LITERACY LOST

CANADA'S BASIC SKILLS SHORTFALL

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This report was prepared by Janet Lane, Director, Human Capital Centre and T. Scott Murray, Principal, DataAngel Policy Research Inc. The findings are those of the Canada West Foundation. Any errors in fact or interpretation remain the sole responsibility of the Canada West Foundation.

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EXECUTIVE SUMMARY

Workplaces are changing quickly. Machines or algorithms are replacing some tasks, and new and changing jobs require additional technical skills. To keep pace with these changes in current and future jobs, the ability to keep learning is the most important basic skill for any job. Because literacy is the most important "learning to learn skill," Canada's workforce requires high levels of literacy. However, many Canadian workers have poor literacy skills.

Literacy is not just the ability to read, it is the ability to read and understand well and then apply what has been read to a range of problems. According to international literacy assessments, more than 40% of Canada's workforce does not have adequate levels of the literacy skills needed to learn efficiently and be highly productive in most jobs. Without this ability, many Canadians will not be able to keep their jobs – or find new ones – and a growing number of employers will not be able to find workers with the skills they need.

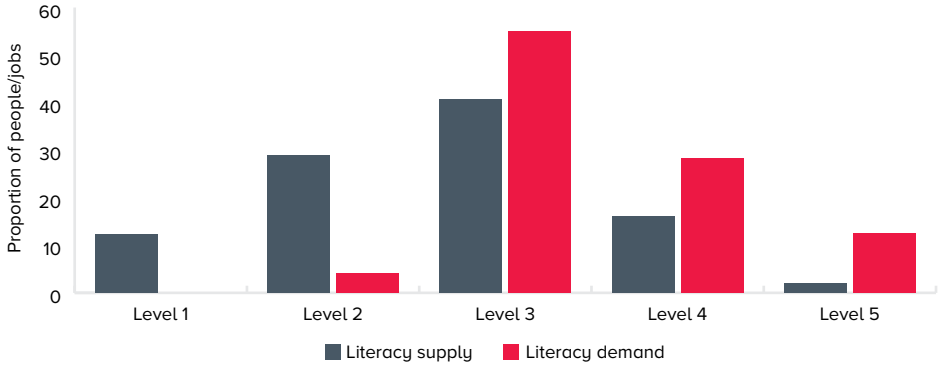
The problem is getting worse.

Younger generations, on average, have more education and are most recently out of school, and generally have higher scores that somewhat offset the lower average levels of skill of older workers. That said, the average scores of all age groups decreased between 2003 and 2011, according to the International Adult Literacy Survey (IALS, 2003) and the Programme of International Assessment of Adult Competencies (PIAAC, 2013).

In addition, people (even young people) tend to lose skills as they age, not through the aging process, but through lack of use. Up to 60% of Canadian employees experience skill mismatches, meaning they have either higher skills or lower skills than their jobs demand. This can cause skill loss. In particular, workers with the lowest skills are the least likely to be offered training by their employers, especially if their jobs are also low-skilled. Compounding the problem is that the likelihood of low-skilled jobs being automated or moved to other countries is growing; the need to upgrade skills in low-skilled workers is crucial.

The good news is that recent analysis of international adult skills data and key macroeconomic performance indicators (GDP per capita and labour productivity) shows that increasing the literacy skills in the workforce by an average of 1% would, over time, lead to a 3% increase in GDP, or *$54 billion per year, every year*, and a 5% increase in productivity. This is up from a 2004 report that showed a gain of 1.5% and 2.5% respectively. What is more, this research also shows that improving the skills of people at the lower end of the scale (Levels 1 and 2 on the five-level scale for literacy) will have more impact than improving the skills of people who are already at Level 3 or higher. As the people most at risk of losing their entire job to automation are the people employed in low-skilled jobs, upgrading their skills would have the added advantage of making them more employable in a new higher-skilled job.

Figure 1: Literacy demand and supply in Canada, 2011



Source: PIAAC, 2011. Employment and Social Development Canada's (ESDC) essential skills profiles

SOLUTIONS TO CANADA'S LITERACY PROBLEM

include efforts to:

Improve the literacy skills of graduates of K-12 and post-secondary programs

Understand the skills needs of employers and the skills proficiencies of the workforce through:

- Investigating the market for skills
- Building and implementing competency frameworks

Embed literacy in all workforce education and training initiatives for all working-aged adults

Stop skill loss in some workers through employers:

- Increasing the knowledge and skill intensity of their jobs
- Assessing the skills of job applicants with reliable tools
- Investing in literacy, numeracy and problem-solving skill upgrading
- Adjusting work processes to ensure skills gained are put to use

Transform the federally funded Labour Market Programs offered in the provinces and territories

Avoid reliance on 21st century skills as the "silver bullet" that will end skills shortages

Mandate the new Future Skills Centre to include cognitive skills in its research

Canada's provincial, territorial and federal governments are rapidly turning attention to the skill gaps in the economy and looking for the best ways to build them in the working-aged population. The solutions they implement will not succeed unless they also incorporate building literacy skills. Improving the literacy skills of Canada's workforce – and putting them to full use – will close the skills gap and improve productivity.

Increasing the literacy skills
in the workforce by an average
of 1% would, over time,
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$54 BILLION PER YEAR EVERY YEAR

and a 5% increase in productivity.

THE PROBLEM

Work is changing. Automation, globalization and ever-changing materials and processes are reducing the number of routine tasks done by humans, which eliminates some jobs altogether, and creates new and different ones. Consequently, skill demands are changing too. The demand for one skill set in particular – the cognitive skills of language, literacy and math that help people solve problems easily – is going up.

Too many Canadians, however, do not have the skills needed to think critically and to solve problems rapidly – abilities that are required in new and transitioning jobs.

Researchers use the literacy scores from international skills surveys as an indication of the cognitive skills of working-aged adults.[1] The results for Canada from the international skills surveys in 1994, 2003 and 2011, show that more than 40% of Canadian working-aged adults have literacy skills below the minimum level (Level 3) required for technical skills and knowledge to be applied in new ways or different situations.[2]

Literacy levels and what they mean

LEVEL	TASKS
Level 1 0-225 pts	Tasks require the respondent to read short pieces of text to find a single piece of information. Knowledge and skill in recognizing basic vocabulary, determining the meaning of sentences and reading paragraphs is expected.
Level 2 226-275 pts	Tasks require basic matching between the text and information, along with some paraphrasing and making low-level inferences.
Level 3 276-325 pts	Texts are lengthier and denser. Tasks require interpreting and evaluating multiple pieces of information.
Level 4 326-375 pts	Tasks are usually multi-step, requiring a synthesis and integration of information, as well as making complex inferences.
Level 5 376-500 pts	Tasks require a search for, and integration of, information from a variety of sources and making high-level inferences. Application and evaluation of conceptual ideas may also be required.

Source: PIACC, 2013

[1] Rychen, D.W., Salganik, L. *Definition and Selection of Competencie: Theoretical and Conceptual Foundations*. Higrefe & Huber. 2001

[2] Murray and Shillington *Understanding Literacy Markets in Alberta: A Segmentation Analysis*

Meanwhile, a DataAngel analysis of Employment and Social Development Canada's (ESDC) essential skills profiles for occupations in Canada shows most jobs require Level 3 or higher literacy skills (See Figure 1).[3] There are virtually no jobs in the Canadian economy that require only Level 1 skills.

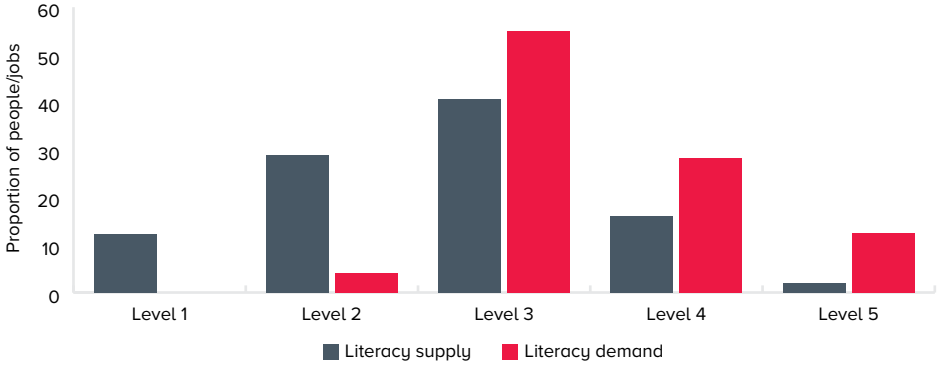
For the past few years, as many as 40% of employers have complained that they cannot find people with the skills they are looking for. While they are usually talking about technical skills, the problem also exists when it comes to the cognitive skills that are needed to make decisions, solve problems and work in teams.

Adding to the problem is that virtually all of the newer jobs in the economy (97% of jobs created in the last 20 years) require that workers have Level 3 or higher skills to be fully productive (Figure 2). Workers with skills below this proficiency level may still be able to do these new jobs but not as well or as productively.

What is more, literacy is the "learning to learn" skill; Level 3 literacy is required to learn new skills efficiently (see page 7). The problem of employers not being able to find workers with new technical skills for available jobs will continue to grow as a large proportion of the workforce does not have the capacity to acquire them rapidly.

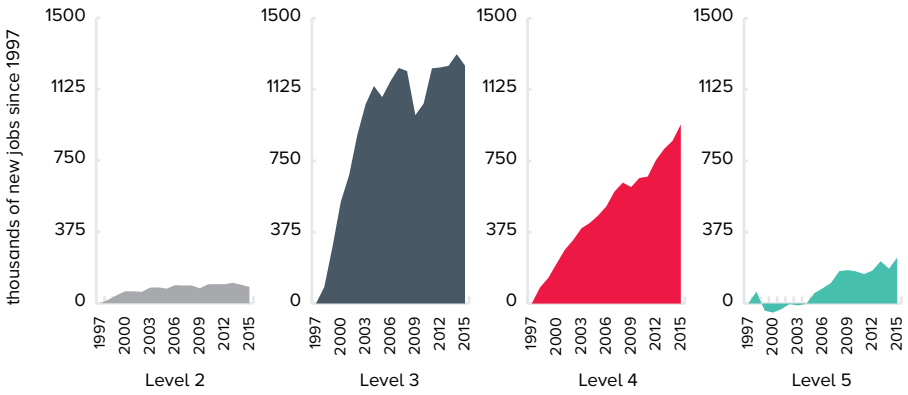
The forecast for the economy and the workforce is dismal unless we increase the supply of these basic skills.

Figure 1: Literacy demand and supply in Canada, 2011



Source: PIAAC, 2011. Employment and Social Development Canada's (ESDC) essential skills profiles

Figure 2: Literacy demand of paid worker jobs in the economy



Source: DataAngel analysis of ESDC's Essential Skills Profile for reading text by occupation applied to estimated employment by occupation from the monthly Statistics Canada Labour Force Survey

[3] ManpowerGroup 2018 Canadian Talent Shortage Survey

What we mean by literacy and why it is so important

"Literacy is defined as the ability to understand, evaluate, use and engage with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential. Literacy encompasses a range of skills from the decoding of written words and sentences to the comprehension, interpretation, and evaluation of complex texts."[4]

Literacy is at the heart of learning; to learn and retain cognitively demanding new skills, people must first be able to read well. Research has shown that literacy:

- Underlies the acquisition and application of other skills.
- Is necessary for jobs that require technical skills and knowledge to be applied in a non-routine way.
- Is more useful as an indicator of capacity to adapt, change and grow when looking towards an uncertain future, than measures that reflect past or present skills such as belonging to a particular occupation, or holding a particular credential.
- Is a better proxy for an individual's capacity to learn than other measures, such as educational attainment, which often do not reflect the level of skills currently held or how these skills levels change over the course of one's life.[5]

Without adequate levels of literacy skill, people either avoid learning or are inefficient learners when they do enter learning situations.

Being literate is not just about the ability to read – it is about the ability to read well and to apply what is read to a range of problems. Experts define five levels of literacy attainment based on the ability to read and to process what is read. At Levels 1 and 2, most people can retrieve information and apply it in routine, predictable ways. At Level 3 and above, people can analyze, evaluate and create new information, precursors to fluid problem solving, critical thinking and innovation. Literacy is also the key to the efficient acquisition and application of higher order numeracy and problem-solving skills. Most jobs in Canada, according to ESDC's Essential Skills Profiles, require workers to have Level 3 literacy skills or higher to succeed.

Literacy is important not just for work and learning, but also for quality of life. Even those who predict a kind of employment dystopia where robots take over most jobs, call for increasing levels of literacy and other cognitive skills to support a life of self-fulfillment outside the traditional areas of the market economy.

Where the data comes from

The analysis in this report relies on the data from three comparable Organisation for Economic Co-operation and Development (OECD) international adult literacy surveys conducted in the last 25 years. The data has been adjusted for the changes in the methodologies.

- 2011 Program for the Assessment of International Adult Competencies Survey (PIACC)
- 2003 International Adult Literacy and Life Skills Survey (IALSS)
- 1994 International Adult Literacy Survey (IALS)

Canada oversampled the population in each survey to ensure it received statistically accurate information.

[4] *OECD Skills Outlook 2013: First results from the Survey of Adult Skills.* Skills volume 1 (eng) – full v12 – eBook (04 11 2013).pdf

[5] McCracken and Murray. Statistics Canada and NCES (2005) *The Adult Literacy and Life Skills Survey: New Frameworks for Assessment*, (2010)

The Economic Benefits of Literacy: Evidence and Implications for Policy, CLLRNet and Competencies at age 14 and competency development for competent learners, study sample. (2004)

Wylie, Ferral, Hodgen and Thompson. *Competent Children Study*, Wellington. (2004)

HOW DID WE GET HERE?

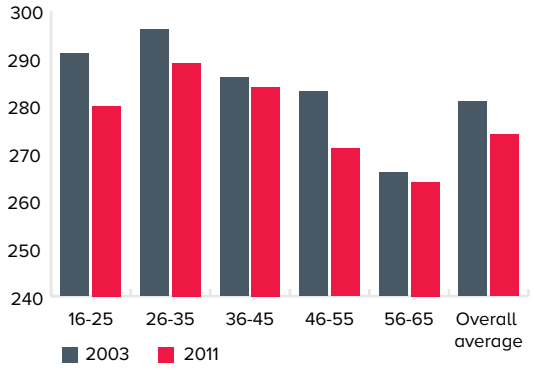
The literacy data show three trends that explain different pieces of the skills challenge.

First, the results of the last two literacy surveys consistently show that with the exception of an increase from the youngest group (16-25) to the next age group (26-35), average scores declined across age groups (see Figure 3a). That is, each age group had lower scores than the previous one, and the effect was more pronounced in the 2011 data.

In general, people's skills peak between 26-35 years of age and then decline as they age. This could be attributed to fewer years of education among older workers. Educational attainment has steadily increased in Canada over time.[6] A closer look at this follows in the next section on youth outcomes.

Second, when the data is viewed by cohort (Figure 3b), it shows that individuals, on average, actually lost skill between 2003 and 2011. An age

Figure 3a: Decline in literacy scores by age group – 2003 and 2011



Source: IALS, PIACC (Standardized to the PIAAC composition for comparison)

Figure 3b: Skill loss by age cohort between 2003 and 2011

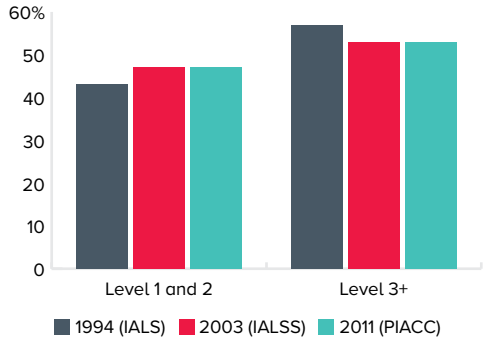
Source: IALS and PIACC

[6] *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program* September 2018 Stats Canada

cohort measures the same people at different points in time. For example, the average score for people who were 26-35 in 2003 was 290; eight years later in 2011, when that same group of people were in the 36-45 age category, their average score had fallen by 8 points to 282. On average, across all age cohorts, Canadian literacy scores declined by 7 points.[7]

What is more, the proportion of adults in Canada with the literacy skills required by today's economy has not increased (Figure 4) over the last three surveys. Given the increasing skill demands of new jobs in Canada's economy, skill levels are not keeping up with demand.

Figure 4: Proportion of working-aged adults by literacy skills over time



Source: IALS (1994), IALSS (2003), PIACC (2011)

There are three main reasons for the growing number of working-aged Canadians whose literacy skills are lower than they need: 1) Canada is not ensuring young people attain high levels of skill; 2) the current labour force has a high proportion of low-skilled workers without the opportunity to improve their skills; and 3) many people lose skills while in the workforce.

Youth literacy levels are low – and they are not getting better

The assumption is that with a high school graduation rate of 85% in 2011, a remarkable participation rate in post-secondary programs (85% of youth go on to some form of post-secondary education), and 75% of the country with some form of post-secondary qualifications, Canada does not have a literacy problem.[8,9,10] Unfortunately it does, a conclusion based on the results of the three cycles of literacy surveys.

On average, people are staying in school longer than they did in previous decades. Between 2003 and 2011, Canadians gained an average of one year of schooling.[11] Given that a year of schooling can equate to between 8 and 25 points on the 500-point literacy scale, it would be anticipated that the average score would go up by a minimum of 8 points between 2003 and 2011. But, as lower-skilled, less-educated older people in the survey population were replaced by younger, higher-skilled, higher-educated people, the literacy scores did *not* go up. Quite the opposite: the average literacy score decreased by 7 points. So the gap between the expected score and the actual score was at least 15 points. That's over 5% of the 2011 average score.

The one notable exception to this general situation relates to the impact of immigration. While first generation immigrants typically have lower levels of literacy than Canadian-born, the national lower average score in 2011 would have been even lower without recent immigrants. The 2011 data suggest that current cohorts of immigrants have significantly higher reading skills than previous cohorts, a finding that we believe is attributable to the new, more stringent language requirements. Higher proportions of recent immigrants are arriving with better official language and literacy skills than previous cohorts. The 2016 census shows that 52% of recent immigrants have at least a bachelor's degree (compared to 24% of Canadian born).

[7] Given the sample size of 25,000, a 7 point decline is statistically significant.

[8] Cansim Table A.2.1 Upper secondary graduation rates by sex, Canada provinces and territories, 2011

[9] *Youth in Transition Survey*, 2011

[10] Cansim table Table: 14-10-0019-01 Labour force characteristics by educational attainment, monthly, unadjusted for seasonality

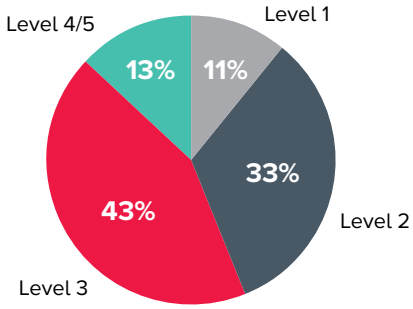
[11] Statistics Canada. *Education indicators in Canada*. September 2018

Previous analysis has shown that each point of literacy skill gained by an individual is worth $61 to the economy; this 7 point decline constitutes a potential annual $6.8 billion loss to Canada's GDP.[12]

The 2011 international literacy survey results show that 44% of 16-25-year-olds had skills below Level 3 (Figure 5). This is the age group into which almost all high school and the majority of recent post-secondary graduates fall.

On one hand, Canada's 15-year-olds do comparatively well on the Programme of International Student Assessment (PISA) which assesses the reading, math and science levels of students around the world. Canada's reading scores have slightly improved over the last two iterations (Figure 6). Canada's 15-year-olds had an average PISA score of 527 in 2015, which is still below the Level 3 PIAAC equivalent threshold of 529.

Figure 5: Literacy levels of 16-25-year-olds in 2011



Source: PIAAC

Education beyond high school contributes to subsequent skill gain and loss. Those who were 16-25 years old in 2003 and had not graduated from high school by 2011 lost an average of 86 points (from an average of 291). If they had graduated from high school, they lost an average of 15 points, and if they had earned a college diploma in the interim, they lost only 13 points. Only those who had attained a university degree gained skills – an average of 16 points.[13]

Low and decreasing skill attainment and subsequent skill loss is particularly troubling in the 16 to 25-year-old group. Most youth – 85% – go on to some form of post-secondary education (college, university, trade or training school).[14] But students with below Level 3 skills do not have the cognitive tools to take full advantage of education at the post-secondary level. Some 40% of all college students leave their programs with literacy skill below the level needed to satisfy the demands of their intended occupations.[15] A recent study by the Higher Education Quality Council of Ontario found that one in four graduates does not meet the Level 3 bar in literacy and/or numeracy.[16]

Further, young adults are expected to inject new skills into the workforce at a time when the demand for literacy skill has been rising. But almost half of this cohort of young people, including some that have graduated from post-secondary education, do not have the literacy skills to meet the demands of the overwhelming majority of jobs, even the ones that are typically filled by workers without post-secondary qualifications.

This lack of adequate skills coming out of our education systems is exacerbated by what happens later.

[12] DataAngel. *The relative quality of secondary leavers in Ontario: A review of the evidence*, 2010

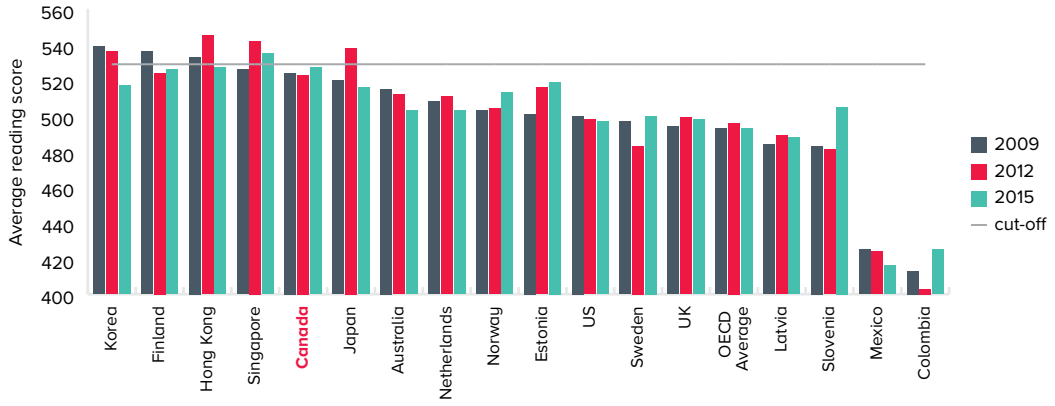
[13] Murray and Shillington, *The efficiency of skill markets in Alberta: Initial results from PIAAC*. 2014

[14] *Youth in Transition Survey*, 2011

[15] Association of Canadian Community Colleges Essential Skills Framework Project

[16] Weingarten, H. P. & Hicks, M. (2018). *On Test: Skills. Summary of Findings from HEQCO's Skills Assessment Pilot Studies*. Toronto: Higher Education Quality Council of Ontario

Figure 6: Canada does comparatively well on the PISA reading scores for 15-year-olds – but they still have a way to go

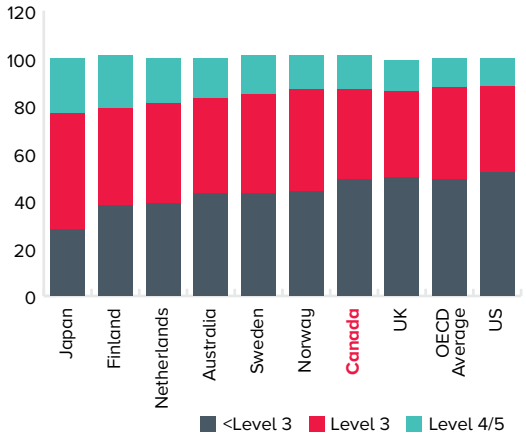


Source: http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-I.pdf; http://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf; http://www.oecd.org/pisa/46643496.pdf

Canada has many lower-skilled workers

Across all age groups, Canada is just average among OECD countries in adult literacy. Figure 7 shows the proportion of low-skilled people in our working age population compared to other OECD countries.

Figure 7: Canada's literacy levels in comparison to its peers



Source: PIAAC, 2011

Lack of training for adult workers compounds the problem

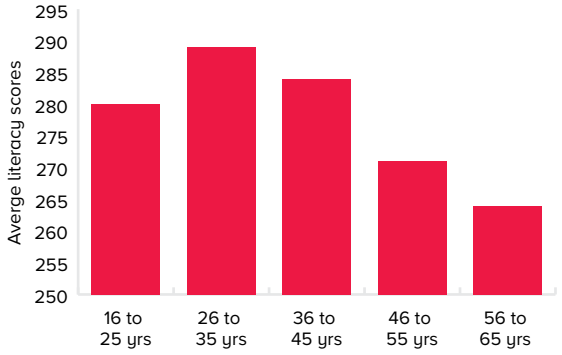
As shown in Figure 7, Canada's proportion of working-aged adults with Level 3 and above skill levels is at the OECD average of 52%. However, countries such as Australia (67%), Norway (57%) and Japan (72%) have a much larger proportion of people at the preferred literacy skill levels, Level 3 and higher, than Canada (52%).

The 2003 Adult Literacy and Life Skills Survey, looked specifically at the number of people who were involved in adult learning and training in 2002. The survey found that, in Canada, just 20% of people who had low skills and were in low-skilled jobs were involved in a course or program, compared to 60% of high-skilled people in high-skilled jobs. Employer-financed training was also highest for people who had higher-level skills and were in high-skilled jobs – 35% compared to 7% for lower-skilled people who were in low-skilled jobs. Employers were more likely to fund training for people who were in higher-skilled jobs if they had lower-level skills, but still, only 25% of them had received employer-funded training of any kind in the prior year.

People tend to lose skills as they age, not through the aging process, but through lack of use

Adults both lose and gain skills over the course of their lives. While average scores are declining over time, on average Canadians gain skill until they are 35, then lose skill as they age (Figure 8). Canada's population is aging.[17,18] Without an effort to stem both low skill attainment and skill loss, the number of individuals with inadequate skill levels will continue to grow.

Figure 8: Skills by age group (2011)



Source: PIAAC

Literacy skill loss does not occur naturally with age. Research by the Swiss Federal Statistical Office in advance of the 2003 Adult Literacy and Life Skills Survey (ALL) found no biological reason for literacy skills to decline with age, at least until adults reach their mid-80s. More specifically, the research associated skill loss with a lack of skill use rather than because of aging.[19]

Skills that are not used on the job are ultimately lost

Microdata from PIAAC coupled with the skill level requirements in ESDC's Essential Skills Profiles show that most workers (as many as 60%) are in jobs that do not match their skill level.[20] Employees with Level 1 and 2 skills are more often in jobs requiring higher literacy skills, while some employees with Level 4 and 5 skills have excess skills for their positions. Some employees with Level 3 skills are in lower-skilled jobs, but many are in Level 4 or 5 jobs. Skills mismatches are costly: people with skills below the level their job demands are much less productive than they would be if their skills were at the appropriate level.

These trends hold within and across industries. While different industries display different distributions of skills mismatch, the overall proportion of skill balance – where the employees' skills match those of their jobs – is reasonably consistent across industries and always represents less than half of the employees in the sector. For more on this subject see *Smarten Up: It's time to build essential skills*, published in 2015 by Canada West Foundation.[21]

For workers in jobs below their skills level, this mismatch can be detrimental to skill retention as the adage – "use it or lose it" – applies. For the economy, having people in jobs that are below their level is an inefficiency that wastes skill that was expensive to teach and learn. On the other hand, if those jobs were reorganized so that they used the skills available, output and productivity could be increased at very little cost.

[17] https://www150.statcan.gc.ca/n1/pub/11-402-x/2010000/chap/pop/pop02-eng.htm

[18] https://www150.statcan.gc.ca/n1/daily-quotidien/150929/dq150929b-eng.htm

[19] Rychen, D.W., Salganik, L. *Definition and Selection of Competencie: Theoretical and Conceptual Foundations*. Higrefe & Huber. 2001

[20] Lane, Janet and Murray, Scott. *Smarten Up: It's Time to Build Essential Skills*, Canada West Foundation, June 2015

[21] ibid

Research found no biological reason for literacy skills to decline with age, at least until adults reach their mid-80s. More specifically, the research associated skill loss with a lack of skill use rather than because of aging.

It is possible that some people with good cognitive skills do not have the level and type of technical skills for jobs that are available and consequently do work that demands lower levels of cognitive skill. This then contributes to skill loss.

The mismatches can be wasteful, but also indicate a big problem with Canada's labour market. Many employers either a) have difficulty assessing candidates' literacy skills and matching people with jobs; b) are obliged to accept credentials that do not represent an appropriate level of skill attainment; c) cannot find or attract people with the appropriate skill level; or, d) are unwilling or unable to afford the prevailing wage rate for workers with the level of skill they need. No matter the cause, this problem is wasteful of skills gained, highlights issues with the effectiveness of our education system, and contributes to Canada's productivity problems.

On the other hand, people who work in jobs that demand higher skills than they bring to the job sometimes gain skills. Factors that affect skill gain are the same that affect skill loss – it all depends on the cognitive demand of the jobs people are in. As was reported in an analysis of the PIACC results for the Government of Alberta:

"Collectively, the variables that explain skill gain are things that are associated with 'good' jobs that afford workers to apply their cognitive skills in non-routine ways, i.e. jobs that involve ICT use and numeracy at work, that provide workers with discretion over the structure of work and that involve structured thinking such as selling, presenting and planning."[22]

[22] Murray, T. Scott and Shillington, Richard. *The Efficiency of Essential Skill Markets in Alberta: Initial Results from PIAAC.*

WHY LITERACY SKILL MATTERS

Increased literacy skill leads to higher productivity

The expectation internationally is that higher levels of education are accompanied by improvements in GDP. Canadians Coulombe and Tremblay used data from 14 OECD countries from the first literacy study (IALS, 1994) along with data from other international sources to look further into the subject. They found that raising a country's literacy scores by 1% (five points on the 500-point scale) is associated with an eventual 2.5% relative rise in labour productivity and a 1.5% rise in GDP.[23] These effects are three times as great as for investment in physical capital such as machinery. Moreover, the results indicate that raising literacy and numeracy for people with the lowest skills was more important to economic growth than producing more highly skilled graduates.[24]

They also found that:

"In particular, we find that human capital indicators based on average literacy scores per country have a stronger effect on growth than comparable indicators based on the percentage of the population that achieved top scores. This result suggests that productivity is mostly influenced by the effect of skills and human capital accumulation on the general labour force, rather than their effect on highly specialized labour only."

Craig Alexander, then VP and Deputy Chief Economist at TD Bank Financial Group, calculated in 2007 that based on Coulombe and Tremblay's analysis, each 1% improvement in literacy would boost national income by $32 billion.[25]

An analysis in 2018 shows an even larger return on literacy skill. Wiederhold and Schwerdt have found that a 1% rise in literacy rates would ultimately lead to a 3% rise in GDP. Clearly, raising literacy skills across the workforce leads to a tangible return on investment.

[23] Serge Coulombe and Jean-François Tremblay, *Literacy, Human Capital, and Growth, Department of Economics*, University of Ottawa. September 2004

[24] ibid

[25] *Literacy Matter: A Call to Action*. TD Bank Financial Group. 2007

Jobs in the changing economy demand even higher levels of literacy

Technology is taking over many routine tasks leaving higher-level, more complex, interactive tasks to humans. While specific technical skills are a requisite to being hired for existing and newly created jobs, the capacity to adapt to and use changing technology and processes is also necessary. Employers are increasing the skill level demanded by their jobs to maintain competitiveness in the global economy. Manufacturing, for example, is becoming much more skill intensive, for technical and cognitive skills.

> "The pace of change that the industry is experiencing, combined with global competitive pressures, means that manufacturers will continue to expect more from their employees. Essentially, manufacturers need skilled workers who have the ability to master new, advanced technologies, work in highly collaborative team environments, use critical thinking and problem-solving skills, adapt to ever changing environments, and embrace an attitude of never-ending learning."[26]

Employers surveyed by McKinsey Global Institute "... expect to need more of the social and emotional, higher cognitive and technology skills in the future and less of the basic cognitive and physical and manual skills."[27]

Skill shortages lead to decisions with poor long-term results

Automation and competition from equally skilled but lower-paid workers in other countries has put downward pressure on wages for lower-skilled jobs. Consequently, wages in jobs that demand Level 2 literacy skill are growing very slowly. Our analysis shows that since 1999, the average hourly earnings for jobs requiring higher-level literacy skills have increased at much faster rate (see Figure 9, page 17).

Further analysis suggests that a shortage of workers with sufficient skills has resulted in employers resorting to either of two strategies for managing their workforce. They have either adopted a low-wage, low-skill strategy that generates far less output per hour worked; or, used a high-skill, high-wage strategy and paid a premium for the higher skills of their workforce. These two strategies are resulting in a) lower productivity growth and b) rapidly increasing wages for higher-skilled workers.

A low-skill, low-wage strategy to manage the workforce

In this strategy, employers keep the skills required to do the jobs at a low level, and consequently are able to keep wages low. The danger for Canadian employers using a low-skilled, low-wage solution to manage skills shortages is that much of the rest of the world is rapidly increasing the skills of their workforces. Workers in other countries, who are paid less, can now do production and some service jobs currently done by our low-skilled workers. In the long run, Canada will lose more jobs to other countries – jobs that may never return to the Canadian economy. Ultimately, Canada could find that this portion of the workforce becomes unemployable. The better solution is to train workers to increase their skill, or to use the existing skill that some workers already possess and to change workplace processes to increase the skill level demanded by their job.

As the story on page 16 shows, employers do not always understand that improving the skills of their employees, and reorganizing the work processes to use those skills fully could improve both productivity and retention.

[26] Giffi, Craig, et al. *Help Wanted: American manufacturing competitiveness and the looming skills gap*. Deloitte Review. Issue 16. 2015

[27] Bughin et al. *Skill Shift Automation and the Future of the Workforce. McKinsey Global Institute*. Discussion paper

A not uncommon productivity story

Company X wants to scale up its operations and grow the company but is having trouble doing so because of high employee turnover. The top two executives have a good grip on the company and their production processes. But, the company's standard operating procedures are not yet written down – they exist only in the executives' heads. GO Productivity is brought in to create a process map of the way things are done and then develop a training program that will standardize their new employee orientation, making it easier and faster to onboard their new employees. This, the executives say, will solve their problem of not being able to grow the company.

Part of the engagement conversation goes something like this:

Q: "Do you want to engage employees in the development of the process map?"
A: "No, we know what's best for our business."

Q: "Would you like to make sure that your processes are the best ones?"
A: "No, we have been doing this for a long time, and we know they are."

Q: "Would you rather upgrade the skills of your current workers?
A: "No! That would take forever."

Says Lori Schmidt of GO Productivity,

"What this company *wants* is a training program for the status quo. What it would *get* is a training program that keeps the door revolving. What the company *needs* are improved processes, better trained, more engaged employees who will help to increase productivity and grow the company, and a door that doesn't keep slamming behind unhappy past employees."

For more on GO Productivity go to: **goproductivity.ca**

A recent OECD report showed that greater use of workers' skills leads to:

For workers

- Higher wages – having *and using* high levels of skill on the job results in higher earnings. Being able to use literacy skills is even more important than years of education and overall literacy proficiency in determining compensation.
- Greater job satisfaction – workers who use their skills more fully not only have greater job satisfaction and get paid more, but also have greater satisfaction with life in general; they also have better overall health.

For firms

- Better productivity, and less turnover – firms that utilize their workers' skills better are associated with higher productivity and output and less worker turnover.[28]

[28] Gyarmati et al. *Upskill: A credible test of workplace essential skills training.* SRDC (2014)

McDonald's

McDonald's Corporation saw benefits from a recent automation that increased the skills it demanded from its employees.

It would be easy to assume that when McDonald's introduced its new kiosks for ordering meals that it resulted in fewer employees – that machines replaced humans.

However, while they may have reduced the number of counter staff needed, by increasing the number of orders that could be placed per hour, kiosks increased the number of people needed in the kitchen. Meanwhile the counter remained open for people who prefer to order that way.

Furthermore, the increased customization of meals that was made possible by the kiosks meant that they used more of their employees' skills. It takes higher-level thinking skills to build a made to order burger than a standard Big Mac.

The introduction of kiosks increased sales and also improved productivity.

A high-skill, high-wage strategy to manage the workforce

Higher-skilled jobs have always paid more than lower-skilled jobs, because they are worth more in terms of productivity to an employer. However, there is now an even larger premium paid than before. Figure 9 shows the change in inflation adjusted average hourly earnings since 1999 for jobs by peak literacy skill required. The pay for Level 4 and Level 5 jobs has increased by over 15% in real dollars during the period, while that for Level 2 jobs has only increased by 1%. When converted to annualized earnings, employees at Level 2 gained only $325 between these years. Those at Level 3 gained almost $3,000 annually, while those at Levels 4 and 5 gained $7,200 and $8,800 respectively. Note, this gain is realized every year. This is another indication of the declining demand for and oversupply of employees with low skill levels and the relative shortage of higher-skilled employees.

Rapid increases in minimum wages in some parts of the country could be at least partially offset by increasing the skill demands of the jobs, which in turn would increase the productivity of the workers. McDonald's is one employer that has at least partially implemented this solution.

Figure 9: The highest-level skills demand a faster growing premium

Source: DataAngel Policy Research analysis of the increase in average wage rates by the level of literacy associated with the occupation in the ESDC Essential Skills Profiles, 12-month averages of employment by detailed occupation from the Labour Force Survey, 1997 – 2015

Improving the literacy skills of Canada's secondary and post-secondary graduates will not, alone, solve Canada's literacy skills problems – but it is a necessary part of the solution.

Training is lowest for those who need it most

The 2003 International Adult Literacy and Life Skills Survey (IALSS) looked specifically at the number of people who were involved in adult learning and training in 2002. The survey found that, in Canada, just 20% of people who had low skills and were in low-skilled jobs were involved in a course or program, and this is 10 percentage points lower than Norway, Switzerland and the United States. Over 60% of high-skilled people in high-skilled jobs in Canada participated in adult education and training – again, Canada was 10 percentage points lower than the United States[29] (which is also troubling for productivity of our most skilled workers). Employer-financed training was highest for people who had higher-level skills and were in high-skilled jobs – 35% compared to 7% for lower-skilled people in low-skilled jobs. Employers were more likely to fund training for people with lower skill levels who were in higher-skilled jobs, but still, only 25% of them received employer-funded training of any kind in the previous year.

While this situation may have improved somewhat since 2003, it is clear that too little has been done to overcome the skill gaps of any kind in our workforce. In Canada, Conference Board surveys of employers found training investment per employee has been much lower than in other countries – and declined by close to 40% over two decades ending 2014.[30] Between 2015 and 2017, spending on employee training increased $89, to $889 per employee; however, this only brought Canadian investment in training by the large employers surveyed to 81 cents for every dollar spent by comparable U.S. employers.[31]

[29] *Learning a Living: First results from the Adult Literacy and Life Skills Survey*. OECD, Statistics Canada. 2005.

[30] Hall, Colin *Learning and Development Outlook 2014: Strong Learning Organizations, Strong Leadership*. Conference Board of Canada. 2014

[31] *Learning and Development Outlook 2018*. Conference Board of Canada https://www.conferenceboard.ca/press/newsrelease/2018/01/31/canadian-employers-investment-in-employee-learning-and-development-continues-to-rise

Low-skilled workers clearly reduce productivity and profitability. However, a common refrain from employers has been, "but if I train them, they will just leave." This may be why employers have been inclined to poach from other firms.[32] Conversely, research has proven that training helps employees to feel valued and more inclined to stay with their employer and, if the training is appropriate, they are also more productive.[33]

However, training has not always been appropriate to the needs of the employee and the job. Employers may understand that they have a problem, but not have the understanding that it is a lack of cognitive skills that is affecting their productivity and bottom line. As a result, they may have provided training in the past that was not designed to solve their specific skills problem.

Boeing Canada

A training success story

Boeing Winnipeg, part of Boeing Fabrication, is the largest aerospace composite manufacturing center in Canada, employing nearly 1,500 people. At its two sites in Winnipeg, it produces more than 500 end item composite parts and assemblies for Boeing Commercial Airplanes.[34] The corporate culture at Boeing is continuous improvement.

At Boeing Winnipeg, as at all Boeing sites, training for the next job is part of the job. Essential skills training (which includes literacy) is part of the training package. ABC Life Literacy Canada recognized Boeing for its exemplary training in March of 2016. Kim Westenskow, general manager, Boeing Canada Operations Limited, said at the time:

"Boeing Winnipeg is on the cutting edge of technology and we build the best aircraft products in the industry. This is all possible because of our people—Boeing is a great place to have a career. It's through the investment in our people including training and upskilling which will allow The Boeing Company to be even more successful over the next 100 years."[35]

Nick Bevilacqua, Director of Business Operations at Boeing Canada Operations says: "We succeed in reaching our productivity goals because we invest in our people."

Boeing Canada's workforce is growing, because they are building more components for the aerospace industry. They are able to accomplish all this new work with a smaller number of people than other businesses might, because their people are highly productive. This is the value of the investment they make in training.

Onboarding new employees is expensive. Boeing has minimized its onboarding costs, because its turnover rate is so low. This enables the company to invest more in the employees they already have. That creates a virtuous circle, because employees who feel valued and who are growing in their careers are more engaged, more productive, and more interested in staying with their employer.

So much for the old thinking that "if we train them they will leave!"

[32] Labour Supply/Demand Dynamics of Canada's Information and Communications Technology (ICT) Sector as quoted in https://business.financialpost.com/executive/management-hr/employers-must-start-investing-in-skills-training-or-risk-having-public-policy-nudge-them-along

[33] https://www.conferenceboard.ca/press/newsrelease/2018/01/31/canadian-employers-investment-in-employee-learning-and-development-continues-to-rise

[34] http://www.boeing.ca/boeing-in-canada/backgrounder.page

[35] http://www.abclifeliteracy.ca/literacy-and-essential-skills-are-critical-future-workplace-training

SOLUTIONS TO CANADA'S LITERACY PROBLEM

include efforts to:

Improve the literacy skills of graduates of K-12 and post-secondary programs

Understand the skills needs of employers and the skills proficiencies of the workforce through:

- Investigating the market for skills
- Building and implementing competency frameworks

Embed literacy in all workforce education and training initiatives for all working-aged adults

Stop skill loss in some workers through employers:

- Increasing the knowledge and skill intensity of their jobs
- Assessing the skills of job applicants with reliable tools
- Investing in literacy, numeracy and problem-solving skill upgrading
- Adjusting work processes to ensure skills gained are put to use

Transform the federally funded Labour Market Programs offered in the provinces and territories

Avoid reliance on 21st century skills as the "silver bullet" that will end skills shortages

Mandate the new Future Skills Centre to include cognitive skills in its research

RECOMMENDATIONS

to reduce literacy skill shortages

Improving the literacy skills of Canada's secondary and post-secondary graduates will not, alone, solve Canada's literacy skills problems – but it is a necessary part of the solution.

We have shown a complex picture of Canada's literacy skill trends – one where workers – even some young ones – lose the skills they attained in the education system, and not just because they are aging. There is no quick fix. Solutions to this multifaceted problem must also be multifaceted.

To better understand the skills needs of employers, and the skills proficiencies of people, including youth, in the workforce, Canada should:

→ Investigate the market for skills, especially literacy, numeracy and problem-solving skills

Employers are paying increasingly more for higher levels of skill than in the past, or in some cases, reducing the literacy skill demands of their jobs. Neither strategy will work in the long run. To offset both problems, policy-makers need to better understand what is driving these behaviours and find solutions to them.

→ Build and implement competency frameworks

Competency frameworks will help to identify the levels of skills and competencies required by the jobs in the economy – including literacy, numeracy and the other essential skills. See Appendix 1 for more on competency frameworks.

Canada's reliance on credentials has lulled employers and workers into a false sense of achievement. Certificates and diplomas do not mean as much as many think they do. The cognitive skill gaps in Canada's workforce become apparent when employers realize their workers do not have the critical thinking, problem-solving or productive teamwork skills needed for the jobs they are doing. As shown in this report, Canadian youth do not achieve high rates of literacy; low-skilled workers do not have the opportunity to improve their skills; and in the absence of the demand to use all of the skills they have achieved, some higher-skilled people lose skill while in the workforce. Competence is the best credential, as Canada West Foundation discussed in its research report of the same name in 2015.[36] Canada's credentialing system must ensure that assessments include competence in the basic skills of language, literacy and numeracy.

To fill Canada's skills gaps, literacy must also be embedded in all workforce education and training initiatives for both youth and working-aged adults.

Solving the literacy skill loss problem does not mean that Canada must provide separate literacy training to everyone with skill levels below those required. A more successful approach is to embed literacy and other cognitive skills curricula into every training program for those individuals – when they are hired and onboarded, and when they undergo on the job training of other kinds, in-service sessions, and other formal and informal training.

The most useful training incorporates a full needs assessment both of the business goals and practices of the employer and the skill gaps within the employees, and then offers curriculum that meets the needs of both. It is then important to ensure that the new skills are used through new and better processes and work design so that the skills continue to build instead of stagnating and declining.

To stop causing skill loss in some workers, employers using a low-skill, low-wage strategy will need to simultaneously:

- → Increase the knowledge and skill intensity of their jobs by, among other things, increasing the level of critical thinking and decision making embedded in each job and reducing levels of supervision. This will help employers keep up with foreign competitors and adjust to the ongoing automation of jobs that only demand the routine application of procedural knowledge.

- → Start assessing the skills of job applicants with tools that reliably certify skills and competencies so they can make better hiring decisions – which will reduce skill loss and increase productivity.[37]

- → Invest in literacy, numeracy and problem solving skill upgrading for current employees, by embedding it into other training. A comprehensive assessment of current skills with curriculum customized to the assessed needs provides the best results. Providing training will reduce turnover, and provide all the new skills the workforce needs as jobs change.

- → Adjust work processes to ensure that skills gained through upgrading are put to use and do not stagnate or deteriorate.

ESDC has funded various pilot projects that have proved that fewer than 25 hours of training that incorporates these skills into work-related curricula can improve literacy skill by as much as 23 points (enough to propel many people from Level 2 to Level 3 on the literacy scale).[38] The research suggests that these investments can yield as much as 25% in first year rates of return on investment through the positive impact of additional skills on productivity, turnover, material wastage and employee health.[39] See Appendix 3 for more details.

Most employers are not yet aware of these new models of effective, efficient and durable literacy training that are now are available. Even when aware of the possible benefits of training, few employers have taken advantage of the new training models. Because the benefits can outweigh the costs, incentives for employers to improve the skills of their workforce, equivalent to those that incent capital investment, should be provided for a time. Given that the return on increased literacy skills is three times that of the return on capital investments, any financial incentives could be recouped by government through additional productivity, GDP and taxes.

[36] Lane and Christensen, *Competence is the Best Credential*. Canada West Foundation. 2015.

[37] For an example of such a tool see Vametric's Valid-8 tool at www.vametric.com

[38] SRDC (2014) *Upskill: A credible test of workplace essential skills training*

[39] Ibid

Transform the federally funded Labour Market Programs offered in the provinces and territories.

Billions of dollars are spent every year on preparing unemployed and marginally employed people for better jobs. There are new programs that offer proof that participation has generated durable skills efficiently, effectively and consistently. Programming should be driven by these data. It is worth noting, however, that literacy and numeracy skill upgrading will only generate positive rates of return if employers use the new skills generated through the training and the instruction moves the trainees to at least Level 3. See Appendices 2 and 3 for more on this.

Avoid reliance on 21st century skills as the "silver bullet" that will end skills shortages.

Basic cognitive skills are also a pre-requisite of these skills.

Various frameworks for 21st Century Skills exist, and they usually include critical thinking, creativity, collaboration, communication, information literacy, media literacy, technology literacy, flexibility, leadership, initiative, productivity, and social skills. These are higher-order skills and require adequate levels of basic cognitive skills – literacy, numeracy and oral language – in order to be acquired efficiently and applied at required levels.

Any program or curriculum designed to build 21st Century Skills must also consider the need to ensure that learners first have adequate literacy levels. Roughly half of the workforce do not have these skill levels, so unless their language, literacy and numeracy skills are upgraded, investments in increasing the supply of 21st Century Skills will not be rewarded.

Finally, as awareness of the problems due to literacy skill shortages grows, awareness of the importance of including literacy and other cognitive skills into all adult training programs will too. Financial support for much of this investigative and programme work could be made available through existing federal and provincial/territorial funding pots.

Mandate the new Future Skills Centre to include cognitive skills in its research.

A new federal skills agency, Future Skills Centre, is being created at a crucial moment in Canada's skill environment. The research with which this agency will be tasked can and should be transformative for Canadian workforce skills and competency development. The Future Skills Centre will have links to the on-the-ground organizations that are active in the education, training and development spaces. It will have the opportunity to test out all of the recommendations listed above. However, it will fail to achieve its mandate if it does not pay attention to Canada's growing literacy and other cognitive skills gaps.

CONCLUSION

International studies have shown that 40% of working age people in Canada have low or poor literacy skills, which makes it difficult for them to learn new skills. Good basic cognitive skills – language, literacy and numeracy – help workers learn in a way that is efficient and to apply skills independently. The ability to learn will enable workers to remain competitive in a shifting and uncertain labour market.

The situation is critical, but solutions exist. Implementation of the recommendations listed in this report will reduce Canada's literacy skill problems and go a long way to improving the country's productivity and competitiveness. More importantly, it will give Canada's workers a fighting chance at finding and keeping employment in the changing economy, and maintaining quality of life.

APPENDIX 1

Competency frameworks

Recently, the notion of competencies has been incorporated into the skills agenda. Competencies are abilities to apply one's skills, knowledge and attributes to the tasks of a job. Competencies cover all the skills required on the job, technical and cognitive, including literacy and other essential skills. Canada does not yet have a system of competency frameworks which link competency profiles for every job in the economy.[40] Competency profiles detail the component tasks and sub-tasks of a job, and the competencies, and the level of competence required to perform those tasks well. If Canada had them, the profiles would also detail the criteria and standards by which to judge a person's level of competence for each task.

Identifying the required level of literacy for each job, and making that explicit in competency frameworks, would provide employers with a clear sense of their skill needs. Providing workers with micro-credentials that signal their skill levels would provide employers with a reliable and inexpensive way to select workers with the requisite skill levels. Because competency frameworks link competency profiles together, they make it apparent which competencies, and which levels of competence are common to various jobs. This in turn, enables users to see the pathways between jobs and educational institutions a clear sense of what their curricula should cover.

Building and implementing competency frameworks would help to ease the skill mismatch, both in technical and cognitive skills, that is currently occurring, and make more obvious any need for further training. This, in turn, would help reduce skill erosion in the workforce.

The need to better match people with jobs, and jobs with people, by using competency frameworks was discussed in a recent Canada West Foundation paper, *Match Up: A case for pan-Canadian competency frameworks*.

[40] Although the federal government has begun to work on a more comprehensive taxonomy of the skills used in today's workplaces, it is at this stage, still a list, rather than a framework.

APPENDIX 2

Big data and predictive analytics: the coming transformation of Active Labour Market Programming[*]

Predictive analytic technology is most advanced in areas such as active market programming that provides training, counselling and practical work experience directed to people who are unemployed or otherwise in need of assistance in entering or re-entering the labour market or moving to better jobs. Progress is easiest here since there is quite good information on inputs and processes (e.g., the kind of training or intervention that is provided and its costs) and even better information exists on outputs and outcomes (such as information from tax files and other administrative sources on the subsequent employment and earnings of trainees and on their subsequent need to rely on programs such Employment Insurance).

The technology has been tested. In the 1990s, the predecessor of Employment and Social Development Canada (ESDC) played a world-leading role in developing and piloting a highly individualized, evidence-driven approach to the delivery of active labour market interventions. Their initial pilot study created a nine-year longitudinal file drawn from some 19 provincial and federal administrative datasets, covering more than 10 million clients across time. The data was cleansed in order to anonymously track clients against 250 different variables and outcomes, using tax, EI and other administrative records. From this combined dataset, the department was able to develop various equations that would estimate "what will work best" for different types of clients, in different regions.[41] This data could then be used to make appropriate referrals to each of the 25 ALMP interventions that were available in local areas at that time. The techniques that were used underwent a number of iterations based on lessons learned but, by the near the end of the decade, they were working sufficiently well that full-scale implementation was possible.

The system was designed such that an employment counsellor fed information about a client sitting in front of him or her into the database and, a few seconds later, obtained information about the type of available ALMP intervention that would likely work best for that client. The calculation of outcomes was based on information about the subsequent employment, earnings and receipt of social benefits of earlier participants based on characteristics that best matched the client. The system could also produce management information about what kind of interventions were working best overall and which were in greatest demand. Although crude by comparison to today's standards, the calculations were still significantly better than anything that was otherwise possible at the time.

The pilot was abandoned for a variety of reasons. However, it could be readily re-introduced in an even more powerful form through initially small-scale pilots as part of the federal-provincial-territorial labour market agreements.[42] In many ways, doing this would be an ideal way of introducing the technology gradually and on experimental basis, where one could learn from the experience of a small number of initial trials that could be gradually extended to other labour market agreements and eventually to other forms of skills acquisition and, indeed, to other forms of service.

There would be large payoffs from the early, experimental, introduction of evidence-driven labour market programs in a few areas. The micro-level evidence that is used relates not only to individual outcomes, but also costs, processes and outputs. This means that, if well managed, it can evolve into an open, transparent system where, lessons learned can be readily transferred to other applications. This provides balanced, consistent evidence for all those who participate in the delivery system. It allows the development of feedback loops such that the quality of interventions improves over time – learning from the results of earlier experience.

* Special thanks to Peter Hicks, former senior civil servant and advisor to the Privy Council Office for his work on Appendix 2.

[41] For a more detailed overview of this pilot program, its history and why it was terminated, see Colpitts and Smith (2002).

[42] ESDC continues to use similar, but updated, techniques in their current evaluation of these programs.

APPENDIX 3

A new approach to affordable, efficient literacy skills training by employers

The instructional recipe that has been shown to work:

Work with the employer to identify business issues that might be addressed through literacy and numeracy skill upgrading.

Profile the levels of literacy and numeracy demanded of workers.

Develop of curricula that explicitly focuses instruction on the factors that underlie and predict the relative difficulty of reading and numeracy tasks and that includes authentic occupational content.

Systematically assess learners at the point of intake to clarify their learning needs and to adjust the instructional focus to better fit the learner's needs. Assessment results are also used to generate a score report for learners that serves to increase learner motivation levels and to generate a customized training proposal for the employer that includes information on instructional costs, expected benefits and implied rates of return on investment that serves to engage the employers.

Deliver instruction by skilled and experienced instructors who receive three days of focused training on the assessment and instructional framework, training that equips them with the ability to introduce authentic content that maintains the link to the factors that underlie task difficulty

Actively manage instructors and instructional quality. Instructors are obliged to reflect on instructional goals before and after each instructional session and to adjust the content and pace of instruction accordingly.

Systematically assess learners at the point of program exit, data that is used to generate a score report for learners, a summary report for the employer that reports average skill gain and skill gain distributions and an analysis of instructor efficiency and effectiveness by instructor

Partial reimbursement of employer's training costs by government where the size of the proportion of training costs reimbursed depends on the average level of skill gain realized. These payments were designed to increase the level of employer engagement and to create incentives for training providers to realize significant skill gain.

Work with employers to ensure that workplace organization, processes and technologies are configured in a way that ensures that the newly created skill gets taken up and put to productive use. This element helps to reduce the rapid loss of skill observed when trainees return to jobs that do not provide them with an opportunity to apply their skill.

The results of a pilot test of the new approach

In terms of effectiveness, 15 to 30 hours of instruction generated average skill gains of 16 to 26 points, enough to move most learners from Level 2 to Level 3.

In terms of efficiency 15 to 30 hours of instruction generated additional skill at roughly half the cost per point of conventional provision.

In terms of equity, the active management of the learning process reduced the variance in skill gain significantly within and among programs.

In terms of durability, the work with employers on the skill demand side reduced the level of skill loss experienced in earlier studies, something that should increase returns on investments in skill upgrading.

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