sous-emploi des qualifications de titulaires de diplômes postsecondaires qui trouvent que, dans leurs emplois, la formation continue n'offre que peu de valeur ajoutée. Il est possible que les incidences

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d'apprentissages informels reliés à l'emploi soient aussi à la baisse. Dans ce contexte, les différences d'âge et de classe économique en matière de scolarité et de formation continue semblent s'atténuer. Les implications découlant de l'écart grandissant entre les études supérieures et la formation continue, ainsi que l'incidence croissante du sous-emploi, sont discutées.

Introduction

In the late 1990s, a research network was established in Canada to investigate trends in relations between formal and informal learning and paid and unpaid work.¹ This network conducted a series of national surveys and case studies. The national surveys were conducted in 1998, 2004, and 2010. The inclusive conceptual framework and basic research design, as well as the survey findings for the general adult population, have been summarized in previous articles in this journal (Livingstone, 1999, 2007, 2012). The present article focuses on the *employed* labour force in these surveys and incorporates findings from a comparable 2016 national survey.²

At least three forms of intentional adult learning can be distinguished: *formal schooling*, which includes the initial cycle of compulsory primary and secondary education followed by more discretionary post-secondary programs of study leading to diplomas and degrees; *further education*, which includes diverse classes and courses led by an instructor for diverse purposes; and *informal learning*, which learners do by themselves or with others by diverse means at their own initiative. Prior surveys and case studies have begun to show how these three forms of learning are interrelated in adults adapting to changing contemporary working conditions as well as modifying these requirements (e.g., Livingstone, 2009, 2010; Livingstone & Sawchuk, 2004).

Since the turn of the century, there have been few continuing surveys in advanced capitalist societies tracking trends in adult learning. In Canada, relevant surveys that tracked transitions from youth into the labour market (Youth in Transition Survey), trends in further education for the general adult population and the employed labour force (Adult Education and Training Survey), and trends in employment conditions (Workplace and Employee Survey) all were terminated by the federal government during the last decade. Statistics Canada had initiated an international research program in the 1990s to assess the literacy and numeracy of the adult population. This program involved most OECD countries in the development of standardized measures and administration of large-scale surveys in 2003 and 2012 to test competencies and ask other questions about skill use. The cross-national survey conducted in 2012 as part of the OECD Programme for the International Assessment of Adult Competencies (PIAAC) included 24 OECD member

1 Most of the research material produced by the New Approaches to Lifelong Learning (NALL) and the Work and Lifelong Learning (WALL) research networks funded by the Social Sciences and Humanities Research Council (SSHRC) may be found at www.wallnetwork.ca.

2 The 2016 national survey of the employed labour force has been conducted as a component of the SSHRC-funded project Changing Workplaces in a Knowledge Economy: Occupational Class Structure, Skill Use and the Place of Professions in Canada (CWKE), conducted by Livingstone with Tracey Adams and Peter Sawchuk. Further information may be found at <http://www.oise.toronto.ca/clsew/Research/index.html>.

countries (Statistics Canada, 2013). Standardized tests on literacy and numeracy (as well as problem-solving in technology-rich environments) were administered. The Canadian labour force was found to be at the OECD average in literacy, slightly below average in numeracy, and much above average in computer literacy and related problem solving. These estimated skills were analyzed in relation to demographic features and by employment status and general types of occupations. Statistics Canada also tried to estimate the change in literacy and numeracy levels of the Canadian population between the 2003 survey and the 2012 survey, using an array of technical adjustments for contextual changes. A general conclusion was that “Canadians are among those most equipped with the new skills demanded in the 21st century” (Programme for the International Assessment of Adult Competencies, 2013).³ Whatever the merits of this initiative, the data provide little information on actual relations between formal schooling, further education, and employment conditions compared to the prior series of surveys.

Survey data generated by PIAAC and its predecessors do provide some useful comparative information about changes in participation in further education in OECD member countries, as does the European Union Adult Education Survey of 2007 and 2011 (Desjardins, 2015). These will be referred to later in this article. But in terms of assessing trends in relations between formal schooling and further education or their relations with employment conditions, the Skills and Employment Survey (2012) time series conducted in the United Kingdom between 1986 and 2012, also to be referred to later, appears to be one of the few bodies of research that has continued to provide direct trend evidence for any of these countries.⁴

Despite much policy rhetoric about the growing strategic importance of adult learning for economic development, there has been little recent empirical research devoted to documenting trends in relations between adult learning and work, and almost none that has tried to assess levels and trends in all three forms of adult learning (formal schooling, further education, and informal learning) and their relation to employment conditions. The primary purpose of the present paper is to document and suggest interpretation of recent trends in these relations based on our continuing series of national surveys in Canada.

Basic Research Design

The present series of national surveys on work and learning began in 1998 (NALL 1998 Survey) with the first large-scale survey to address both different forms of adult learning (i.e., formal schooling, further education, and informal learning) and different forms of work (i.e., paid employment, housework, and volunteer community work). Further national

3 The Canadian Literacy and Learning Network, a major advocacy organization for adult literacy and a supporter of PIAAC, closed its operations in early 2015 as a result of changed federal funding priorities.

4 The EU Adult Education Survey was designed with the promise of addressing trends in formal schooling, further education, and informal learning as well as some demographic characteristics and work context of adults between 25 and 64. The first wave of this survey began in 2007 and the second in 2011, with a third intended in 2016 (see <http://ec.europa.eu/eurostat/web/microdata/adult-education-survey>). So far, there has been limited access to the data. OECD-based efforts to develop internationally comparable indicators have continued (see Borkowsky, 2013; Kuwan & Larsson, 2008).

surveys in 2004 (WALL 2004 Survey) and 2010 (WALL 2010 Survey) followed the same format and permitted documentation of trends in relations between these dimensions of work and learning (see especially Livingstone, 2012). A comparable survey was conducted in 2016 as part of the SSHRC-funded Changing Workplaces in a Knowledge Economy project (CWKE 2016 Survey). The 2016 survey focuses only on the employed labour force. As in prior surveys, all respondents are over 18 years of age and coverage is limited to those who speak English or French and reside in a private home in one of the 10 Canadian provinces. The 2016 survey was conducted by Leger Research Intelligence Group from January 1 to March 31.

The 2016 sample had two components. First, respondents were selected by random digit dialling and interviews were conducted over the telephone. A total of $n = 1,248$ responses were collected via telephone. Second, respondents were selected at random from the Leger Web panel of approximately 475,000 rotating members nationally. A total of $n = 1,779$ responses were collected online. For the telephone survey, the response rate was 33% of eligible respondents. For the Leger Web panel, 2,731 clicked on the link, resulting in a 65% response rate. The overall response rate, taking account of the proportion of the interviews done by telephone (41%) and online (59%), was therefore 52%. The response rates for the prior surveys conducted exclusively by telephone were 60%, 52%, and 40%, respectively. The proliferation of cell phones and increasing reliance of people generally on electronic communication devices now requires use of such hybrid means to ensure representative samples of the population. As in prior surveys, the data reported are weighted by the best available population estimates for age, sex, educational attainment, and regional distributions. For the current employed Canadian population, these estimates are provided by the Labour Force Survey of March 2016.

There are considerable difficulties in making comparisons between and trend inferences among the array of existing surveys of adult learning as a consequence of differing conceptualizations, collection processes, question wordings, and reference periods (Desjardins, 2015; Eisermann, Janik, & Kruppe, 2014). However, our four surveys of work and lifelong learning in Canada conducted in 1998, 2004, 2010, and 2016 are highly comparable, being based on consistent measures of further education and job-related learning and very similar research methods. Relevant findings from other prior surveys are cited where comparable conceptions and methods were used. Differences in levels and trends cited in the text are all significant at the 1% level of statistical confidence.

Findings

We begin by briefly noting the increasing instability of paid employment in recent times. Next, basic learning profiles are summarized, including trends in formal schooling, further education, and informal learning, as well as their interrelations. Relationships between learning patterns and social background factors (especially age and economic class) are then summarized. Finally, apparent indications of growing gaps between working conditions and learning activities are identified and discussed, with particular attention to the growing incidence of underemployment of adult learning.

Increasing Job Instability

Whatever the accuracy of predictions of the emergence of a third industrial revolution (Rifkin, 2014), it is clear that the labour forces in advanced capitalist economies have been experiencing increasing turmoil and uncertainty. The rapid diffusion of new information technologies has led to widespread changes in most sectors. Less than 40% of the employed Canadian labour force used a computer in 1989 compared to nearly universal use today. Computerization and automation of many jobs, along with offshoring of more portable jobs, have provoked extensive organizational restructuring of the employed labour force. There has been very substantial decline of unionized manufacturing jobs with long-term security and benefits (e.g., Livingstone, Smith, & Smith, 2011). The growing movement into service-sector jobs has been characterized by increased job churning and transitory employment. The growth of precarious employment has been extensively documented (Vosko, 2006). According to our four surveys, the majority of the employed have experienced some combination of downsizing, increases in part-time work, job rotation, and multi-skilling in their paid workplaces during the past decade. While the 2008 Great Recession was particularly destabilizing in financial terms and business cycles have continued to induce fluctuations in specific employment indicators, the general job conditions of the employed Canadian labour force have definitely become more unstable during the first part of this century.

As noted in the prior surveys, unpaid work—including housework, child care, elder care, and volunteer work—makes up roughly half of the work that Canadian adults do. Men still do more paid work and women still do more unpaid housework, but the gap has been closing as most women have remained in the paid labour force after childbirth (Livingstone, 2002). A notable change in recent years appears to have been a reduction in the time devoted to working in voluntary organizations. In 2010, over 40% of the employed labour force participated in volunteer organizations for an average of around eight hours per week. In 2016, these rates have dropped to around 30% and an average of around five hours per week. Volunteer work is, by definition, the most discretionary work that people do. This decline may suggest that the increasing uncertainty around securing paid employment and the increasing time needed to search for it and do supplementary tasks to keep it are at the expense of employed workers' free time. The amount of unpaid overtime has been increasing since the 1990s, as have class action suits for compensation (e.g., Statistics Canada, 2007). The majority of participants in the employed labour force in recent surveys perceive that their job workloads have been increasing (cf. Felstead, Gallie, Green, & Inanc, 2013a). More generally, wage levels have stagnated while household debt levels have increased.

Overall, the data on working conditions in our 1998–2016 series and other related surveys suggest an employed labour force increasingly preoccupied with coping with increasingly unstable job conditions, still compelled to take care of essential unpaid household work, and perhaps with decreasing opportunities to engage in more discretionary activities—including intentional learning.

Employed Worker Learning Profiles

Formal schooling and further education. These four surveys permit the documentation of trends in formal schooling, further education, and informal learning. Canada has had the

distinction of leading the advanced capitalist world in participation and completion rates in higher education for much of the past generation (OECD, 2015). As Figure 1 shows, a trend toward an increasing level of post-secondary education completion continues among the employed labour force aged 25 to 64. In 1998, about 40% had completed either university or community college programs. By 2016, the level has increased to over two-thirds. This is still among the highest levels of post-secondary education of any national labour force in the world. Post-secondary completion levels have continued to increase at least partly because higher parental educational attainments continue to stimulate higher educational attainments among their children. Canadians of all economic class, gender, and racial backgrounds express clear majority views that young people need a post-secondary education today (Clandfield et al., 2014). In addition, post-secondary enrolments have tended to increase in the wake of periods such as the Great Recession of 2008 because of relatively lower "opportunity costs" in the absence of good jobs (e.g., Brown & Hoxby, 2015). Recent increases have occurred in spite of high increases in tuition fees and student debt loads. Elsewhere, we have described this process as an "educational arms race" (Livingstone, 2009).

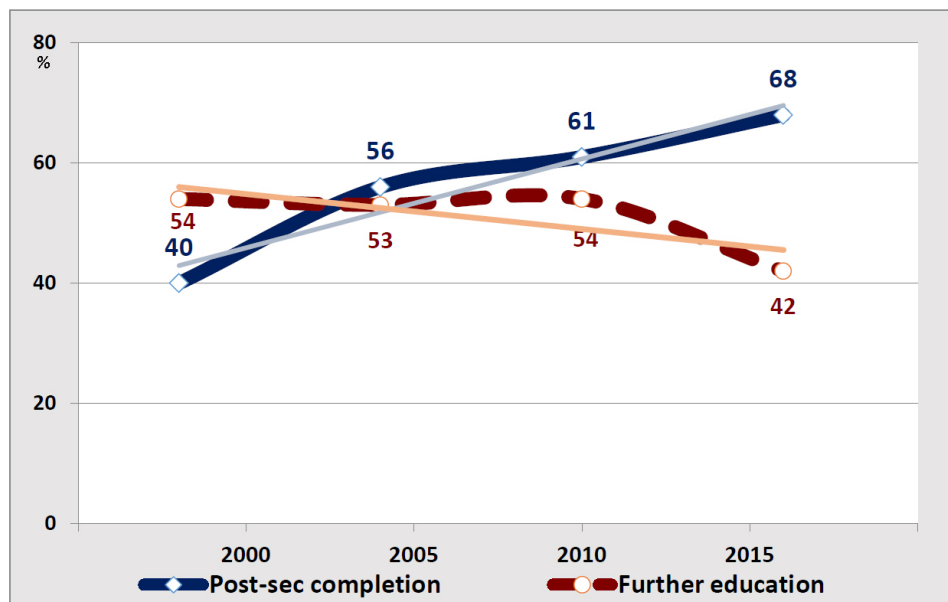
The recent participation rate in further education courses appears to follow a quite different pattern in the employed labour force. As Figure 1 shows, over half of the employed were enrolled in some form of further education in 1998. This includes any organized training or education beyond initial schooling, including courses, private lessons, correspondence courses (written or electronic), workshops, apprenticeship training, arts, crafts, recreation courses, or any other training or education of long or short duration. Such organized continuing adult education may vary widely in quality and the extent to which it is required to maintain job certification, for example. Much further education has tended to be job-related. In the present series of surveys, the proportion of the employed labour force who indicate that their further education is primarily or partially job-related has increased from less than two-thirds in 1998 to over 85% in the most recent surveys, indicative of a still more instrumental approach to further education in tougher economic times. However, the general participation rate, after holding steady from 1998 to 2010, now appears to have *dropped* to around 40%.

A positive relationship between level of formal schooling and participation in further education has been one of the most consistent findings in social research. In contrast, the current survey suggests that the level of formal schooling continues to increase while the further education rate declines. This finding requires further studies to assess the accuracy of the new hybrid sampling method and the reliability of the data. But, as Figure 1 shows, the post-secondary completion level has increasingly exceeded the further education rate since the turn of the century.

International comparisons using PIAAC 2012 data with prior International Adult Literacy Survey (IALS) 1994–1998 data found increases in further education in all participating countries including Canada over this period, but the trend inference is somewhat limited by the wider scope of PIAAC questions (Desjardins, 2015, p. 13). In contrast, the EU Adult Education Survey in 2007 and 2011, using more directly comparable questions, found both positive and negative trends in various European countries (Desjardins, 2015, p. 14). These surveys found significant decreases in some OECD economies that were crippled by the 2008 recession, notably the United Kingdom and Greece. As Desjardins (2015, p. 13) observed, "It is probably unwise to draw conclusive results on trends over shorter periods of time."

Figure 1

Post-secondary completion and further education participation rates, employed labour force aged 25–64, Canada, 1998–2016.



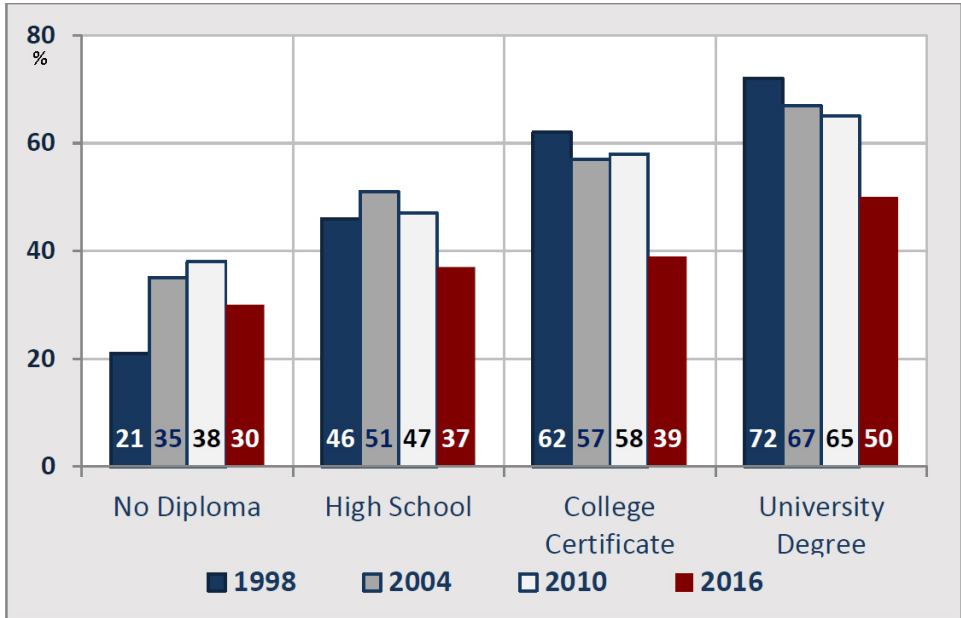
Sources: NALL 1998 Survey ($N = 1,021$); WALL 2004 Survey ($N = 5,644$); WALL 2010 Survey ($N = 1,254$); CWKE 2016 Survey ($N = 2,949$).

The only country for which there are currently comparable trend data to Canada is the United Kingdom. There, as in Canada, the post-secondary completion rate has also continued to increase significantly, to one of the highest in Europe (Holmes & Mayhew, 2015), while the further education rate has recently decreased (Felstead, Gallie, Green, & Inanc, 2013b; Skills Funding Agency, 2016).⁵ In the United Kingdom, there is evidence that public spending cuts for further education have been associated with falling numbers of funded adult learners in recent years (Lupton, 2015). But general spending cuts for education in recessionary times are likely not the whole story. At least in Canada, where employer support for employee training has historically been much lower than in the United Kingdom (Canadian Council on Learning, 2007, p. 57), other factors are probably involved in this apparently unprecedented decline in further education participation.

5 The National Institute of Adult Continuing Education conducted annual surveys of adult learning in England and Wales between 1996 and 2015 (see Learning and Work Institute, 2015). Their surveys in the 2010–14 period found a declining rate of adult participation in learning. However, the measure of adult learners used in those surveys conflates further education with some aspects of informal learning and is not directly comparable with the current surveys.

Figure 2

Participation in further education by level of schooling, employed labour force over age 18, Canada, 1998–2016.



Sources: NALL 1998 Survey (N = 1,021); WALL 2004 Survey (N = 5,569); WALL 2010 Survey (N = 1,253); CWKE 2016 Survey (N = 2,935).

While global leader Sweden may have experienced a slight decline in participation by all adults in further education to around 70% between 2007 and 2011 (Desjardins, 2015), no inherent threshold of further education appears to have been reached in either Canada or the United Kingdom. Some further insight into factors involved is provided by comparing level of attained schooling by further education participation rates over the 1998–2016 period. As Figure 2 shows, the decline in further education has occurred across all levels of schooling since 2004. But the decline has been greater for those with post-secondary schooling and began earlier in 1998. A similar pattern has been found in the United Kingdom, where there have been declining rates for younger age groups holding higher education qualifications (Mason & Bishop, 2010). Those with higher levels of schooling still tend to participate more in further education, but the gap is narrowing.

The Canadian surveys find that the unmet need for further education—the proportion who wanted to take additional courses but were unable to do so—has also dropped from about half of the employed labour force in 2004 and 2010 to 40% in 2016, while post-secondary attainment has continued to grow. Table 1 shows that the unmet demand for further education over time by level of schooling exhibits a significant decrease for those with higher schooling but only marginal decline for those with less schooling. This suggests declining motivation to take further education among those with the highest levels of school attainment in this period. As suggested in the report on the 2010

Table 1: Unmet Demand for Further Education by Educational Attainment, Employed Labour Force over Age 18, Canada, 2004–2016 (%)

	No diploma	HS diploma	College	University	Total
2004	36	45	52	54	48
2010	36	46	48	56	48
2016	32	41	37	43	40
2004–16 decline	-4	-4	-15	-11	-8

Sources: WALL 2004 Survey ($N = 5,712$); WALL 2010 Survey ($N = 1,255$); CWKE 2016 Survey ($N = 2,881$).

survey (Livingstone, 2012), something new may be happening here in terms of disincentives to participate in further education.

Informal job-related learning. Most recent surveys of adult learning have paid scant attention to informal learning, the learning activities that people do on their own and with colleagues without necessary engagement with educational institutions or employers. Empirical studies led by our colleague Allen Tough (1979) documented that the “iceberg” of intentional informal learning is far more extensive than organized further education. For example, it is now commonly estimated that job-related informal learning is responsible for over 80% of job training, much more than organized further education courses (e.g., Cross, 2011). The 1998, 2004, and 2010 surveys confirmed the much greater extent of informal learning than further education participation among Canadian adults in terms of paid job-related learning, housework-related learning, community volunteer work-related learning, and general interest learning (see Livingstone, 2012). The 2016 survey focuses on job-related informal learning among the employed labour force and compares this with similar profiles in the prior surveys.⁶

As Table 2 shows, the general incidence of participation in self-reported informal learning related to the job has remained much higher than the participation rate in further education. This is probably self-evident given the greater constraints on involvement in further education, such as qualification processes and fee payment. But there may also have been some recent changes in the incidence of job-related informal learning. About 90% of those in the employed labour force indicated that they had been involved in job-related informal learning activities in 1998, 2004, and 2010; the incidence drops to 75% in 2016. The estimated amount of time devoted to such learning also appears to have dropped from a prior average of over five hours to under four hours now. In addition to this apparent general recent decline in the incidence of job-related informal learning, those with higher levels of schooling continue to report higher levels of participation in such learning than those with less schooling. Nevertheless, even a majority of those who lack a high-school diploma and do not participate in further education still continue to engage in substantial intentional informal job-related learning.

6 The 2016 survey does not address specific topical aspects of informal learning related to housework, volunteer work, or general interests. Therefore, it does not provide estimates of the full extent of self-reported informal learning that are comparable with the prior surveys..

Table 2: Incidence of Job-Related Informal Learning by Level of Schooling, Employed Labour Force over Age 18, Canada, 1998–2016

Level of Schooling	Do any job-related informal learning (%)			
	1998	2004	2010	2016
No diploma	75	77	77	58
High-school diploma	95	86	87	73
Community College	91	90	94	74
University Degree	94	92	94	82
TOTAL INCIDENCE	89	87	90	75
AVERAGE HOURS	6.9	5.2	5.5	3.5

Sources: NALL 1998 Survey ($N = 895$); WALL 2004 Survey ($N = 5,659$); WALL 2010 Survey ($N = 1,257$); CWKE 2016 Survey ($N = 2,975$).

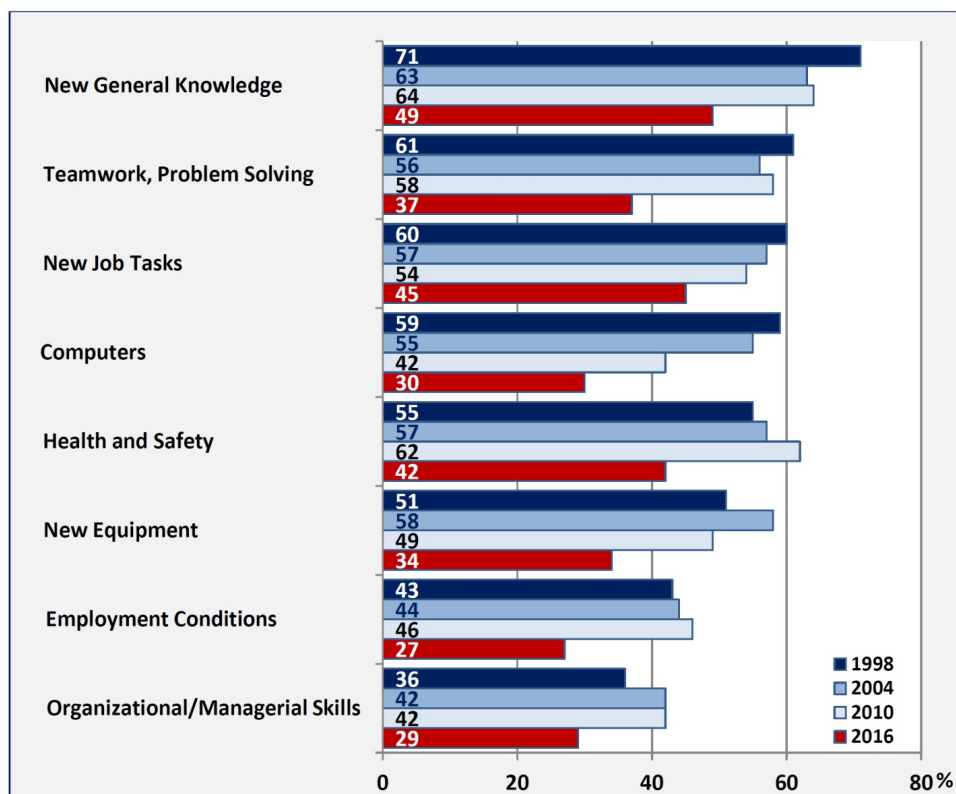
As Figure 3 shows, a similar pattern of decline is found in the incidence of informal learning of various job-related topics. Without exception, a lower incidence of participation in all of these topics is reported in 2016 in relation to prior years. Continuing declines through these four surveys are found in the proportions of those devoting informal learning time to new general knowledge, teamwork issues, new job tasks, and learning about computers in their jobs, the last survey showing the greatest decline.

The rapid decline in informal learning about computers may be related to the fact that use of computers increased very rapidly during the 1990s to near universality in the past decade, and such learning may now be increasingly taken for granted. Various interpretations may be offered for different topical declines, including diminishing amounts of discretionary time for intentional informal learning. The bottom line is that the participation rate, amount of time devoted to such learning, and attention to specific job-related topics all appear to be declining among the employed labour force. We will explore factors related to declining participation in further education and job-related informal learning in a later section.

The large informal part of the iceberg of job-related learning must have some connections with the pyramid of formal schooling and further education that is visible above it. The 2003 Adult Education and Training Survey found an association between higher school attainment and a few specific job-related informal learning activities over a month-long period (Peters, 2004, pp. 17, 44). The 2003 International Adult Literacy and Life Skills Survey (Rubenson, Desjardins, & Yoon, 2007, pp. 53–56) found that learning informally by using tools interactively (such as literacy, numeracy, computers, the Internet) was more common among those with higher levels of formal schooling. Longitudinal research with a continuously employed sub-sample from our 1998 survey in 2004 found that those who did not participate in further education courses tended to reduce their participation in job-related informal learning over time (Livingstone & Stowe, 2007). Secondary analysis of our 2004 survey has found that a number of contextual factors are related to *combined* involvement in further education and job-related informal learning, including age, level of schooling, occupational class, education-job match, job autonomy, work intensity, production sector, and organization size (Nilsson & Rubenson, 2014). Many workers

Figure 3

Topics of job-related informal learning, employed labour force over age 18, Canada, 1998–2016.



Sources: NALL 1998 Survey ($N = 770$); WALL 2004 Survey ($N = 5,710$); WALL 2010 Survey ($N = 1,256$); CWKE 2016 Survey ($N = 2,960$).

with limited schooling have achieved high levels of competency through the informal mentoring and self-directed learning in which all workers inevitably engage (Livingstone & Sawchuk, 2004). But the increasingly instrumental focus of much further education on job training, the apparent recent reduction in incidence of both further education and job-related informal learning, and the possible tightening of connection between further education and informal learning might suggest a narrowing of the scope of job-related learning.

Age, Class, and Job-Related Learning

Two social background factors have commonly been found to be closely related to further education: age and economic class.

With regard to age, the historical tendency has been for younger workers to have higher participation rates than older workers. We might expect younger workers to be more

motivated to gain additional job-related knowledge through further education courses, while older workers may rely more on their cumulative experience to do their jobs. In addition, since most further education has been job-oriented, there would be less motivation to seek further job-oriented education as workers approach retirement. Numerous prior studies of adults in general have found a substantial decline in further education with age.

But, as Figure 4 shows, only a gradual decrease in further education with age was exhibited in the 1998 to 2010 surveys. While workers aged 18 to 24 had average participation rates of around 60% in these surveys, even those aged 55 to 59 had rates of around 50%. This is probably reflective of the facts that the majority of the employed labour force had completed a post-secondary degree by the late 1990s, that older age cohorts are increasingly highly schooled, and that the more highly schooled are generally more likely to take further education. The most recent government-sponsored national survey of participation in job-related further education in Canada found a similar narrowing of the difference between younger and middle-aged groups (Knighton, Hujaleh, Iacampo, & Werkneh, , 2009, pp. 11–12). Since most further education remains job-oriented, all prior surveys have found that it drops off rapidly among those who have retired from employment. However, among those over 65 who remain in the employed labour force, the participation rate in further education also now remains high. Further education appears to have become almost equally pertinent throughout workers’ employment lives.

However, as Figure 4 also shows, participation in further education in 2016 has declined among all age cohorts, and particularly in the middle age groups from 30 to 45. This finding of a decline across all age groups may suggest a decreasing general marginal economic benefit of further education in a labour force in which advanced schooling has become so widespread. Perhaps this decline reflects a diminished priority for further education among both employers and employees in a period of increased job instability.

The historical pattern of participation in informal job-related learning by age has been much different. As Figure 4 shows, the average participation rate from 1998 to 2010 was over 80% for all age cohorts, with only a slight decline among the oldest workers. The informal part of the job-related learning iceberg has remained relatively large among all ages. Aging has never been found to be very significantly associated empirically with the incidence of informal adult learning activities. But this pattern also appears to have shifted recently. The general decline noted earlier in the incidence of job-related informal learning in 2016 has occurred across all age groups, including older workers.

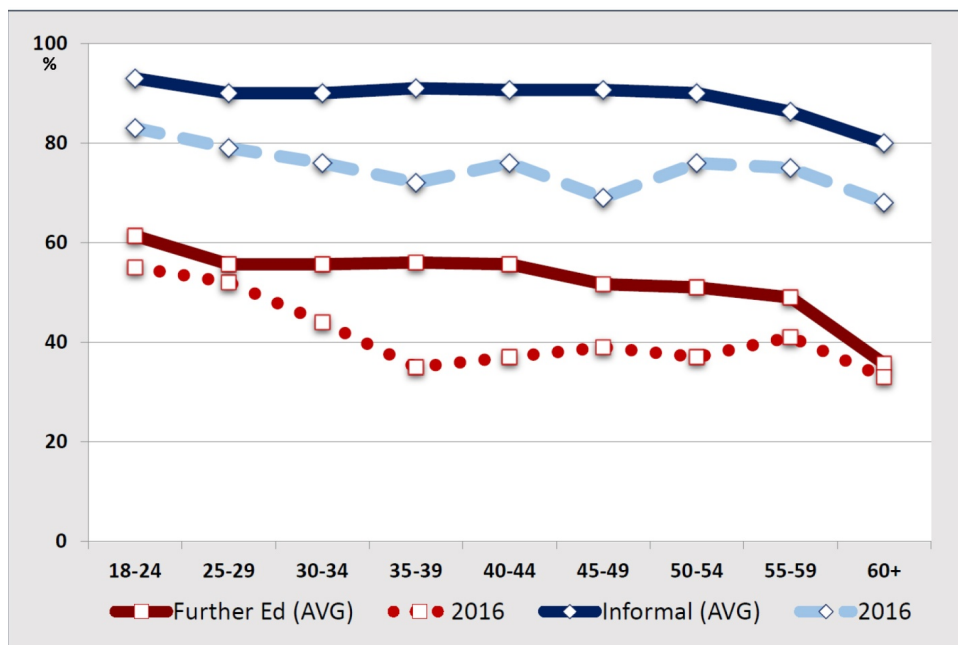
The class structure of the employed Canadian labour force has been shifting in recent decades, with substantial decline in the traditional working class and growth of managers and professional employees (see Livingstone & Scholtz, 2016). Economic class positions in credential-based labour markets have historically been closely linked to levels of schooling, with those in professional and managerial positions having much higher levels of formal attainment. Table 3 summarizes the patterns of post-secondary completion by economic class in the 1998–2016 period.⁷

The majority of professional employees and managers had post-secondary completion in 1998, and, along with their increasing numbers, these levels have increased to 80%

7 The class profiles of post-secondary completion and further education reported here exclude employers and the self-employed, since owners of businesses can set their own educational requirements to a much greater extent than hired employees can.

Figure 4

Age by participation in further education and job-related informal learning, employed labour force over age 18, Canada, 1998–2010 (averages) and 2016.



Sources: NALL 1998 Survey ($N = 1,021$); WALL 2004 Survey ($N = 5,644$); WALL 2010 Survey ($N = 1,254$); CWKE 2016 Survey ($N = 2,949$).

or greater by 2016. The traditional working class, constituted by industrial and service workers, had post-secondary completion rates of less than one-third in 1998. But, along with their declining numbers, their post-secondary completion rates increased even more rapidly to around 50% or more by 2016. Differential completion rates remain between these “higher” and “lower” classes of employees, but the basic educational attainment gap between them has been closing as post-secondary schooling has become the norm among the employed labour force. In this particular sense, one might say that the “knowledge economy” has arrived.

As Table 3 shows, the pattern of association between economic class and job-related further education has historically been less extreme, with many less highly schooled workers relying on variants of further education to upgrade and gain recognition for their job skills. For example, in 1998, around 60% of service workers took a further education course, compared to about 75% of professional employees. The decline in participation in further education more recently and particularly since 2010 appears to have been a general tendency across all economic classes. While all economic classes have continued to increase their post-secondary completion rates, their further education rates have recently declined. As the general participation rate in further education has declined, the further education gap between workers in different economic classes has become even smaller.

Table 3: Employee Economic Class by Post-Secondary Completion and Participation in Further Education, Employees Only, Canada, 1998–2016

Employee economic class	Post-secondary completion (%)					Taken further education course in past year (%)				
	1998	2004	2010	2016	Difference	1998	2004	2010	2016	Difference
Professional employees	73	83	91	88	+15	75	67	72	51	-24
Managers	66	72	67	80	+14	71	68	63	42	-29
Supervisors	45	56	46	63	+18	37	54	60	43	+6
Service workers	31	50	56	59	+28	63	52	48	38	-25
Industrial workers	23	34	39	48	+25	45	41	44	36	-9
Total labour force	41	56	60	68	+27	61	53	54	42	-19
<i>N</i>	948	5365	1243	2471		945	5436	1241	2446	

Sources: NALL 1998 Survey, WALL 2004 Survey, WALL 2010 Survey, CWKE 2016 Survey.

It should also be noted here that all economic classes in all four surveys exhibit similarly high rates of participation in job-related informal learning.

Sex and race are also important social background factors that should be considered as influences on schooling, further education, and job-related informal learning. Discriminatory effects of sexism and racism, as well as classism, on school attainments generally are well documented in Canada (e.g., Clandfield et al., 2014). With regard to post-secondary education, the basic gender gap has been closing, with women now outnumbering men in general completion rates, although women still remain relatively excluded from some professional fields. The most significant racial difference is between Aboriginal and non-Aboriginal peoples; this difference has also been shrinking in recent decades, but only a minority of Aboriginal young adults hold a post-secondary credential, compared to two-thirds of the general employed labour force (Canadian Council on Learning, 2009). In terms of further education, we have found no significant differences either between men and women or between Whites and non-Whites in these surveys. Similarly, the basic incidence of job-related informal learning appears to be as widespread among all sexes and races in the employed Canadian labour force, according to these surveys. There may be important interactive effects among class, sex, and race in terms of job-related learning beyond the scope of the current analysis of these surveys.

In sum, while substantial systemic barriers to equal educational opportunity remain in Canadian schooling, our survey findings indicate significant trends in the narrowing of age, class, sex, and race differences in participation in job-related adult learning overall. In the final section, we turn to the question of the extent to which Canadian employees have been able to use their increasing educational qualifications in paid employment.

Increasing Underemployment and Job-Related Learning

In dynamic market economies, where employers continually seek adequately qualified employees at competitive cost while job seekers continually try to enhance their

employability, some mismatch between job requirements and workers' qualifications is probably inevitable. In the short run, a surplus of qualified workers may permit employers to pick and choose more easily, while a shortage allows qualified workers to do so. In the long run, if workers' skills and knowledge are chronically underutilized in paid workplaces, there is likely to be a lack of fulfillment for workers and sub-optimal production for society as a whole. Such chronic underutilization or underemployment can lead to social unrest, inefficient business performance, and wasteful government spending on skill training. There is mounting international evidence that underutilization of workers' qualifications has increased significantly in recent decades (e.g., Felstead et al., 2013b; Holmes & Mayhew, 2015; Livingstone, 2016; McKee & Harvey, 2011). Such evidence continues to be overwhelmed by assertions by large employers and governments and mass media that workers must make greater learning efforts to respond to the increasing job requirements of a knowledge economy.

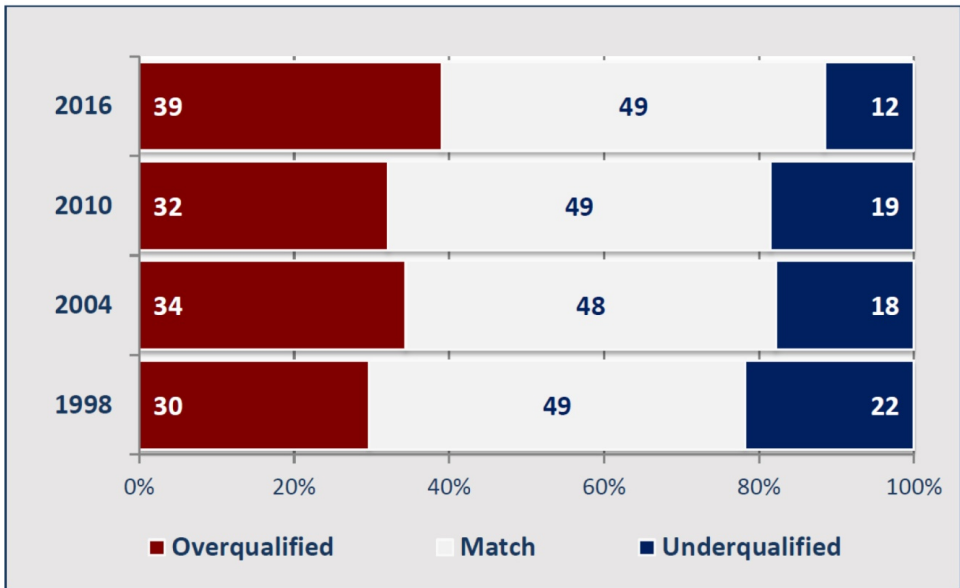
It is important to recognize here a distinction between qualifications mismatch and skills mismatch. Desjardins and Rubenson (2011) have ably reviewed the conceptual distinctions, varied theoretical approaches, and contextual factors involved in both types of mismatches. Qualifications mismatch refers to the difference between the formal educational qualifications the worker brings to the job and the educational qualifications employers require to obtain or retain the job. Skill mismatch refers to the difference between the skills workers bring to the job and their use in the job. There are, admittedly, some bodies of empirical evidence that suggest that skill mismatches may still constitute minor variations in labour markets. Most notably, researchers relying on the standardized tests of worker proficiency in PIAAC and its predecessors have tended to find lower levels of surplus than studies that have compared educational attainments with employers' required levels of education (e.g., Desjardins & Rubenson, 2011; Pellizzari & Fichen, 2013). Such skill-based studies are typically focused on internationally standardized measures of literacy and numeracy combined with estimates of the incidence of use in jobs. Such measures are admittedly narrow, ignoring dimensions of complexity. They estimate skill matches somewhat arbitrarily, either by median test scores or by workers' reports on whether they have the skills to cope with their jobs. These combined measures have also been complicated to replicate, making estimates of skill gains or losses difficult. The distinction between skills and qualifications remains important. However, in our view, current measures of standardized skills remain too narrow to reflect the general extent of mismatch between workers and their jobs and are unable to offer estimates of general trends in this relationship. Such estimates tend in most instances to find either very high levels of matching skills or substantial levels of both skill surpluses and deficits.⁸

The weight of empirical evidence using reports directly from workers themselves about qualification for their own jobs is clear that in many respects the job-related learning efforts of the employed labour force have increasingly exceeded job requirements. Various criteria have been used to estimate such underemployment.

8 Pellizzari and Fichen (2013), using test scores and worker estimates on skill match, found general matches of over 80% with skill surplus of 10% and deficit of 4% across OECD countries in 2012. Desjardins and Rubenson (2011), using test scores and median skill use scores, found lower levels of match and wider variations between OECD countries; for example, numeracy surpluses ranged from 17% to 46% while deficits ranged from 6% to 20%; for Canada, they found equal surpluses and deficits of 18%.

Figure 5

Credential underemployment, employed labour force, Canada, 1998–2016.



Sources: NALL 1998 Survey ($N = 894$); WALL 2004 Survey ($N = 5,099$); WALL 2010 Survey ($N = 1,206$); CWKE 2016 Survey ($N = 2,777$).

Our 2016 survey data indicate that, while 68% have attained a post-secondary education, only about 46% required a post-secondary credential to perform their jobs, compared to roughly equivalent levels of attainments and requirements in 1982.⁹ In terms of subjective perceptions of education-job match, those who perceive that they are underemployed in their current jobs has increased from 22% in 1998 to 35% in 2016. Various other aspects of the match between workers’ abilities and job requirements have been assessed by these surveys. Perhaps most pertinent is the match between workers’ formal educational attainments and the credential required to get their jobs. As Figure 5 shows, about 30% of employed workers were underemployed in 1998 while over 20% were underqualified for their jobs. By 2016, underemployment of credentials has increased to around 40% of workers while the underqualified have decreased to around 10%. The basic conclusion for virtually all such measures is that underemployment is still increasing and underqualification is decreasing. It should also be noted that a comparable indicator of credential underemployment in the UK surveys increased from about 27% in 1986 to 40% in 2006, then may have declined to around 37% in 2012 (Felstead et al., 2013b). On the other hand, low literacy and underqualification remains a serious problem for some increasingly marginalized people, but this is now a relatively minor condition among the employed, usually overcome by continuing learning. In any case, most researchers can now probably agree that underemployment is a much more substantial issue among the employed labour force.

⁹ The 1982 data are drawn from a comparable national survey conducted in 1982. For further information on this survey, see Clement and Myles (1994).

Perhaps a more relevant question than basic literacy and numeracy levels now concerns competence with computers. As previously noted, use of computers in Canadian workplaces jumped from around 40% in 1989 to a nearly universal requirement today. One might expect significant underqualification as workers struggle to catch up with such rapid change. However, in the 2010 and 2016 surveys, around half of employed workers indicated that they have higher computer skills than they are able to use in their current jobs, while only around 5% said they are underqualified. In the wake of the very quick diffusion of computer literacy requirements, employed workers' learning activities may have kept them ahead.

Comparative evidence suggests that, at least on some measures, underemployment may now be greater in Canada than in most other advanced capitalist economies. For example, in our 2010 and 2016 surveys, over 40% of all Canadian workers described themselves as having the skills to cope with more demanding duties. This is a higher proportion than found on the same question in 2010 surveys of most European countries; the United Kingdom also had one of the highest scores at around 40% (Eurofound, 2012). As noted previously, Canada has one of the most highly schooled labour forces in the world, partly as a consequence of constructing a relatively accessible post-secondary educational system and partly as a result of selecting highly educated immigrants. Canada also has had a branch plant economy that has continued to be highly based on the harvesting and export of staple resources such as wheat and bitumen, with relatively limited priority to diversification into more knowledge-based industries (Bell, 2012; Laxer, 1989). Underemployment has been increasing most rapidly among Canadian post-secondary graduates. It may be that Canada now represents one of the most extreme cases in terms of the underutilization of the qualifications of the employed labour force in an advanced capitalist economy.

The unprecedented decline in participation in further education may be related to diminishing returns for individual investment in further education for those who have invested most heavily in formal schooling. Recent analyses indicate that those with graduate degrees have almost doubled as a proportion of low-wage earners in the Canadian labour force between 1997 and 2014 (Thomas, 2016). Disincentives for further education may be greatest among those who are experiencing continuing underemployment. Prior research using PIAAC standardized skill criteria found that those with surplus skills for their jobs were generally less likely to take further education than those with matching skills (Desjardins & Rubenson, 2011). Table 4 shows the relationship between credential underemployment and participation in further education over the 1998–2016 period for those with post-secondary credentials. For those with underemployed post-secondary credentials, the participation rate in further education dropped from 64% in 1998 to 39% in 2016. Participation rates also dropped for post-secondary graduates with matching jobs and those who were underqualified, but their rates were still around 50% in 2016. Respondents were also asked in all surveys about prior learning assessment and recognition (PLAR), specifically whether they would be interested in enrolling in future courses if they received credit for their prior learning experiences. Historically, the more highly schooled have been most interested in taking advantage of PLAR. But, as Table 4 also shows, interest in PLAR declined somewhat for post-secondary graduates across all credential match statuses. In addition, while job-related informal learning remains very widespread, declared lack of interest is now higher among underemployed graduates (26%) than among the underqualified (11%).

Table 4: Credential Underemployment, Annual Participation in Further Education and Interest in Prior Learning Assessment and Recognition (PLAR), Employed Labour Force with Post-Secondary Credentials, Canada, 1998–2016

Credential Match	Further education (%)				PLAR (%)			
	1998	2004	2010	2016	1998	2004	2010	2016
Underemployed	64	55	52	39	68	63	60	59
Match	76	63	66	50	72	64	54	62
Underqualified	77	74	76	49	77	62	49	67
Total	71	61	61	45	70	63	56	61
<i>N</i>	365	2885	750	1879	355	2851	746	1708

Sources: NALL 1998 Survey, WALL 2004 Survey, WALL 2010 Survey, CWKE 2016 Survey.

We previously found that participation in further education may be becoming even more narrowly job-related while the participation rate has been decreasing more quickly for those with post-secondary credentials. We now find decreasing incidence of further education participation and diminishing expression of interest among the growing numbers of underemployed post-secondary graduates across all age groups. There is at least some support here for the argument that declining economic benefits to further education are now being experienced, especially among the most highly educated in the Canadian labour force.

Concluding Remarks

The most striking finding from the 2016 survey of the employed Canadian labour force is the growing gap between the increasing level of post-secondary education and the decreasing rate of participation in further education. This pattern is probably unprecedented in modern times. During the Great Depression of the 1930s, resources for providing both post-secondary education and further education may have declined. But even then and consistently since, the relationship between more schooling and further education was always positive, and motivation to engage in both actually increased in economic hard times. The increasing incidence of unstable employment conditions and relative cutbacks in educational provisions by neo-liberal governments in recent years may be responsible for some of the observed cessation of growth and subsequent decline in further education. But at the same time, post-secondary completion has continued to increase—in spite of government cutbacks and mounting relative costs to students. The relatively high accessibility of Canadian higher education, high normative expectations that a higher education is needed to cope with current life, and the continuing increase in credential levels required by employers for job entry, as well as decreasing opportunity costs of advanced schooling in the absence of good jobs, all conspire to drive growing student sacrifices to complete a higher education. Serious systemic differences in school attainment by economic class, gender, and racial background persist in 2016 and may become more pronounced with mounting student costs (see Marginson, 2016). However, once they get jobs, these increasingly highly schooled workers from all social backgrounds are increasingly finding

that their educational attainments are underemployed on the job. Underemployment of qualifications is becoming a more pervasive condition than ever before. The motivation to continue to pursue further education is therefore muted for growing numbers.

In the context of increasingly unstable employment conditions, increasing underemployment, and decreasing accessibility of and demand for further education, there are also indications that workers are becoming somewhat less engaged in intentional informal job-related learning. Informal learning remains the relatively pervasive basis of most job training, still dwarfing formal learning. But there are intimations in the current survey that this iceberg itself may be melting. The implications of these apparent declines in both further education and informal job-related learning should be highly worrying.

Generations of empirical research on informal learning have established that it is a dominant basis for much lifelong learning (see Livingstone, 2010). Continual informal learning may be seen as fundamental for humans to cope with our changing environmental conditions. If the economic and social organizations that we construct for ourselves begin to constrain and limit our practical learning activities, we also begin to imperil our survival capacity. It may seem outlandish to claim that the declines observed here in participation in further education and informal job-related learning are so serious. But the unprecedented nature of these changes should at least provoke some reconsideration of established relations between learning and work.

The supply of qualified workers has often exceeded demand in advanced capitalist economies as workers have sought further qualifications to compete and employers have encouraged workers to compete among themselves for jobs. But underemployment is now chronic and growing, particularly in Canada. The key problem is *not* a lack of relevant formal schooling and further education, nor is it a failure to engage in continual job-related informal learning. Whatever improvements are made in the form and content of formal schooling and further education, increasing numbers with advanced formal education cannot find commensurate jobs. Continuing escalation of the post-secondary educational arms race will continue to produce greater underemployment of learning and knowledge. The unprecedented decline in further education and diminished interest in PLAR are indicative of a growing systemic failure of the economy as now organized to effectively use the skills and knowledge of growing numbers. These declines are not likely to be indications of less interest in learning per se, but there is mounting skepticism about the prospects of recognition or reward for further investments in job-related intentional learning under current conditions.

A resolution of this problem should be increasingly obvious: provide better opportunities for application of workers' knowledge through *economic* reforms. Such reforms should include redistribution of paid work so that older overworked employees can take more phased retirement while mentoring younger workers, and involuntary part-timers can work more while full-timers who want to reduce their hours can also do so. Greater democratization of paid workplaces should allow many more highly qualified workers discretion in designing their own jobs and contributing to organizational decision making. New job creation should give increasing priority to renewable energy and collaborative communications networks for future jobs to be sustainable. In short, there should be concerted efforts to create more decent fulfilling jobs for an increasingly knowledgeable labour force (Livingstone, 2004, 2009). There are signs here and there of the development of such reforms, but whether these tendencies can blossom into a third industrial revolution of zero marginal costs and

widespread knowledge sharing (Rifkin, 2014) is a doubtful prospect at the moment in light of the dominant fixation on maximizing profit in private-sector workplaces.

In more immediate terms, further surveys and case studies documenting the actual organization of work processes, training provisions, and utilization of qualified workers' skills in different sectors and enterprises should be conducted to continue to assess the trends and gaps suggested here. Such comparative studies may also identify emerging forms of innovative work organization and workplace learning that can enhance skill utilization and sustainability in the economy and society of the 21st century.

This 1998–2016 series of national surveys has been primarily intended to provide general benchmarks for continuing studies of adult learning and work (see www.wallnetwork.ca). Further critical inquiry into the full array of formal schooling, further education, and informal learning in relation to changing social and economic conditions remains necessary as an antidote to the persistent myth that workers' skill deficits prohibit full emergence of a knowledge-based economy. It should now be obvious to any who care to examine the evidence that we are living in a knowledge society of lifelong learners but not yet in a knowledge-based economy that effectively uses their job-related knowledge. A slight recent decline in an indicator of underemployment detected in the United Kingdom (Felstead et al., 2013) "may signal more effective use of qualifications at work by employers," but we doubt that this indicates a serious trend reversal. We profoundly hope that others will be able to take up needed critical inquiry.

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