**Literacy in Canada: Trends in skill supply and skill demand, skill shortages and surpluses and skill loss**

T. Scott Murray

DataAngel Policy Research

**Executive Summary**

Automation and the rapid globalization of markets is driving a rapid increase in the demand for key cognitive skills in Canada, including literacy.

All of jobs created over the past 15 years require workers with a minimum of Level 3 literacy skill, a level that supports the application of technical skills and knowledge in non-routine ways.

The supply of literacy skill is not growing rapidly enough over the past decade to keep pace with the growth in demand despite significant increases in high school graduation rates and rates of post-secondary education. Roughly 50% of youth leaving the secondary system still have literacy skills below this level. Post-secondary participation reduces this proportion but not as much as expected. It appears that a significant amount of literacy skill loss is occurring after youth leave the education system., enough to more than offset the skill gains associated with higher levels of educational attainment. Ironically, the observed skill loss seems to be the result of employers adjusting down the cognitive demands of their jobs in response to the presence of large proportions of workers with literacy skill below the level needed to be fully productive in their occupation.

The amount of literacy skill being lost is high enough that the proportion of workers with literacy skills below the minimum level demanded by the jobs, at 40% in 2011, is expected to grow. Literacy skill shortages are associated with a significant loss of economic output. The shortage of adults with Level 3, 4 and 5 literacy skills is driving a rapid increase in the wage premia to literacy skills and an associated rapid increase in skill-based income inequality. Each point of literacy below the minimum level needed to be fully productive is associated with a loss of $61 in annual earnings. In total, the economy loses an estimated $9.1 billion of labour income per year as a result of literacy skill loss. Additional economic output is lost as a result of the fact that 30% of workers have literacy skills above the level demanded by their jobs.

Finding a way to reduce the proportion of youth leaving the secondary system with literacy skills below the level demanded by the jobs that are being created would have a significant impact on the return on public and private returns on investment in post-secondary education, on rates of productivity, employment and GDP growth and on the growth of skill-based inequality in incomes, health and social engagement. The policy measures set out in the conclusion of this report hold the promise to add .5% to current levels of productivity growth.

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1. **Introduction**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* outtake box \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**Automation, the globalization of markets, falling trade barriers and increasing global skill supply are driving steady increases in the occupational demand for key cognitive skills, including literacy and numeracy. This trend is projected to continue over the coming decades, a fact that raises important questions:**

**Is the supply of literacy and numeracy likely to keep up with rising demand?**

**If not, where are skill shortages likely to emerge?**

**If not, what are the economic and social consequences for individuals, institutions and macro-economic performance of rising cognitive skill shortages?**

**If literacy and numeracy skill shortages are likely to impair our individual and collective economic and social success, what measures should be taken to mitigate these effects?**

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*end outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

This chapter introduces the report and its objectives and provides readers with a framework for thinking about literacy and numeracy, their impact on individual outcomes and their import for policy.

Literacy and numeracy skill have been shown to be socially and economically important, if only because of the impact that they have on individual, institutional and macro-level outcomes (McCracken and Murray, 2010).

This report presents an analysis of how the supply of these two cognitive skills, literacy and numeracy, have evolved since 1994. The goal of the analysis is to:

Explore what factors underlie changes in the level and distribution of skill,

Document changes in the impact that these skills have had on adult’s labour market, health, social and educational outcomes,

Evaluate whether the available supply of literacy and numeracy skills is able to satisfy the likely occupational demand for these skills. Economic theory suggests that both skill surpluses and skill shortages are economically damaging so are worthy of policymaker’s attention.

The report concludes with a summary of what the findings presented imply for policy and what specific policy measures might be needed to respond to challenges and issues raised.

**About literacy and numeracy**

Our understanding of literacy and numeracy has evolved considerably over the past 30 years in response to theoretical advances in the understanding of what underlies the relative difficulty of literacy and numeracy tasks, in the development of statistical methods to assess the skill levels of individuals and populations and through the analysis of data from successive large-scale international assessments of adult skills, including the 1994 International Adult Literacy Survey (IALS), the 2003 International Survey of Adult Literacy and Skills Survey (IALSS), the 2005 International Survey of Reading Skills (ISRS), the 2011 Program for the International Assessment of Adult Competencies (PIAAC) and successive cycles of the Program for the International Student Assessment

(PISA). Literacy is no longer thought of as the act of reading but of reading understanding and applying what is read to tasks of increasing difficulty. This shift transforms literacy from an absolute concept in which one is either literate or illiterate into a relative concept in which one’s proficiency can only be judged against the demands of the reading tasks that are encountered in the course of daily life or that are required to realize one’s goals.

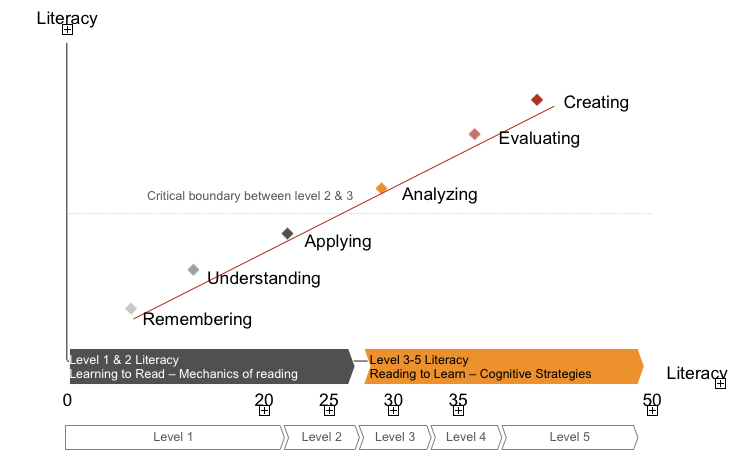
Similarly, numeracy is no longer thought of as the ability to perform mathematical operations but to read and understand mathematical concepts, to select and apply mathematical operations and to apply mathematical knowledge and results. As with literacy, numeracy is a relative concept the adequacy of which can only be judged relative to the level of task difficulties faced. Numeracy differs slightly from literacy in that it is highly dependent on the individual’s reading skill level as the first step coping with a numeracy task is to read about and understand the problem to be solved.

Adults with high skill levels are able to cope independently with the reading and numeracy tasks that they encounter, something that reduces their dependency on others.

Adults with low levels of skill are still obliged to cope with the skill-based tasks that life presents them with but are forced to rely on less efficient means of confronting these tasks. In this way, literacy and numeracy are simply tools that, like any tool, make the task at hand easier to accomplish.

The following figure illustrates the essential nature of literacy. Literacy is best thought of a continuum that can be subdivided into levels, each of which represents the skills needed to cope with reading tasks of increasing difficulty. Conventionally, adult literacy and numeracy skill have been expressed on a 500-point proficiency scale that is divided into 5 levels. Each proficiency level reflects a distinct set of cognitive skills and strategies that are needed to reliably solve tasks at that level. Research has established that these proficiency levels have a significant impact on individual outcomes, with the boundary between Level 2 and Level 3 being associated with a marked reduction in the probability of realizing poor outcomes. The IALS, IALSS and PIAAC proficiency levels can be used to describe and compare both the demands of jobs and the skills of workers in those jobs.

**Figure 1.1 The relationship of literacy skill to the hierarchy of task difficulty**



Jobs that demand Levels 1 and 2 only require workers to apply routine procedural knowledge, however acquired.

Adults at Levels 1 and 2 literacy skill are able to perform tasks that require them to remember, to understand and to apply routine procedural knowledge that they have acquired either by observation or by reading.

Jobs at Levels 3, 4 and 5 require workers to solve increasingly difficult problems.

Adults with Level 3 or higher literacy skill are able to analyze and evaluate information presented in print and have the ability to create new information and draw conclusions based on information that they have read. This level of skill allows them to solve unfamiliar problems in non-routine ways.

This interpretation fits with the two taxonomies that underpin most of the curricula in the world. Bloom’s revised taxonomy identifies the important threshold between applying, that takes place in the recall processes in the back of the brain, and analyzing, that activates the reasoning processes in the pre-frontal cortex.

**Figure 1.2 The relationship of literacy skill to levels in Bloom’s taxonomy**



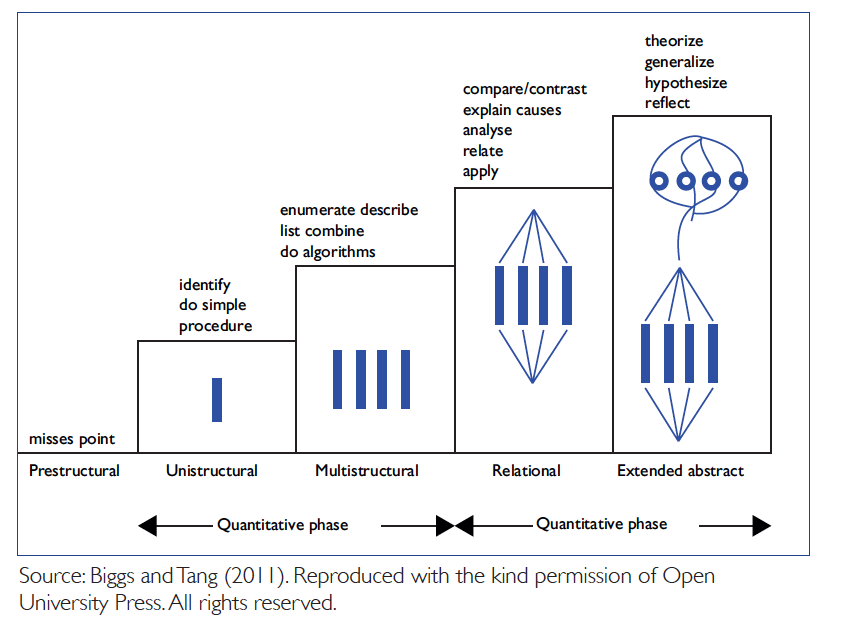
The SOLO taxonomy also identifies a similar transition between algorithmic skill and analysis. Interestingly the SOLO taxonomy associates this transition with the emergence of quantitative, relational thinking. This insight fits with our own work on health literacy, that shows that the relative impact of numeracy on task difficulty rises as one moves up the health literacy proficiency scale (Murray and Shillington, 2012)

It is also worth pointing out that numeracy skill is highly correlated with literacy skill. This relationship can be attributed to two things. First, the majority of the population acquire basic levels of both skills during the course of primary and secondary education. Second, the definition of numeracy adopted by PIAAC requires adults to read and understand the nature of the problem to be solved and the type of response that is required, both skills that depend critically upon the individual’s level of literacy.

**Figure 1.3 The relationship of literacy skill to the hierarchy of learning in the SOLO taxonomy**

Levels , 4 and 5

Levels 1 and 2



Thus, technical skills are a necessary but insufficient condition for meeting the demands of jobs that require workers to undertake Level 3 or higher literacy and numeracy tasks. To satisfy the demand of the vast majority of the jobs that the Canadian economy is creating one needs Level 3 or better literacy and numeracy skill that allow one to apply their technical skills and knowledge in a non-routine way.

As long as there is a sufficient aggregate supply of key cognitive skills to meet anticipated demand, and market mechanisms do a reasonably efficient job of matching job demands for skills to the skills of workers, then the labour market should adjust rapidly to changes in either skill supply or demand.

**What determines the demand for literacy and numeracy**

Skill demand changes with time in response to technical advance and in how work and society are organized. Some changes increase the demand for skill while others reduce the demand for literacy and numeracy skills.

The level of skill demand also responds to the social and economic incentives that individuals face over the life course. The education system selects upon and rewards literacy and numeracy skills, so youth have a strong interest in acquiring these skills. Canada’s labour market also selects and rewards these skills to a high degree. Adults with high levels of these skills are more likely to be employed, to work more over the course of a year, have higher wage rates, earn more, are less likely to experience spells of unemployment, experience shorter spells of unemployment, are more likely to participate in both adult education and workplace training and are less likely to experience a workplace illness or accident. These impacts create strong incentives for workers and the unemployed to acquire high levels of these skills and to maintain their skill levels throughout the life course. As we will learn, however, jobs differ greatly in the level of these skills they demand and in the amount that they require workers to apply their skills.

Increases in the average literacy skill level have been shown to have a significant impact on rates of GDP and labour productivity growth over the long term, a relationship that has created a strong economic demand for higher average skill levels.

The economic demand for skill is also influenced by the distribution of skill by proficiency level. Higher levels of adults with relatively low levels of literacy skill have been shown to induce employers to reduce the level of skill demanded by their jobs. This strategy allows the production process to cope with the presence of high proportions of low skilled workers in the production process but is associated with a significant loss of output per hour worked.

These are important insights for policy as they suggest a simultaneous need to both increase average skill levels and to reduce the proportions of adults with low levels of proficiency.

**What determines someone’s literacy and numeracy skill supply**

Literacy and numeracy skill are largely, but not exclusively, acquired during the initial cycle of formal education (OECD and Statistics Canada, 2000). The majority of children become fluid and automatic readers by Grade 4 and continue to gain skill as they learn to apply their skills to problems of increasing difficulty. Once youth have left the secondary education system one begins to see literacy and numeracy skill levels change in response to differential rates of skill gain and loss. Some individuals gain skill as they transit the post-secondary system and go on to get jobs that demand high levels of skill use while others lose skill because they get jobs that demand very low levels of skill use.

Over time the process of skill gain and loss serves to increase the level of variance in skill in the population, something that provides more scope for the markets that mediate skill supply and demand to discriminate on skill. High skilled individuals accumulate both skill and advantage, low skilled individuals lose additional skill and accumulate disadvantage.

The fact that significant skill loss is eroding the supply of key cognitive skills is important for policy. To begin with, the skill that is being lost cost a considerable amount of public money and effort to create. The lost skill is needed to take full advantage of the technical skills and knowledge conferred by post-secondary education, something that reduces both the public and the private returns on investments in acquiring post-secondary credentials. The net result of skill loss is lower levels of economic output and higher levels of social inequality in a range of key labour market, social and health outcomes.

**The market mechanisms that link skill supply and demand**

This analysis adopts a markets model of skill to understand the social and economic processes that determine the demand for skill, the processes that underlie skill acquisition and loss over the life course and the markets that mediate skill supply and demand. The most obvious market for skill is the labour market but other markets, including the health system, the education system and our social systems also select upon and reward skill to differing degrees. Because markets can be more or less efficient at selecting upon and rewarding skill one sees significant variation in how much of the available supply of skill gets put to productive use and what impact skills have on outcomes.

The markets that mediate skill supply and demand are themselves in constant flux in response to changes in supply and demand conditions, the returns to skill and the behavior of market actors, including consumers, employers and public policy makers. The labour market, the education system, the health system and the social system all function as markets in which adults can translate their skill into advantage. The fundamental insight offered by the analysis presented in this report is that skill supply and demand are out of balance. Specifically, the high proportion of youth and immigrants entering the labour market who have skills below Level 3 is forcing employers to reduce the level of cognitive skill demanded by their jobs. The associated loss of output is significant and, ironically, leads to significant skill loss among those workers who have skill above the level notionally demanded by their occupation.

**The forces that are driving increases in the demand for literacy and numeracy skills**

The research in this paper is predicated on the assumption that we are in a period of

profound economic change and explores how this change has influenced the demand for key cognitive skill, such as literacy and numeracy, and the size and impact of

skill shortages. A brief summary of the forces that are driving change are set out below.

**Globalization of markets for capital, raw materials, advanced production technology and R&D have leveled the playing field**

The globalization of markets for capital, raw materials, advanced production technology and even research and development has leveled the economic playing field by reducing or eliminating price differentials for these inputs. Thus, the process of globalization has served increase the relative importance of human capital as a determinant of national competitiveness. To compete Canadian employers must have access to the requisite skills and then find a way to apply those skills more productively than their foreign competitors. Differences in productivity need to be large enough to offset the lower wage rates of foreign producers.

**Falling trade barriers are exposing Canadian producers to higher levels of competition from lower cost competitors**

A series of trade agreements have lowered or eliminated tariff and non-tariff barriers. These agreements have opened Canadian markets to the entry of foreign goods and opened foreign markets to Canadian producers. More open markets will translate into economic advantage for Canadian producers but only if they are able to transform inputs into outputs more efficiently than their competitors i.e. if they are more productive.

**The rising global supply of economically-important skills is putting downward pressure on wage rates**

The global supply of economically important skills is growing exponentially in response to massive investments in education in both the developing and developed world.

Much of the new skill supply is being created in labour markets with much lower prevailing wage rates than Canadian rates. As noted above, firms in these economies are able to access raw materials, capital, advanced production technology and cutting edge R&D at the same prices as Canadian firms on global markets. As a result, foreign firms can match Canadian firms on quality and will be able to beat Canadian firms on price unless our productivity growth rates are high enough to offset the lower wage rates faced by our competitors.

This price advantage plays out in two ways – we import more finished goods and services from foreign sources or Canadian firms offshore some or all of their production. In both case output and employment in in Canada falls. The only way to close the competitive gap, other than throwing up tariff barriers, is to increase the productivity of Canadian workers.

**Skill-biased technical change is increasing the demand for higher levels of key cognitive skills, including literacy**

Skill-biased technical change – the theory developed to explain the impact of technology on the demand for skill - is a shift in the production technology that favours skilled over unskilled labour by increasing its relative productivity and, therefore, its relative demand.

Traditionally, technical change has been viewed as factor-neutral i.e. it was thought to have no effect on firm’s choices about their mix of raw materials, production technology, research or capital. However, recent technological change has been skill-biased rather than neutral. The new variants of skill-biased technical change suggest that new information technologies are complementary with skilled labour, at least in their adoption phase. Whether new capital complements skilled or unskilled labour may be determined endogenously by innovators’ economic incentives shaped by relative prices, the size of the market, and institutions. This ‘factor bias’ attribute is what puts technological change at the center of the competitiveness and income-distribution debate.

The process of skill-biased technical change is supposed to be generating productivity growth throughout the economy as computer technologies diffuse throughout the production process. Unfortunately, the expected productivity growth has not been forthcoming.

Two noted economists, Paul Krugman and Robert Reich, dismiss the theory of skill-biased technical change, arguing that the lack of productivity growth is the product of rising imbalances in the bargaining power of different groups of workers. Government has enabled this shift in bargaining power by allowing the economy to operate with lots of labour market slack, enabled by an ample supply of temporary foreign workers and of immigrants, and by relying on falling pay to boost competitiveness.

Our analysis supports Reich’s and Krugman’s thesis of shifts in bargaining power but traces the cause of the shift to the impact of skill-biased technical change on the relative productivity of workers and their wage rates. More specifically, we believe skill-biased technical change is a theory capable of explaining the changes in the relative wages as long as one relies on differentiated measures of skill and think of skill as endogenous rather than exogenous to firm’s decisions.

Foley and Green provide analysis of skill biased technical change that incorporates skill as an endogenous factor that is strongly “factor biased”[[1]](#footnote-1). They observe that institutional and globalization factors account for only a small portion of observed wage shifts, leaving skill-biased technological change — as the preferred residual explanation. They point out that there is reason to question the small role assigned to globalization and institutional determinants, when technological innovation or adoption is *endogenous*, in the sense of being related to the supply of skills available in the economy, rather than being exogenous. In this case, the conclusion that education policy necessarily reduces inequality can be reversed (Acemoglu 2002; Beaudry and Green 2005).

A weakness in the Foley and Green focus their analysis on measures of the quantity of various sorts of education rather than direct measures of what kinds of skills jobs demand and of the skills that workers bring to jobs. Our analysis, presented in the body of this report, documents a rapid rise in the occupational demand for advanced cognitive skills and in the technical intensity of jobs, accompanied by an associated rapid growth in the wage premia paid to advanced cognitive skills

David Autor et al provide a second more nuanced explanation of skill-biased technical change that treats skill as endogenous but that distinguishes among different types of skill rather than relying on credentials as a reliable signal of skill. They advance the proposition that production occurs through combinations of workers and machines carrying out specific types of tasks. In broad terms, tasks are broken down into three groups: *cognitive tasks* that require abstract thinking and, often, independent decision making; *routine tasks* that involve repetitive actions and little decision making; and *manual or service tasks* that often involve personal interactions and are non-repetitive but do not involve abstract thinking.

Given these relationships, Autor asserts that the increasing power and accessibility of computers should lead to increased demand for cognitive tasks and reduced demand for routine tasks. This, in turn, implies rising wages and employment for occupations associated with cognitive tasks, and declining wages and employment for routine occupations. In an open globalized market, competition may amplify these effects by depressing the wages of workers doing routine tasks and raising the relative wages of workers capable of doing non-routine cognitive tasks.

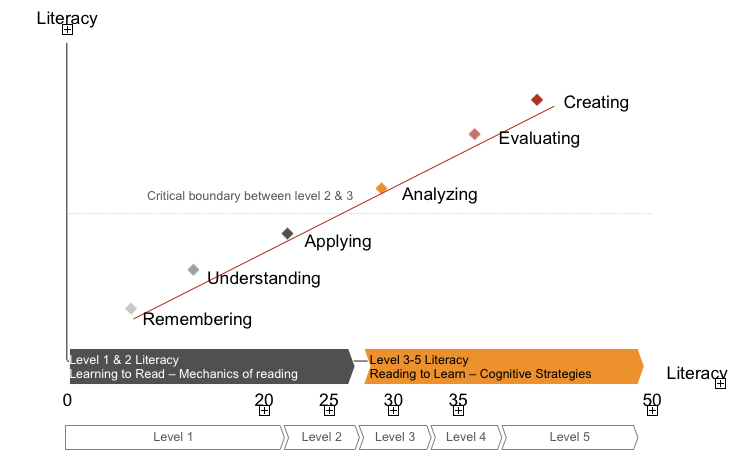
As illustrated in Figure 1.1, Autor’s classification of skill fits exactly with the measures of literacy skill provided by the four most recent international assessments of adult cognitive skills: the 1989 LSUDA, the 1994 IALS, the 2003 IALSS/ALL and the 2011 PIAAC study.

Our analysis, presented below, suggests that the markets for adult cognitive skills generation and utilization are in failure, something that will reduce the rate at which markets for skill can adjust. Foreign competition and skill-biased technical change are having a significant impact on the demand for cognitive skills that the market is not able to satisfy. More specifically, there appears to be a small aggregate shortage of key cognitive skills and a very high degree of misfit between the occupational demand for skill and the skills of workers in those occupations. As a result, we are seeing large shifts in the relative wages of workers at different literacy levels.

In keeping with Autor, and in contrast to Foley and Green, this analysis is based upon direct measures of the demand for, and supply of, key cognitive skills rather than measures of educational attainment. Judged in statistical terms, one’s level of qualification is a very poor indicator of an individual’s cognitive skill level. The former are reliable and stable, the latter are increasingly unreliable signals of an individual’s actual skill level because of changes in educational quality over time and in differential rates of skill gain and loss over the life course.

Great care must be exercised in interpreting the estimates of skill demand presented in this report too literally.

The defining feature of jobs that demand Level 3 and above literacy skill is that they require workers to go beyond the routine application of procedural knowledge, in theory workers in these jobs need to apply their technical skills and knowledge in non-routine ways.

As illustrated in Figure 1.1 shown above, workers in jobs that demand Level 3 and above need to analyze, evaluate and create new information. Below this level all one need do is to retrieve information and apply it in routine, predictable ways. Importantly, the information in question could have been learned in any way, not necessarily through a process of formal education.

The observed impact of education on wages in jobs that demand literacy level 3 and above reflects the joint impact of literacy and technical skills and knowledge and any wage premium created by shortage. In contrast, the observed impact of education on wages in jobs at Level 2 might not reflect the marginal impact of education at all as the underlying knowledge might have been acquired by other means, such as observation.

The fact that a large proportion of post-secondary graduates fail to demonstrate Level 3 skill at the point of graduation implies that they will be unable to meet the demands of the jobs for which they are destined with the result that they will earn less than they should, that the economy will generate less output than expected and that the public will earn a lower return on its investments in post-secondary education than expected.

Our policy analysis suggests that the educational and labour markets for literacy skills are in failure, one that can be traced to a lack of information available to market participants. More specifically, neither individuals, educational institutions, firms nor governments have a way to know that they have a literacy or numeracy skill problem, have access to reliable information on the returns to various levels of investment on their educational or labour market prospects nor any way to select among available training providers should they decide that higher skills levels are needed.

**Key questions for policy makers**

The key questions for public policy makers that this analysis is designed to answer are:

“Is the current aggregate supply of key skills sufficient to satisfy current demand?

“ Are the mechanisms that match worker skills with the available jobs efficient and effective?”

“How is the demand for key skills likely to evolve over the medium term?”

“Are the available sources of new skill supply likely to be able to meet expected increases in demand?”

“If not, what policy measures might needed to avoid the negative consequences associated with any skill shortages that might emerge?”

For educators, important questions include:

“ Are the students leaving my care equipped with the literacy and numeracy skill levels that they need to succeed in learning and work?”

“If the answer to this question is no, what measures need to be taken to reduce the proportion of youth leaving my care with literacy and numeracy skills below the required levels?”

Currently, an estimated 50% of youth leaving the secondary and post-secondary systems have literacy and numeracy skills below Level 3, something that will impair their educational, economic and social success.

At the firm level, the central questions for firms are:

“Are my production processes, production technologies and work organization sufficiently skill intense to maintain my competitive position and to take full advantage of the skills of my workers?”

“Are the skills of the current workforce able to satisfy the demands of our work?”

“If not, what is the optimal mix of measures to reduce or eliminate the size of any current skill shortages? How much could be offset by upgrading the skills of our current workforce? How much could be offset by changing recruitment and selection processes to ensure new employees have the requisite skills?”

Currently, roughly 40% of the workforce has cognitive skills below the levels demanded by their occupations. So, virtually every employer in Canada has a cognitive skill shortage that, if left unaddressed, will have a material impact on profitability and competitiveness.

The actual mix of remedial measures will depend on the size of skill gaps and the cost of closing those gaps through remedial instruction compared to whether the labour pool has sufficient qualified candidates and how much of a wage premia would have to be paid to recruit suitably qualified candidates.

More prospectively, firms face the prospect of adjusting to changes in skill demand. Key questions for firms will be:

“Given anticipated changes in the competitive environment, technology and skill supply, how are skill demands and mix likely to evolve?”

“What proportion of the current workforce have the skill levels to satisfy the new, emerging skill demands?

“If a significant proportion of the current workforce do not have the requisite skill level, what is the optimal mix of measures to reduce or eliminate the size of any anticipated skill shortages? How much could be offset by upgrading the skills of our current workforce? How much could be offset by changing recruitment and selection processes to ensure new employees have the requisite skills?”

Current circumstances suggest an urgent need to find answers to these questions. Canada continues to underperform in terms of job creation and productivity growth, two of the most important determinants of improvements in our standard of living.

Both employment growth and productivity growth depend upon an adequate supply of skills. Between 2003 and 2011, Canada increased secondary graduation rates and added an estimated 22.5 million person years of post-secondary education. Given the relationship between education and literacy skill, the average literacy skill of the adult population aged 16 to 65 should have risen 25 points over the period. In fact, average literacy skills fell 7 points, a finding that suggests a massive loss of skill occured.

**Report Organization**

The report responds to these questions in six chapters.

This chapter, Chapter 1, outlines the report’s objectives and structure and provides a summary of the policy issues that inform the research.

Chapter 2 provides a summary of trends in the occupational demand for literacy skill.

Chapter 3 profiles how the distribution of literacy and numeracy skill have evolved in Canada using data from the 1994 International Adult Literacy Survey (IALS), the 2003 International Adult Literacy and Skills Survey (IALSS) and the 2011 Program for the International Assessment of Adult Competencies (PIAAC) in Canada. Results are presented for the adult population aged 16 to 65 and for selected subpopulations.

Chapter 4 presents the results of an analysis that traces the evolution of literacy skill profiles in response to the skill gain and loss that occurs over the life course.

Chapter 5 documents a serious level of inefficiency in the labour market mechanisms that allocate workers to jobs. The fact that 40% of workers do not have the minimum level of literacy skill needed to be fully productive implies a significant loss of labour income.

Chapter 6 provides a summary of the findings presented in the report and their implications for policy and recommendations for additional research.

The report is supported by two annexes.

Annex A provides the statistical tables upon which the figures are based.

Annex B provides full references for publications that are cited in the body of the document.

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**About the PIAAC scales**

The analyses presented in this report are based on the 500-point PIAAC reading literacy scale.

Ideally, these scales would be interval scales that would allow for comparison across the entire range of skill. In reality the PIAAC scales are quasi-interval scales. The Item response theory models that are used to summarize proficiency were derived from a normal ogive model, one that yields a non-linear standardization of scores.

The idea of 'doubling' a score from 150 to 300 is a property of a ratio scale, which the PIAAC scales did not initially support. Because the score of 0 was an arbitrary setting, doubling an PIAAC score is like doubling the temperature in Celsius. The ratio of scores was initially meaningless (e.g., 5 degrees C is not infinitely warmer than 0 degrees C). The PIAAC quasi -interval scales can be transformed into ratio scales provided that one assumes that the lower bound of the scale is, in fact, real. Although there is no way to prove or disprove that the scales display interval or ratio properties the available evidence does provide strong support for treating the scales as if they were interval scales. Specifically, the letter and word recognition data from the PIAAC study provides strong support for the notion that the lower bound of PIAAC scale scores does indeed represent a true zero threshold i.e. a complete absence of literacy. Similarly, the fact that very few individuals manage to get all of the most difficult PIAAC test items correct suggests that the upper bound of the scale represents a true maximum level of skill for the construct that is being measured.

So the inference structure for using the PIAAC scales does not prohibit the expression of “doubling”, one just has to be careful with the resulting interpretation of findings. Provided that one is reasonably sure of the lower threshold one can say that the difference between one set of group means are twice of the difference of two other group means. In this respect temperature scales offer good examples of the duplex nature of scales i.e. “doubling” of temperature is meaningless for F and C but it is meaningful for K since there is the absolute zero.

Adding and subtracting scores also makes sense with the PIAAC scales. All scales with a sufficiently large number of distinct scores and a normal distribution are called quasi-interval, because one has no way to prove or disprove if they are interval, but they function as if they are.

Similarly, multiplying literacy scores by population weights to derive estimates of aggregate supply and demand are supported by quasi-interval scales. Using literacy scores to measure the stock of human capital, the aggregates would have the same properties as the original scale: averages make sense, but sums make less sense (unless you are comparing sums calculated from the same number of units, which is just like a rescaled average). Using the analogy of temperature, just as it is reasonable to compare the expected temperature of two cities, or compare the change in temperature in one city with the change in temperature of another city, we can also characterize literacy of nations the same way.

Within those interpretations, one can come estimate literacy stocks and flows, but, literacy is slightly different from the traditional economic interpretations of stocks and flows that are denominated in dollars. Interestingly, although the sum of scores for a country by itself does not make much sense, the population average is the expected value of individuals. So if one wanted to estimate the stock of an asset, one simply multiplies the number of units with the expected individual value. For literacy, this product is equal to the original sum of scores of all people, which is where you started out. Accounting also works a little differently, inflows and outflows in literacy skills are the result of birth, death, immigration, schooling, etc., and not by transformation of, or into, other forms of capital. It acts as a multiplier in terms of facilitating the translation of other forms of capital and is itself a corollary of capital (like zero point energy). Using aggregate literacy measures a country with 1 billion of people with the average of 200 would have the same stock of literacy as a country with 500 million of people with the average of 400 but the economic value of the stock would be quite different depending upon non-linearities in the returns to literacy skill and in the underlying distribution of literacy skill demand.

The Item response theory (IRT) methods employed to generate proficiency scores, particularly the use of multiple imputations, handle the issue elegantly, because the scale is not artificially bounded and individual measurement error is reflected in the dispersion of the multiple imputations. So, if a test cannot accurately place a high scorer, then his or her estimate is spread across a wider range.

An irony here is that classical scores have both interval and ratio properties, because their increments are test items. The down-side is that the interpretation of those scores relies on the equivalence of all test items to each other and that the interpretation is always fixed to specific test, not to a general domain of literacy. These problems only go away as the test length approaches infinity, at which point the scores look like IRT estimates anyways, but with a known 0 point.

Any analysis looking at classical scores (which theoretically support both ratio and interval interpretations as length approaches infinity) with IRT scores will show similar results. With shorter tests, the relationship between the two score estimates will be distinctly S-shaped, with the classical scores truncating the range. As the length increases, the relationship becomes more linear, and becomes truly linear as length goes to infinity. Interestingly, the relationship between IRT scores estimated from a representative sub sample of items from a long test and the classical score estimated using all items is also linear, which suggests that any IRT score is an estimate of the classical score of an infinite-length test. The remaining limitations are that one still won't know exactly where the true 0 should be, and the measurement error for fixed-length tests is greater around the extremes.

Because of the varying measurement error for individual scores, any analysis that treats a quasi- interval scale as merely ordinal will have more inferential errors than an analysis that treats them as interval.

The degree of effort required to move a person along the scale does differ according to location, but that is an issue related to the nature of literacy, not of the scale. If one were to interpret a study suggesting the cost or effort required to move somebody x number of scale points, one could safely assume that this is an average effect for the population under analysis and would interpret the results accordingly. The marginal cost at each level of literacy is different, and if one wanted the marginal cost for a specific level of literacy or set of learning needs one would design the research accordingly by restricting the my analysis to that level. Analysis of the ISRS data has revealed that the unit cost of raising different groups of learners varies significantly. The cost estimates presented in this volume take into account both the number of score points that would be required to close any literacy skill shortage and where along the distribution of scores these shortages are themselves distributed. The ISRS unit costs have been updated to reflect inflation between the time that they were first estimated and the current reference period.

Readers should note that the PIAAC study chose to collapse the IALSS prose literacy and document literacy scales into a single reading literacy measure. While prose literacy and document literacy are highly correlated overall (.95%) adults display a diverse set of skills across the domains. There is some loss of information to educators about the content of remedial instruction.

Readers should also note that one apparently subtle change in the PIAAC methods has the effect of reducing the size of estimated skill shortages when compared to similar analysis undertaken with the 2003 IALSS study and the 2006 Census of Population. The Essential Skills profiles have always implicitly assumed a conventional mastery standard i.e. mastery is conferred by meeting or surpassing an 80% threshold. The 1989 LSUDA, the 1994 IALS and the 2003 IALSS, the assessments upon which PIAAC was based, all adopted the same 80% threshold. PIAAC, for reasons that have only to do with making the adult assessment data look like the PISA data, chose to adopt a much less demanding 67% mastery standard. This change has the effect of moving people up the scale and, by extension, of reducing the estimated size of skill shortages.

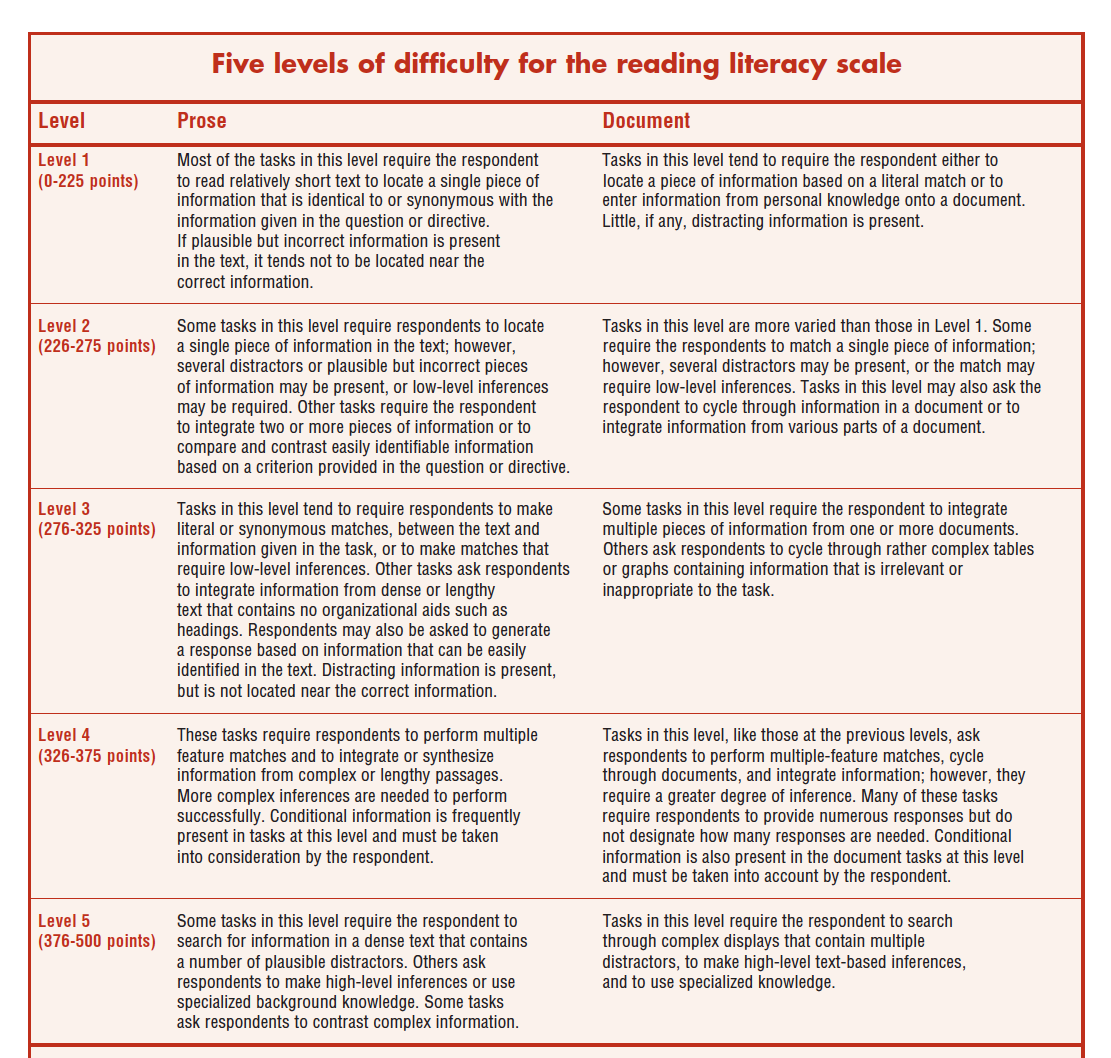
The selection of the lower bound of the proficiency level is a crucial one for the current analysis as it is the level that is used to define literacy skill shortages. The lower bounds of the typical and occasional ES proficiency levels were selected as they yield the lowest estimates of aggregate literacy demand that satisfy the ES-defined constraint. Adopting the mid-point or upper bound of the indicated ES proficiency level would result in much higher levels of aggregate literacy skill demand and, ultimately, much larger literacy skill shortages.

In order to provide results for the entire workforce demand levels had to be derived for the occupations that have yet to be profiled. One of the barriers to progress in the area of literacy has been the mistaken impression that literacy skill shortages are something that only apply to the low-skilled end of the labour market. Thus, a decision was taken to assume the average skill level of jobholders in the occupation revealed by the analysis of PIAAC data. This approach assumes that the market for skill for un-profiled occupations is in rough equilibrium i.e. that on average job incumbents possess the level of literacy skill demanded by their jobs. As a result the literacy skill surpluses and shortages derived by comparing skill supply and demand for these occupations are based on the distributions of actual skill around the observed average and may under or over-estimate the true size of the associated skill shortages. At a minimum the data will be useful in establishing priorities for which occupations should be profiled. Ultimately using the average skill level for un-profiled occupations is likely to under- estimate the size of reported literacy skill shortages slightly.

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The PIAAC 500-point proficiency scales are divided into 5 proficiency levels, with 1 being the lowest (see text box).

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**Chapter 2 Trends in the occupational demand for literacy skill**

One of the generally accepted goals of education is to provide workers with the technical skills and knowledge demanded by their likely target occupations, and the cognitive skills needed to apply these technical skills and knowledge to productive work.

Economic theory that suggests that, at any given time, the supply of skill should be slightly higher than the demand for skill so as to avoid the negative economic consequences that are associated with skill shortages.

At the same time, research suggests that large skill surpluses, where supply exceeds demand by a significant amount, are associated with significant skill loss. Workers who are not afforded an opportunity to apply their skills on a regular basis lose them. Thus, given that skills are expensive to create in the first case, there is an economic incentive to try to keep supply and demand in rough balance.

An exception to this rule is when rapid technical advance is driving change in the occupational demand for skill and shifts in the occupational mix of employment. As noted above, technical advance simultaneously increases the demand for workers with higher skill levels and decreases the demand for workers with lower levels of skill.

For example, the diffusion of digital technologies throughout the production process is greatly reducing the demand for workers whose jobs involve the routine application of procedural knowledge, tasks that demand Level 2 literacy and numeracy. Our analysis suggests that this reduction has led firms to reduce the knowledge and skill intensity of their jobs, with the unintended result that workers with skill levels above the required levels lose skills through a lack of use.

Coincidentally, the introduction of digital technologies is also increasing the demand for a smaller number of workers with the cognitive skills associated with analysis, evaluation and problem solving, tasks that normally demand Level 3 and above literacy and numeracy skill.

A key insight offered by our analysis is that the human capital and skill management strategies of both firms and public policy makers are both highly dependent on whether skill supply and demand are currently in balance and how changes in the technology and organization of work, in the global supply of skill and in the terms of trade that govern the global economy.

Our analysis, documented below, suggests that the supply of key cognitive skills is unlikely to grow rapidly enough to satisfy rapidly growing skill demand. Thus, existing occupational cognitive skill shortages are expected to grow equally rapidly.

Figure 2.1 plots the distribution of the occupational demand for literacy skill by literacy level in 1997 and 2014.

**Figure 2.1 Distribution of paid jobs by literacy level demanded by the occupation, 1997 and 2014, Canada**

The figure suggests that the distribution of employment by the literacy level demanded by the job is roughly the same at the end of the period as it was at the beginning of the period: 96.1% of jobs in 2014 require level 3 or above v.s. 95.9% in 1997.

Figure 2.2 below plots the growth in the occupational demand for literacy skill over the past 20 years. The estimates of skill demand were derived by assigning the literacy skill level identified in Employment and Social Development Canada’s Essential Skill profiles to monthly estimates of employment by four-digit occupation for the period 1997 to 2015.

**Figure 2.2 Trend in employment levels by the literacy level demanded by the job, Canada, 1995 – 2015.**

**Source: Monthly estimates of paid employment classified by the literacy level demanded by the occupation per Employment and Social Development Canada’s (ESDC) Essential Skill Profiles, the Labour Force Survey, Statistics Canada**

The chart shows that all employment growth over the past 17 years demands literacy level 3 or above, a finding that begs the question of whether the education system has been able to generate sufficient new skill supply to fill this demand.

Employment in jobs at Level 2, the ones that only require the routine application of procedural knowledge, have not grown over the period. As shown in the following table, employment in jobs that demand literacy Levels 3, 4 and 5 have grown rapidly.

**Figure 2.3 Distribution of job creation by level of literacy skill demanded, paid employment, Canada, 1997 – 2014**

|  |  |  |
| --- | --- | --- |
| **Literacy level demanded by the job** | **Number of paid jobs created by literacy level demanded, 1997 – 2014** | **Proportion of jobs created by literacy level** |
| 2 | 86,354 | 3% |
| 3 | 1,250,500 | 50% |
| 4 | 941,521 | 37% |
| 5 | 241,479 | 10% |
| **Total jobs created over period** | 2,519,854 | 100% |

By the end of the reference period, 94% of all paid jobs added demanded Level 3 literacy or above. Foreshadowing the central policy issue of this report, only 48% of all adults aged 16 to 65 have literacy skills at Level 3 or above, a fact that suggests that 52% of all employed workers do not have the literacy level demanded by the occupations in which they will work.

Figures 2.4a – 2.4j presents similar literacy skill profiles for provinces in Canada.[[2]](#footnote-2)

The figures reveal large differences in the distribution of literacy skill among provinces and territories and significant differences in how the level and distribution of literacy skill have evolved over time.

**Figure 2.4a Trend in paid employment levels by the literacy level demanded by the job, Newfoundland and Labrador**, **1995 – 2014.**

Job growth in Newfoundland and Labrador has been concentrated in jobs that demand higher levels of literacy skill. Of the 17, 688 jobs created between 1997 and 2014 100% have demanded Level 3 or above. Jobs that demand Level 4 literacy have experienced the highest growth rate of 56%.

**Figure 2.4b Trend in paid employment levels by the literacy level demanded by the job, Nova Scotia**, **1995 – 2014.**

Job growth in Nova Scotia has been concentrated in jobs that demand higher levels of literacy skill. Of the 25,521 jobs created between 1997 and 2014 100% have demanded Level 3 or above. Jobs that demand Level 4 literacy have experienced the highest growth rate of 82%.

**Figure 2.4c Trend in paid employment levels by the literacy level demanded by the job, Prince Edward Island**, **1995 – 2014.**

Job growth in Prince Edward Island has been concentrated in jobs that demand higher levels of literacy skill. Of the 4,563 jobs created between 1997 and 2014 99.5% have demanded Level 3 or above. Jobs that demand Level 4 literacy have experienced the highest growth rate of 122%.

**Figure 2.4d Trend in paid employment levels by the literacy level demanded by the job, New Brunswick**, **1995 – 2014.**

Job growth in New Brunswick has been concentrated in jobs that demand higher levels of literacy skill. Of the 20,292 jobs created between 1997 and 2014 95.4% have demanded Level 3 or above. Jobs that demand Level 4 literacy have experienced the highest growth rate of 89%.

**Figure 2.4e Trend in paid employment levels by the literacy level demanded by the job, Quebec**, **1995 – 2014.**

Job growth in Quebec has been concentrated in jobs that demand higher levels of literacy skill. Of the 334,646 jobs created between 1997 and 2014 95.8% have demanded Level 3 or above. Jobs that demand Level 4 literacy have experienced the highest growth rate of 57.2%.

**Figure 2.4f Trend in paid employment levels by the literacy level demanded by the job,**

**Ontario**, **1995 – 2014.**

Job growth in Ontario has been concentrated in jobs that demand higher levels of literacy skill. Of the 514,667 jobs created between 1997 and 2014 96.7% have demanded Level 3 or above. Jobs that demand Level 5 literacy have experienced the highest growth rate of 80%.

**Figure 2.4g Trend in paid employment levels by the literacy level demanded by the job,** Manitoba, **1995 – 2014.**

Job growth in Manitoba has been concentrated in jobs that demand higher levels of literacy skill. Of the 32,938 jobs created between 1997 and 2014 100%% have demanded Level 3 or above. Jobs that demand Level 5 literacy have experienced the highest growth rate of 86%.

**Figure 2.4h Trend in paid employment levels by the literacy level demanded by the job, Saskatchewan**, **1995 – 2014.**

Job growth in Saskatchewan has been concentrated in jobs that demand higher levels of literacy skill. Of the 32,437 jobs created between 1997 and 2014 97% have demanded Level 3 or above. Jobs that demand Level 4 literacy have experienced the highest growth rate of 64%.

**Figure 2.4i Trend in paid employment levels by the literacy level demanded by the job,** Alberta, **1995 – 2014.**

Job growth in Alberta has been concentrated in jobs that demand higher levels of literacy skill. Of the 212,792 jobs created between 1997 and 2014 97.6% have demanded Level 3 or above. Jobs that demand Level 4 literacy have experienced the highest growth rate of 54%.

**Figure 2.4j Trend in paid employment levels by the literacy level demanded by the job, British Columbia, 1995 – 2014.**

Job growth in British Columbia has been concentrated in jobs that demand higher levels of literacy skill. Of the 132,792 jobs created between 1997 and 2014 98% have demanded Level 3 or above. Jobs that demand Level 4 literacy have experienced the highest growth rate of 62.7%.

**Chapter 3: The supply of literacy**

This chapter profiles trends in the supply of literacy using data from the 2003 IALSS and the 2011 PIAAC data[[3]](#footnote-3). Where sample sizes permit, results from the 1994 IALS study are also presented. This information is crucial to understand if the available skill supply is likely to be able to meet projected increased levels of skill demanded by the economy.

Understanding the evolution of skill profiles is a matter of understanding the flows of skill that are expected to transform the available stock of skill over time.

The rest is simple arithmetic – multiply the number of people in each of the expected flows by their relative skill level, and then adding the resultant values up year over year, provides an estimate of the stock of literacy skill for any given period.

An analogy is useful here. Think of a bathtub partly full of water at a given temperature. The volume of water and its temperature represents the stock of literacy skills available in the initial period for use by the labour market and the broader society.

Now think of the tap being on. The flow of water into the tub serves to raise the water level, just as the flow of young people leaving the secondary and post-secondary system increases the available stock of literacy skill available to the labour market. Obviously the rate at which the tub will fill up depends upon the how open the tap is on. At a trickle it will take a long time to fill, wide open it will fill rapidly. The same principle applies to how quickly the water in the tub will heat up or cool off. No matter what the rate, incoming water that is cooler than that which is in the tub will tend to cool the entire tubful. Similarly, water that is warmer than that which is in the tub will tend to increase the average temperature. In both cases, the rate at which the temperature increases or decreases will be defined by the product of the flow rate and the difference between the current temperature of the water in the tub and the incoming flow from the tap.

Changes in the stock of literacy skill are driven by the same basic principles. The number of students leaving the education system multiplied by how much their average skill level is above or below the average skill level of all adults will provide an estimate of how quickly the stock of literacy skills is likely to grow over time as successive cohorts of students enter the labour market.

Now think about the tub being so full that water is draining out through the overflow. Again the rate at which the tub drains, and the average temperature of the water leaving the tub, will determine the remaining volume of water and whether it becomes cooler or hotter over time. The dynamics of skill stocks are essentially the same. Older workers leave the labour force through retirement and eventually the mortal coil through death, events that have tended to reduce the stock of skill over time. The rate at which they will change the overall stock of literacy skill will depend upon how many of them there are and what their average skill level is relative to the overall average.

At this point the metaphor begins to break down. Most bathtubs only have one tap and one drain. In contrast, the stock of literacy skill is changed by multiple flows, each with its own “volume” and “average temperature”. The principles, however, remain the same – the rate of change in the stock of skills will depend on both the size of the flows and their average skill levels.

For example, the stock of literacy skill has grown over time due to large numbers of baby-boomers leaving high school with higher skills than previous cohorts. Current cohorts of students are much smaller due to unprecedented declines in fertility, a fact that limits the impact that they can have on the overall stock of skill irrespective of the relative skill level.

Similarly, the stock of literacy skill is added to by varying amounts through participation in various sorts of post-secondary education. Rates of participation are rising rapidly but the relatively small size of the cohorts will limit their contribution to the stock of skill.

Participation in adult education and training will add to the stock of literacy skill. Rates of participation in adult education and training have been rising steadily over the past decades so it might be expected that they would have contributed to increasing the stock of skill.

Immigration will change the stock of skill over time as additional cohorts of immigrants arrive, but will only add to the stock of skill if their average skills are better at arrival than the average skill level or if they improve their literacy skills faster than previous cohorts.

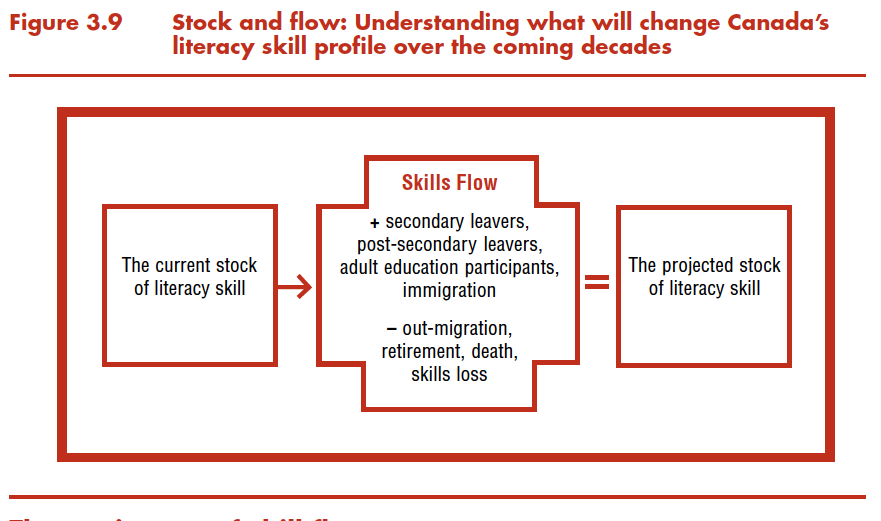
Generally retirement and death will serve to improve the average skill level of the population because, as a group they have much lower levels of education, and literacy skill, than the average.

Similarly, out-migration is likely to reduce the stock of skill over time as high skilled adults seek economic opportunity in other countries and retirees seek warmer climes.

Finally, to the surprise of some, skill loss in adulthood appears to have had a marked impact on the available stock of literacy skills. A large percentage of all adults lost skills they once had between 1994 and 2003 and again between 2003 and 2011, a loss that appears to be the result of inadequate levels of aggregate economic and social demand for skill use. Although each adult lost only a small proportion of their skill, the large number of adults touched implies a significant negative flow.

The following figure attempts to capture the key features of the system that have defined the supply of the literacy skill over the past two decades.

**Figure 3.1 Stock and flow: Understanding what changed Canada’s literacy skill profile since 1994**



**3.1 Why differences in the level and distribution of literacy skill matter**

The distributions of literacy and numeracy in this chapter are presented in the form of box-whisker plots that provide proficiency scores at the 5th, 25th, 50th, 75th and 95th percentiles.

This approach has been taken because research shows that the level and distribution of literacy and numeracy skill are economically and socially important.

First, differences in average scores have been shown to explain over 55% of differences in the long-term rates of Gross Domestic Product (GDP) and labour productivity among countries and provinces (Coulombe, Tremblay and Marchand, 2004 and Coulombe and Tremblay, 2006 a) and b). Increases in skill lead increases in GDP and labour productivity growth, something that suggests that these skills are fundamental determinants of growth.

Second, the same research shows that differences in the proportion of adults with skills below Level 3 has been shown to have an impact the long-term rates of Gross Domestic Product (GDP) and labour productivity among countries and provinces. It would appear that employers adjust the level of skill demand down when the lbour pool from which they draw contain large proportions of workers with literacy skills below Level 3.

Third, the research literature suggests that adults with skills below Level 3 bear a disproportionate share of poor labour market, health, social and educational outcomes (Macracken and Murray, 2010). More prosaically these adults earn less, work less, are less healthy, are less socially engaged and have lower education levels than their more skilled peers.

Fourth, the research literature suggests that the range of skill between the 5th and 95th percentile scores conditions the impact that skills have on individual outcomes. More specifically, the larger the range of skill in the population, the larger the impact of skill on individual outcomes.

Finally, the fit between the level of literacy and numeracy skill demanded by the job and the workers skill has been shown to have an impact on both individual labour market outcomes and macro-economic performance. Higher levels of fit have been shown to have a positive impact on labour productivity and to reduce skill loss (SRDC, 2014 and DataAngel Policy Research, 2016).

**Economic and educational significance of skill differences**

It is useful for readers to have some sense of the economic and educational import of the skill differences documented in this chapter.

Analysis of 1994 IALS and 2003 IALSS data reveal that an additional year of formal education to the average years of schooling adds and average of 25 points.

Analysis of 2011 PIAAC file reveal that each additional point of literacy precipitates an average increase of $61 in annual earnings. Moving up a full proficiency level translates into an average increase of $3050 in annual earnings, the equivalent of a 6.2% increase in average salary. While such an increase may not seem significant, it is useful to note that it is roughly 3 times the current rate of productivity growth realized in recent years.

Trend in Literacy scores 1994 2003 2011

Begin text Box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**Box Whisker Plots**

Many figures in this report show the population mean scores, and the scores at the 5th, 25th, 75th, and 95th percentiles for the domains of literacy and numeracy. The intervals at both ends of the proficiency continuum display the scores for the least and most proficient respondents — the 5th percentile to the lower bound of the distribution and the 95th to the upper bound of the distribution. The middle plus sign shows the mean. Moreover, these plots display the width of the distribution of the proficiency. A smaller spread of scores indicates fewer skill differences; a larger spread indicates more skill differences between the higher and lower performers.



\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End text box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

The following series of charts compare the national distribution of literacy skill by selected demographic characteristics for 1994, 2003 and 2011.

**Figure 3.2a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Canada, 2003**

The figure reveals a complex pattern of change has occurred in the distribution of literacy skill within educational attainment categories.

The average literacy score for those with less than high school dropped between 1994 and 2003 and then rose slightly in 2011. The score at the 5th percentile for those with less than high school rose significantly between 2003 and 2011. These shifts are almost certainly attributable to shifts in the characteristics of who fails to complete high school in each period.

The average literacy score for those with just a high school diploma rose slightly between 1994 and 2003 and then declined in 2011. Scores at the 5th and 95th percentiles were relatively stable.

The average literacy score for those with post-secondary education below the Bachelors level, at the Bachelors level and for those with graduate degrees display a similar, but not identical, pattern of results. Average scores rose slightly between 1994 and 2003 and then declined in 2011.The literacy score at the 5th percentile of those with education below the Bachelors level remained stable but rose significantly for those at the Bachelors level and for those with graduate degrees.

The observed shifts in the distribution of literacy skill are large enough to have a material impact on individual and macro outcomes.

**Figure 3.2b The distribution of literacy skill by age group, adults aged 16 to 65, Canada, 1994, 2003, 2011**

The figure reveals a complex pattern of change has occurred in the distribution of literacy skill by age group.

Average literacy scores for 16 to 25 year olds rose slightly between 1994 and 2003 and then fell back almost to the same level. Average literacy scores at the 5th percentile rose significantly between 1994 and 2003 and then declined slightly.

The other age groups display roughly the same pattern of change but the 36 to 45 year olds and the 56 to 65 year olds realized significant improvement in their average literacy score at the 5th percentile.

**Figure 3.2c The distribution of literacy skill by employment status, adults aged 16 to 65, Canada, 1994, 2003, 2011**

The distribution of literacy skill by employment status displays a somewhat unusual pattern of change. Average literacy scores of those not working fell between 1994 and 2003 fell slightly and then rose in 2011. Average literacy scores at the 5th percentile of those not in work rose significantly between 2003 and 2011. Average literacy scores of those employed rose between 1994 and 2003 and then fell slightly in 2011. After rising significantly between 1994 and 2003 average literacy scores at the 5th percentile remained the same between 2003 and 2011.

Large differences exist between the labour market outcomes of men and women in Canada. An interesting question for policy is how much of these differences are skill-based.

**Figure 3.2d The distribution of literacy skill by gender, adults aged 16 to 65, Canada, 1994, 2003, 2011**

Men and women display similar patterns of change i.e. slight increases in average literacy scores between 1994 and 2003 followed by slight declines in 2011. Average scores at the 5th percentile have increased significantly over time in both genders.

**Figure 3.2e The distribution of literacy skill by immigration status, adults aged 16 to 65, Canada, 1994, 2003, 2011**

Immigrants and non-immigrants display different patterns of change in their distributions of literacy skill. Non-immigrants realized a significant increase in their average literacy score between 1994 and 2003 and then experienced a decline in skill by 2011. The average literacy score at the 5th percentile rose steadily over the period.

In contrast, the average literacy scores of Immigrants fell between 1994 and 2003 fell slightly and then rose in 2011. Average literacy scores at the 5th percentile of immigrants fell significantly between 1994 and 2003 and then rose back to just above the 2003 level by 2011.

**Figure 3.2f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Canada, 2003 and 2011**

Sample sizes and coverage of the 1994 IALS study were too small to support reliable estimates of Aboriginal adult literacy skill distributions. The average literacy scores of Aboriginal adults rose between 2003 and 2011, enough to reduce the gap in average scores with their non-Aboriginal peers by a significant amount.

The charts reveal significant differences in both the average literacy skill level, and the distribution of literacy skill, in both periods. These differences are large enough to imply significant differences in economic output and in skill-based inequality among the jurisdictions.

The charts also suggest that jurisdictional rankings, based on average scores, have not changed over the period.

The next series of charts compare the distribution of literacy skill for key population subgroups at the jurisdictional level. The charts allow for several comparisons, including:

Changes in the average score among reference periods

Changes in the range of skill observed between the 5th and 95th percentiles

Changes in the shape of the distribution as revealed by relative shifts in scores at the 5th, 25th, 50th, 75th, and 95th percentiles

The accompanying text notes cases where the changes in the distribution of literacy skill observed between 2003 and 2011 in a jurisdiction differ from that observed at the national level.

**Newfoundland and Labrador**

**Figure 3.3a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

**Figure 3.3.b The distribution of literacy skill by age group, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

**Figure 3.3c The distribution of literacy skill by employment status, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

**Figure 3.3d The distribution of literacy skill by gender, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

**Figure 3.3e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

**Figure 3.3f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

**Nova Scotia**

**Figure 3.4a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

**Figure 3.4b The distribution of literacy skill by age group, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

**Figure 3.4c The distribution of literacy skill by employment status, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

**Figure 3.4d The distribution of literacy skill by gender, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

**Figure 3.4e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

**Figure 3.4f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

**Prince Edward Island**

**Figure 3.5a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

**Figure 3.5b The distribution of literacy skill by age group, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

**Figure 3.5c The distribution of literacy skill by employment status, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

**Figure 3.5d The distribution of literacy skill by gender, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

**Figure 3.5e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

**Figure 3.5f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

**New Brunswick**

**Figure 3.6a The distribution of literacy skill by educational attainment, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

**Figure 3.6b The distribution of literacy skill by age group, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

**Figure 3.6c The distribution of literacy skill by employment status, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

**Figure 3.6d The distribution of literacy skill by gender, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

**Figure 3.6e The distribution of literacy skill by immigrant status, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

**Figure 3.6f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

**Quebec**

**Figure 3.7a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

**Figure 3.7b The distribution of literacy skill by age group, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

**Figure 3.7c The distribution of literacy skill by employment status, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

**Figure 3.7d The distribution of literacy skill by gender, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

**Figure 3.7e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

**Figure 3.7f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

**Ontario**

**Figure 3.8a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

**Figure 3.8b The distribution of literacy skill by age group, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

**Figure 3.8c The distribution of literacy skill by employment status, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

**Figure 3.8d The distribution of literacy skill by gender, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

**Figure 3.8e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

**Figure 3.8f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

**Manitoba**

**Figure 3.9a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

**Figure 3.9b The distribution of literacy skill by age group, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

**Figure 3.9c The distribution of literacy skill by employment status, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

**Figure 3.9d The distribution of literacy skill by gender, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

**Figure 3.9e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

**Figure 3.9f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

**Saskatchewan**

**Figure 3.10a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

**Figure 3.10b The distribution of literacy skill by age group, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

**Figure 3.10c The distribution of literacy skill by employment status, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

**Figure 3.10d The distribution of literacy skill by gender, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

**Figure 3.10e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

**Figure 3.10f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

**Alberta**

**Figure 3.11a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

**Figure 3.11b The distribution of literacy skill by age group, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

**Figure 3.11c The distribution of literacy skill by employment status, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

**Figure 3.11d The distribution of literacy skill by gender, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

**Figure 3.11e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

**Figure 3.11f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

**British Columbia**

**Figure 3.12a The distribution of literacy skill by educational attainment, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

**Figure 3.12b The distribution of literacy skill by age group, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

**Figure 3.12c The distribution of literacy skill by employment status, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

**Figure 3.12d The distribution of literacy skill by gender, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

**Figure 3.12e The distribution of literacy skill by immigrant status, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

**Figure 3.12f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

**Nunavut**

**Figure 3.13a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

**Figure 3.13b The distribution of literacy skill by age group, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

**Figure 3.13c The distribution of literacy skill by employment status, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

**Figure 3.13d The distribution of literacy skill by gender, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

**Figure 3.13e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

**Figure 3.13f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

**Northwest Territories**

**Figure 3.14a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

**Figure 3.14b The distribution of literacy skill by age group, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

**Figure 3.14c The distribution of literacy skill by employment status, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

**Figure 3.14d The distribution of literacy skill by gender, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

**Figure 3.14e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

**Figure 3.14f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

**Yukon**

**Figure 3.15a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Figure 3.15b The distribution of literacy skill by age group, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Figure 3.15c The distribution of literacy skill by employment status, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Figure 3.15d The distribution of literacy skill by gender, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Figure 3.15e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Figure 3.15f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

For the most part the changes in the distribution of literacy skills observed in the provinces and Territories over the three assessment cycles – 1994, 2003 and 2011 – mirror the national trends.

**Chapter 4: Skill gain and loss**

Chapter 3 documented significant shifts in the distribution of literacy skill over the 18-year reference period. This chapter explores the magnitude and distribution of skill gain and loss occurring over the life course in selected population subgroups.

The skill profiles presented in Chapter 3 are perplexing in this respect as they suggest that skill loss is eroding all of the literacy skill gain associated with increasing years of education. As documented in the following table, average years of education of paid workers rose 0.62 of a year over the reference period.

**Figure 4.1 Increase in average years of education by industry, paid workers aged 16 to 65, 1997 – 2014, Canada**

|  |  |  |
| --- | --- | --- |
|  |  | Average increase in years of education 1997 - 2014 |
| Total Paid Employment all industries | | 0.62 |
| 62:Health & social assist. | | 0.56 |
| 44:Retail trade |  | 0.41 |
| 61:Education |  | 0.21 |
| 33:Manufacturing (metal/mach./other) | | 0.73 |
| 72:Accomm & food |  | 0.51 |
| #N/A |  | 0.81 |
| 23:Construction |  | 0.65 |
| 54:Sci. & Tech. |  | 0.61 |
| 52:Fin. & ins. |  | 0.84 |
| 32:Manufacturing (paper/petrol./plastics) | | 0.64 |
| 48:Transportation |  | 0.67 |
| #N/A |  | 0.57 |
| 41:Wholesale trade |  | 0.67 |
| 56:Admin.support |  | 0.60 |
| 45:Wholesale trade |  | 0.39 |
| 31:Manufacturing (food/bev./apparel) | | 1.09 |
| 51:Inform. & Culture. |  | 0.55 |
| 71:Arts, entertainment. |  | 0.32 |
| 21:Mining, oil & gas |  | 0.71 |
| 11:Agri., forest. |  | 0.58 |
| 53:Real estate |  | 0.86 |
| 49:Warehousing |  | 0.64 |
| 22:Utilities |  | 0.66 |

One would expect, given the relationship between education and skill, that average scores would have risen 15.5 points over this period. In reality, average literacy scores fell 7 points, a 22.5-point swing. Given that the occupational demand for literacy skill has been growing rapidly, occupational literacy skill shortages, already large, are likely to grow.

It is worth reflecting upon what might underlie the observed changes in the level and distribution of literacy skill.

Some of the change might be attributable to the fact that the youth cohorts coming into the target population have higher skill levels as a result of having received more, higher quality education.

In addition, average skill levels should also have risen in response to older age cohorts leaving the target population. These cohorts had much lower levels of education than their peers in younger cohorts, so had much lower average literacy skill levels. Even if the education levels of the incoming youth cohorts had remained stable this gap in skill levels should have driven up average literacy scores of the population aged 16 to 65.

Some of the observed change in skill distribution might be the result of changes in the composition of the population that would drive up or drive down skill supply. Rising education levels should have driven up literacy skill averages but rising proportions of non-official language immigrants, and the rising average age of the population, would be expected to drive literacy skill averages down.

The third source of change in skill distributions is related to the fact that adults have been shown to both gain and lose literacy skill over the life course (Bynner and Parson, 1998 and Willms and Murray, 2007). Whether adults gain or lose skill over time and how much skill they gain or lose depends upon the social value that they place on reading and the amount that they use reading in their daily life. This relationship is described by Steve Reder as “practice engagement theory” (Reder and Bynner, 2010). Kjell Rubensson , a researcher at the University of British Columbia, has documented the significant influence that the skill demands of the job have on skill acquisition, maintenance and loss, something he describes as “the long arm of the job” (Rubensson and Doray, 1997). Workers in jobs that impose high levels of cognitive demand tend to gain skills. Workers in jobs that impose low levels of cognitive demand tend to lose skill with time.

Analysis of the 1994 IALS and 2003 IALSS data for Canada suggested that skills losses were large. For example, for middle-age adults, those at about age 40, the skill loss amounts to about 13 points, roughly equivalent to the average skill gain associated with an additional year of post-secondary education (Willms and Murray, 2007).

**The literacy skills of in school youth at age 15**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Although the literacy skills of youth appear not to be rising there are too few of them to have had a material impact on the aggregate supply of literacy skill available to the labour market or to explain falling average literacy scores**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*end outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

One possible, but unlikely, explanation for the observed drop in average literacy scores is that the literacy skills of students leaving the secondary system have been falling. The size of cohorts of youth entering the workforce are relatively small by historic standards so their average skills would have to have dropped a significant number of points to have a material impact on the aggregate literacy skill supply. In 2011, the youth cohort aged 16 to 25 constituted 19% of the working age population aged 16 to 65.

Figure 4.2 plots trends in PISA reading and science scores for 15-year old students over the period 2000 – 2012.

**Figure 4.2 Trends in average PISA reading and science scores, students aged 15, 2000 – 2102, Canada**



**529**

**Source: CMEC (2014) Measuring up: Canadian Results of the OECD PISA Study: 2012 First Results for Canadians Aged 15, Toronto.**

According to these results published by CMEC, no Canadian province has seen improved scores in either reading or science since 2000 or 2006 respectively. While reading performance did not change significantly for Canada overall between 2000 and 2012, it actually decreased in Prince Edward Island, Quebec, Manitoba, Saskatchewan, and Alberta. Declines in average scores ranged from 16 points in Quebec to 34 in Manitoba. Performance in reading did not change significantly in the remaining provinces.

Given this trend, it is unlikely that the students with literacy skill below Level 3 will close the skill gap before they leave the secondary system.

Importantly, the overall reading average on the PISA scale fell below 529 starting in 2003, the threshold between Level 2 and 3 on the IALSS adult proficiency scale[[4]](#footnote-4).

Despite the fact that the youth cohort is not large enough to have a material impact on the aggregate supply of literacy skill over the short term, the fact that roughly 50% of youth fall below Level 3 is a troubling result in two respects.

First, youth with less than Level 3 skill do not have the cognitive tools to take full advantage of education at the post-secondary level. Given that a significant percentage of these low skilled students are entering the post-secondary system, their skill level is likely to reduce both their, and the public’s, returns on the investment of time and money.

Second, youth are an important source of new skill supply at a time when the demand for literacy skill has been rising rapidly. Literacy skill shortages in the workforce are bound to rise as a result. The fact that more than half of youth do not have the literacy skills to satisfy the literacy skill demands of the overwhelming majority of jobs, even the ones that are normally filled by workers without post-secondary qualifications. More specifically, slightly more than half of 15 year olds are only qualified to fill the 4% of paid jobs that only demand Level 2 literacy skills.

We view this as a monumental institutional failure, one for which parents, teachers and the bureaucrats that manage the K-12 system all bear some responsibility.

Some of this failure can be attributed to the impact of social inequality in the preschool years on school readiness. Children from economically and socially disadvantaged backgrounds tend to arrive at school with lower literacy scores than their more advantaged peers.

Correcting this failure once kids are in the education system is tied to a lack of incentives and information in the primary and secondary education system. Were such incentives and information introduced, teachers might be induced to do a better job.

Although more money would help, money is not the principle barrier to reducing the proportion of students leaving the secondary system with skills needed to realize their educational and economic potential. Teachers need access to assessments that identify individual students who are struggling with literacy acquisition in the early grades, instructional approaches that respond to learning gaps for these learners and additional resources to address these gaps.

Notwithstanding the fact that the literacy skills of many secondary school leavers are below the level needed to take full advantage of education at the post-secondary level, or to meet the reading demands of the overwhelming majority of jobs in the Canadian economy, there are simply not enough of them to explain the observed drop in skills.

So the answer to falling literacy skill levels has to lie elsewhere.

**The skills of immigrants to Canada**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

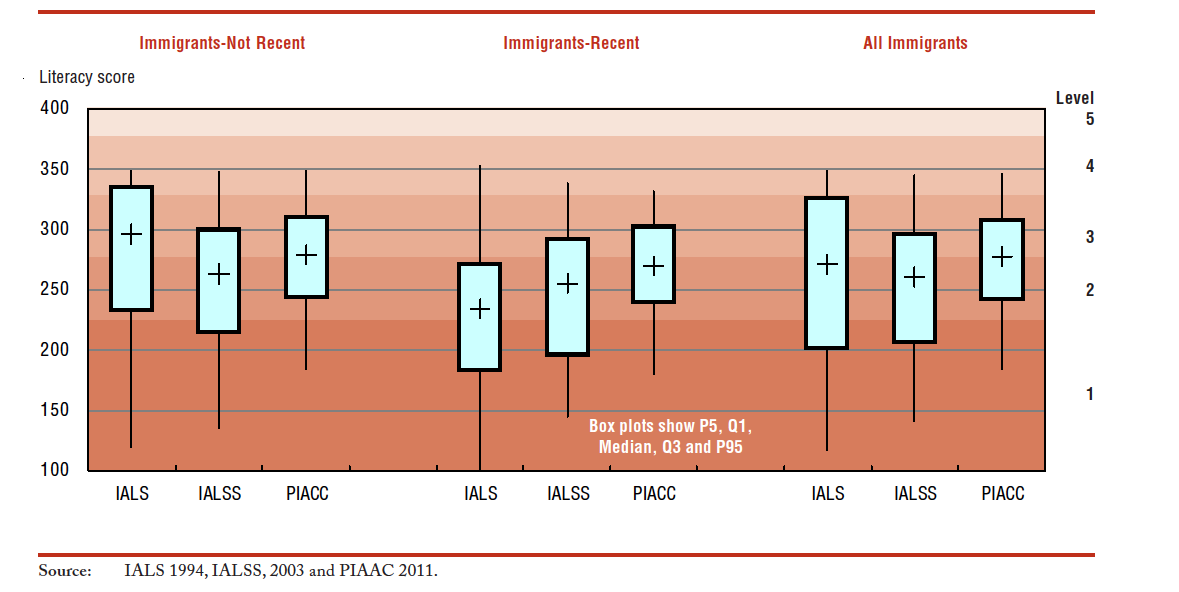
**The literacy skills of successive recent immigrant cohorts have actually risen, so cannot explain falling average literacy scores**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*end outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

An alternate explanation for the drop in average literacy skills is that the literacy skills of immigrants have been falling. Adult immigrants aged 16 to 65 only constitute an estimated 23% of the population aged 16 to 65 in 2011 so their average skills would have to be significantly higher than the Canadian average to have a material impact on the aggregate literacy skill supply of the working age population.

Figure 4.3 plots the literacy skill levels of successive cohorts recent and established immigrant cohorts [[5]](#footnote-5)

**Figure 4.3 Literacy skill distributions of recent immigrants, adults aged 16 to 65, Canada, 1994, 2003, 2011**



The data does not provide any support for the possibility that the literacy skills of recent immigrant cohorts have been falling. The average literacy scores of recent immigrant cohorts have, In fact, been rising, to the point that over half of the most recent cohort possess Level 3 or above literacy skill. The range of literacy scores exhibited by successive immigrant cohorts has been falling. This is a positive outcome as it provides less room for employers to discriminate on skills.

It is also worth noting in passing that the most recent cohort of immigrants is the only population subgroup in Canada whose average literacy skill levels rose between 2003 and 2011.

**Out-migration for Canada**

Out-migration might also serve to reduce the available supply of literacy skill over time if out-migrants from Canada have higher skill levels than the overall population. While a possibility, the flow of outmigration from Canada is so small that it could not explain the observed drop in average literacy skill. Research suggests that economic immigrants are relatively skilled but the flows of out-migrants from Canada are relatively small. In 2005 the total number of Canadians living outside Canada in OECD countries was estimated to be 1.1 million.

**Skill gain and loss in adulthood**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**The average literacy skill scores of every population subgroup except recent immigrants and youth aged 16 to 65 have fallen. Problematically for policy makers, the loss of skill rises with age and with rising educational attainment and has a much greater impact on women. The associated loss of earnings and economic output is material.**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*end outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

The only remaining possibility is that the supply of literacy skill is being eroded by skill loss being experienced by working aged adults. The following analysis employs a synthetic cohort analysis in which the literacy skills of the same subpopulations are observed 9 years apart. If one ignores the small amount of literacy skills lost to outmigration and death, the respondents who were 16 – 24 years of age in the 1994 IALS were aged 25 – 34 in the 2003 and 33 to 43 in 2011 PIAAC. Comparing the average skill levels and skill distributions of these groups proves a first order approximation of the where skill loss might be having a material impact on the aggregate literacy skill supply.

Figure 4.4 plots changes in average literacy scores for selected population for selected sub-populations between 2003 and 2011 based on a comparison of the same cohorts over time.

**Figure 4.4 Changes in average literacy scores for selected population sub-groups, synthetic cohort of 2003 and 2011 populations, Canada**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **IALSS** | | | | |  | **PIAAC** | | | |
|  |  | **Age Groups in 2011** | | | | |  | **Age Groups in 2011** | | | |
|  |  | **16-25** | **26-35** | **36-45** | **46-55** | **56-65** |  | 26-35 | 36-45 | 46-55 | 56-65 |
| **Total** |  | **280** | **291** | **290** | **280** | **275** |  | 289 | 282 | 268 | 262 |
| LT HS|ISCED 1-3 |  | 280 | 291 | 290 | 280 | 275 |  | 235 | 232 | 221 | 228 |
| HS GRAD|ISCED 4-7,15 |  | 289 | 287 | 278 | 275 | 272 |  | 274 | 262 | 254 | 253 |
| Some PSE|ISCED 8-10 |  | #N/A | 307 | 304 | 296 | 296 |  | 300 | 297 | 286 | 280 |
| Total |  |  |  |  |  |  |  |  |  |  |  |
| Less than high school diploma |  | 278 | 267 | 244 | 235 | 233 |  | 233 | 222 | 216 | 222 |
| High school diploma |  | 289 | 287 | 278 | 275 | 272 |  | 273 | 265 | 259 | 260 |
| Post-secondary education-below bachelors degree |  | #N/A | 299 | 295 | 288 | 289 |  | 288 | 283 | 274 | 263 |
| Post-secondary education-bachelors degree or higher |  | #N/A | 318 | 312 | 308 | 306 |  | 314 | 308 | 298 | 295 |
| Total |  | **280** | **291** | **290** | **280** | **275** |  | 289 | 282 | 268 | 262 |
| LT HS|ISCED 1-3 |  | 278 | 267 | 244 | 235 | 233 |  | 235 | 232 | 221 | 228 |
| HS GRAD|ISCED 4-7,15 |  | 289 | 287 | 278 | 275 | 272 |  | 274 | 262 | 254 | 253 |
| Some PSE|ISCED 8-10 |  | #N/A | 299 | 295 | 288 | 289 |  | 279 | 279 | 268 | 262 |
| B. Degree|ISCED 11-12 |  | #N/A | 318 | 313 | 304 | 304 |  | 304 | 301 | 291 | 284 |
| Grad Degree|ISCED 13-14 |  | #N/A | #N/A | 310 | 321 | 313 |  | 329 | 317 | 315 | 307 |
| Total |  |  |  |  |  |  |  |  |  |  |  |
| 1 |  | **273** | **287** | **292** | **279** | **274** |  | 289 | 282 | 269 | 265 |
| 2 |  | **286** | **295** | **288** | **282** | **276** |  | 289 | 282 | 268 | 260 |
| Total |  |  |  |  |  |  |  |  |  |  |  |
| 0 |  | **283** | **295** | **299** | **288** | **283** |  | 292 | 287 | 275 | 267 |
| 1 |  | **260** | **267** | **265** | **253** | **250** |  | 272 | 264 | 245 | 247 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Change in Literacy 2003 - 2011** | | | |
|  | **Age Groups in 2011** | | | |
|  | 26-35 | 36-45 | 46-55 | 56-65 |
| **Total** | **(2)** | **(8)** | **(12)** | **(13)** |
| **LT HS|ISCED 1-3** | **(56)** | **(58)** | **(59)** | **(47)** |
| **HS GRAD|ISCED 4-7,15** | **(13)** | **(16)** | **(22)** | **(18)** |
| **Some PSE|ISCED 8-10** | **(7)** | **(7)** | **(10)** | **(17)** |
| **Total** |  |  |  |  |
| **Less than high school diploma** | **(34)** | **(21)** | **(20)** | **(12)** |
| **High school diploma** | **(15)** | **(13)** | **(17)** | **(12)** |
| **Post-secondary education-below bachelors degree** | **(11)** | **(13)** | **(14)** | **(25)** |
| **Post-secondary education-bachelors degree or higher** | **(4)** | **(4)** | **(10)** | **(11)** |
| **Total** | **(2)** | **(8)** | **(12)** | **(13)** |
| **LT HS|ISCED 1-3** | **(32)** | **(12)** | **(14)** | **(6)** |
| **HS GRAD|ISCED 4-7,15** | **(13)** | **(16)** | **(22)** | **(18)** |
| **Some PSE|ISCED 8-10** | **(21)** | **(17)** | **(19)** | **(27)** |
| **B. Degree|ISCED 11-12** | **(14)** | **(12)** | **(13)** | **(20)** |
| **Grad Degree|ISCED 13-14** | **#N/A** | **7** | **(6)** | **(6)** |
| **Total** |  |  |  |  |
| **1** | **2** | **(10)** | **(10)** | **(9)** |
| **2** | **(6)** | **(6)** | **(14)** | **(16)** |
| **Total** |  |  |  |  |
| **-** | **(3)** | **(12)** | **(13)** | **(16)** |
| **1** | **5** | **(0)** | **(8)** | **(2)** |

The tables document large differences in average skill gain and loss between 2003 and 2011 by demographic group.

Overall, every age group lost literacy skills but the average loss rises with increasing age, from a low of 2 points for adults who were 16- 25 years of age in 2003 to a high of 13 points for adults who were 46 – 55 years of age in 2003.

The amount of literacy skill lost on average is highest in those adults with the lowest levels of education. Literacy skill loss is highest among adults with less than a high school diploma in all age groups, important information given that these adults started out with much lower average skill levels to begin with. Adults with only a high school diploma also lost a significant amount of skill over the period. Interestingly, the average number of points lost varies significantly by age and education level. The magnitude of these skill losses are large enough to have a material impact on the educational and labour market outcomes of adults.

Women lost more literacy points than men, most likely something that reflects the fact that they tend to work fewer weeks per year than their male peers and are more likely to be underemployed given their qualifications.

Interestingly, Canadian born adults lost a much higher number of literacy points on average than their immigrant peers at all age groups.

Males and immigrants aged 16 – 25 in 2003 are the only two subgroups who actually gained literacy skill on average over the period, 2 and 5 points respectively.

Adults who were 26 -35 years old in 2003 with a graduate degree also gained literacy skill (7 points on average)

The second series of tables document the changes in aggregate literacy supply derived by multiply the average gain or loss by the number of adults in the group. These estimates tell a slightly different story than the estimates of change in average literacy scores because even small changes in average literacy score in a large population sub group translate into large aggregate skill losses.

**Table 4.5 Estimated aggregate change in literacy skill supply, selected population sub groups adults age 16 to 56, Canada, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Aggregate Change** | | | |  |  | **Aggregate Change** | | | |  |
|  | **Age Groups in 2011** | | | |  |  | **Age Groups in 2011** | | | |  |
|  | 26-35 | 36-45 | 46-55 | 56-65 | Total | Grand Total | 26-35 | 36-45 | 46-55 | 56-65 | Total |
| **Total** | **(8,012,134)** | **(31,940,406)** | **(58,145,144)** | **(53,149,286)** | **(151,246,970)** |  | **3%** | **11%** | **20%** | **18%** | **52%** |
| **LT HS|ISCED 1-3** | **(15,569,141)** | **(17,260,593)** | **(32,786,766)** | **(29,337,464)** | (94,953,965) | (288,548,084) | 5% | 6% | 11% | 10% | 33% |
| **HS GRAD|ISCED 4-7,15** | **(13,356,830)** | **(18,633,564)** | **(34,558,797)** | **(28,038,479)** | (94,587,670) |  | 5% | 6% | 12% | 10% | 33% |
| **Some PSE|ISCED 8-10** | **(18,057,766)** | **(18,637,388)** | **(27,746,726)** | **(34,564,569)** | (99,006,448) |  | 6% | 6% | 10% | 12% | 34% |
| **Total** |  |  |  |  |  |  |  |  |  |  |  |
| **Less than high school diploma** | **(39,902,134)** | **(6,381,609)** | **(6,986,340)** | **(7,486,305)** | (60,756,389) | (259,679,957) | 15% | 2% | 3% | 3% | 23% |
| **High school diploma** | **(23,867,490)** | **(11,214,096)** | **(12,927,884)** | **(13,146,470)** | (61,155,941) |  | 9% | 4% | 5% | 5% | 24% |
| **Post-secondary education-below bachelors degree** | **(8,884,495)** | **(20,099,476)** | **(23,381,212)** | **(52,387,251)** | (104,752,434) |  | 3% | 8% | 9% | 20% | 40% |
| **Post-secondary education-bachelors degree or higher** | **(1,264,649)** | **(5,548,651)** | **(13,185,700)** | **(13,016,192)** | (33,015,193) |  | 0% | 2% | 5% | 5% | 13% |
| **Total** | **(7,772,416)** | **(31,537,699)** | **(48,002,085)** | **(62,655,974)** | **(149,968,173)** |  |  |  |  |  |  |
| **LT HS|ISCED 1-3** | **(36,863,789)** | **(3,261,725)** | **(4,253,418)** | **(3,108,185)** | **(47,487,117)** | (282,515,791) | 13% | 1% | 2% | 1% | 17% |
| **HS GRAD|ISCED 4-7,15** | **(21,934,121)** | **(16,179,901)** | **(25,005,139)** | **(29,601,994)** | **(92,721,156)** |  | 8% | 6% | 9% | 10% | 33% |
| **Some PSE|ISCED 8-10** | **(8,091,659)** | **(10,557,512)** | **(12,374,624)** | **(21,126,647)** | **(52,150,442)** |  | 3% | 4% | 4% | 7% | 18% |
| **B. Degree|ISCED 11-12** | **(9,169,087)** | **(22,763,447)** | **(22,955,034)** | **(35,269,509)** | **(90,157,077)** |  | 3% | 8% | 8% | 12% | 32% |
| **Grad Degree|ISCED 13-14** | **#N/A** | **1,373,441** | **(1,319,802)** | **(1,396,224)** | **#N/A** |  | #N/A | 0% | 0% | 0% | #N/A |
| **Total** |  |  |  |  |  |  |  |  |  |  |  |
| **1** | **3,924,189** | **(19,834,313)** | **(19,876,077)** | **(21,761,308)** | **(57,547,509)** | (310,742,525) | -1% | 6% | 6% | 7% | 19% |
| **2** | **(11,601,045)** | **(11,814,206)** | **(27,964,997)** | **(40,722,865)** | **(92,103,113)** |  | 4% | 4% | 9% | 13% | 30% |
| **Total** |  |  |  |  |  |  |  |  |  |  |  |
| **-** | **(10,100,251)** | **(39,860,682)** | **(41,037,068)** | **(61,746,198)** | (152,744,198) | (161,091,903) | 6% | 25% | 25% | 38% | 95% |
| **1** | **1,580,187** | **(161,753)** | **(7,124,340)** | **(2,641,800)** | (8,347,705) |  | -1% | 0% | 4% | 2% | 5% |

Of import t policy 32% of the aggregate loss of skill occurred in adults with Bachelor or graduate degrees, 95% in the Canadian born population and 30% among women.

Skill gain and skill loss matter to policy makers because of the material impact that they have on education, labour market and social outcomes. Because the link between literacy skill and wage rates and incomes has been shown to be causal, policies that attenuate the current level of skill loss would be expected to translate into material increases in labour income.

The third series of tables provide estimates of the per capita and aggregate loss of annual labour income associated with skill loss observed between 2003 and 2011 by select population subgroups.

**Table 4.6 Estimated per capita and aggregate of loss annual earnings associated with literacy skill loss, adults age 16 to 56, Canada, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Multiple by $61 per Capita** | | | |  | **Multiple by $61 Aggregate $M** | | | |  |  |
|  | **Age Groups in 2011** | | | |  | **Age Groups in 2011** | | | |  |  |
|  | 26-35 | 36-45 | 46-55 | 56-65 |  | - | - | 26-35 | 36-45 |  |  |
| **Total** | **$(122)** | **$(479)** | **$(719)** | **$(775)** |  | **$(489)** | **$(1,948)** | **$(3,547)** | **$(3,242)** | **(9,226)** | **(20,788)** |
| **LT HS|ISCED 1-3** | $(3,404) | $(3,547) | $(3,607) | $(2,893) |  | $(950) | $(1,053) | $(2,000) | $(1,790) | (5,792) | (17,601) |
| **HS GRAD|ISCED 4-7,15** | $(810) | $(981) | $(1,316) | $(1,127) |  | $(815) | $(1,137) | $(2,108) | $(1,710) | (5,770) |  |
| **Some PSE|ISCED 8-10** | $(403) | $(435) | $(610) | $(1,030) |  | $(1,102) | $(1,137) | $(1,693) | $(2,108) | (6,039) |  |
| **Total** |  |  |  |  |  |  |  |  |  |  |  |
| **Less than high school diploma** |  |  |  |  |  |  |  |  |  |  |  |
| **High school diploma** | $(892) | $(814) | $(1,021) | $(753) |  | $(1,456) | $(684) | $(789) | $(802) | (3,731) | (12,134) |
| **Post-secondary education-below bachelors degree** | $(694) | $(774) | $(869) | $(1,552) |  | $(542) | $(1,226) | $(1,426) | $(3,196) | (6,390) |  |
| **Post-secondary education-bachelors degree or higher** | $(247) | $(261) | $(617) | $(686) |  | $(77) | $(338) | $(804) | $(794) | (2,014) |  |
| **Total** | **$(122)** | **$(479)** | **$(719)** | **$(775)** |  | **$(474)** | **$(1,924)** | **$(2,928)** | **$(3,822)** | **(9,148)** |  |
| **LT HS|ISCED 1-3** |  |  |  |  |  |  |  |  |  |  |  |
| **HS GRAD|ISCED 4-7,15** | $(810) | $(981) | $(1,316) | $(1,127) |  | $(1,338) | $(987) | $(1,525) | $(1,806) | (5,656) | (14,337) |
| **Some PSE|ISCED 8-10** | $(1,255) | $(1,018) | $(1,189) | $(1,654) |  | $(494) | $(644) | $(755) | $(1,289) | (3,181) |  |
| **B. Degree|ISCED 11-12** | $(828) | $(730) | $(789) | $(1,210) |  | $(559) | $(1,389) | $(1,400) | $(2,151) | (5,500) |  |
| **Grad Degree|ISCED 13-14** | #N/A | $423 | $(391) | $(392) |  | #N/A | $84 | $(81) | $(85) | #N/A |  |
| **Total** |  |  |  |  |  |  |  |  |  |  |  |
| **1** | **$119** | **$(588)** | **$(593)** | **$(542)** |  | **$239** | **$(1,210)** | **$(1,212)** | **$(1,327)** | **(3,510)** | (9,129) |
| **2** | **$(375)** | **$(367)** | **$(843)** | **$(1,002)** |  | **$(708)** | **$(721)** | **$(1,706)** | **$(2,484)** | **(5,618)** |  |
| **Total** |  |  |  |  |  |  |  |  |  |  |  |
| **-** | **$(173)** | **$(712)** | **$(783)** | **$(975)** |  | **$(616)** | **$(2,432)** | **$(2,503)** | **$(3,767)** | **(9,317)** | (9,827) |
| **1** | **$286** | **$(16)** | **$(498)** | **$(151)** |  | **$96** | **$(10)** | **$(435)** | **$(161)** | **(509)** |  |

The earnings charts confirm that the aggregate losses of earnings potential associated with lost skill are large enough to justify efforts to understand what might be causing the losses and what public policy makers might do to attenuate the level of loss. Per capita losses of income are as high as $3,607 per year in the population of 46 – 55 year olds with less than a high school diploma.

At the national level, the lost earnings are $9.2 billion per year, enough to add half a percent to Canadian GDP in 2011. If the means were found to reduce skill loss hold the promise of doubling productivity growth rates in Canada.

Collectively, these skill profiles provide information that is critically important for policy.

First, the data suggests that post-secondary education increases average literacy levels but not as much as might be expected once one has adjusted for selection effects.

Second, there is significant variability in the amount of skill change associated with further education. A significant proportion of the 2003 youth cohort actually lost literacy skill by age 25 despite having the benefit of post-secondary education. More generally, the data suggest that the process of skill loss begins early after the point of secondary school leaving with the magnitude of skill loss rising the lower the level of attainment. This reinforces the need for policy makers to both reduce the flow of low skilled youth leaving the education system and to increase the knowledge and skill intensity of employment so that any and all new skill gets taken up and put to productive use.

We view this as a monumental institutional failure. Publically funded colleges, and to a lesser extent universities, are taking tuition money from students, and funding from government, for students who have little chance of ever graduating because their cognitive skills are simply not high enough to support learning at this level. Worse, colleges grant diplomas to a significant proportion of students who lack the literacy skill demanded by their intended occupations. This reduces productivity growth and influences firm hiring practices and, undoubtedly, their business strategies.

Ironically, the way that governments fund colleges means that colleges actually lose revenue for each skill-related dropout – more revenue, in fact, than it would have taken to upgrade their literacy skills to the required level. Colleges also forfeit attractive performance bonuses that are tied to their persistence to graduation rates. Again, the lost value of these bonuses outweighs the cost of upgrading student skills. Federal research that documented the extent of the low skill problem in colleges, and that successfully piloted potential solutions, remains unpublished.

As the principle funder of post-secondary education in Canada, the federal government should work with the provinces and the post-secondary institutions to have every student assessed at the point of program entry and their skill upgraded to a minimum of literacy level 3 – the level needed to take full advantage of education at the post-secondary level. Thanks to federal funding the tools to do so reliably and at low cost are available[[6]](#footnote-6). Students should also have key cognitive skills tested at the point of graduation and their readiness for employment certified.

Public policy in Canada related to education has largely focused on increasing the supply of technical skills and knowledge by increasing rates of participation, largely by removing financial and other barriers. The findings presented above suggest that post-secondary institutions, and the governments that fund them, need to focus more on quality, specifically on ensuring that all learners enter and leave the post-secondary system with a minimum of Level 3 literacy skill. As expected, average skill levels of post-secondary participants rise with rising levels of post-secondary education.

Notwithstanding this general finding, the data also reveal that a significant proportion of youth in the lower half of the skill distribution lost skills by age 25. This finding suggests that these youth are losing literacy skills after they leave initial education. The research literature suggests that this is likely because they work less than their more able peers and tend to work in jobs with very low cognitive demands.

**What predicts changes in literacy distributions?**

**Average literacy skill levels vary significantly by demographic group. The impact of demographic characteristics on literacy skill fell slightly between 2003 and 2011, the sole exception being a significant reduction in the skill advantage enjoyed by Canadian born adults.**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

The following chart displays estimates of the marginal impact that selected demographic characteristics had on average literacy score of adults age 16 to 65 in 2003 and 2011. In each case the estimated impact is relative to a specific comparison group i.e. adults with less than high school graduation and graduates with only high school are compared to adults with some post-secondary education, Canadian born adults are compared to immigrants and younger age groups are compared to adults 55 years of age and over.

**Figure 4.7 The impact of selected demographic variables on average literacy skill, adults aged 16 to 65, Canada, 2003 and 2011**

The chart reveals several important facts, including:

Adults with less than high school or with a high school credential only, those not currently working and males all have significantly lower scores than the comparison group. At -58 points, the impact of being a high school dropout is particularly pronounced.

Canadian born adults and younger age groups all have significantly higher scores than the comparison group. The average literacy skill advantage falls with rising age.

Males were slightly disadvantaged in 2003. By 2011 men enjoyed a small skill advantage.

Overall, the size of the impact of these demographic characteristics on average literacy skill was slightly lower in 2011 than in 2003, likely as a result of the lower variance in literacy skill observed in 2011.

The most striking change in impacts observed over the period relates to a dramatic drop in the skill advantage enjoyed by Canadian born adults, that dropped from 36 to 11 points.

The level of skill differences observed among demographic groups is still large enough to translate into significant differences in education and labour market outcomes across demographic groups.

It is important to remember than the analysis of changes in the social distribution of literacy skill rely on cross-sectional measures of skill that themselves have been changed by skill gain and loss occurring over the life course. The next section of the report presents the results of a synthetic cohort analysis that attempts to reconstruct the distribution of skill gain and loss that underlies the changes in average literacy scores observed among demographic groups between 2003 and 2001.

**What predicts skill gain and loss?**

Skill loss deprives the economy of the economic, social and health benefits associated with each additional point of literacy.

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Adults who work in jobs that impose high levels of cognitive demand/skill use tend to gain skill and adults who work in jobs that impose low levels of cognitive demand/skill use tend to lose skills. It would seem that employers are systematically reducing the cognitive demands of enough jobs to explain falling average literacy scores.**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*end outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

The following analysis attempts to shed light on the processes that underlie skill loss.

More specifically, a regression analysis of the synthetic cohort data was undertaken in order to gain some insight into the factors that underlie skill gain and loss, particularly the degree to which the level of cognitive demand on the job matters. Separate analyses were undertaken for adults who gained skill and those who lost skill in order to allow for the possibility that differing causal structures are at play.

The regression results can be traced back to the theory that underpins the literacy measures assessed in IALS, IALSS and PIAAC that allows one to predict the relative difficulty of reading tasks to a high degree of precision (Statistics Canada, 2005). Careful application of the framework allows one to place both tasks and individuals on the same 500-point scale that is then divided into five proficiency levels that are meant to reflect points along the continuum where the nature of cognitive processing shifts. In the framework, task difficulty is predicted by four sets of variables – the type of requested information, the type of processing, the type of match and distracting information. Analysis of data from IALS, IALSS and PIAAC identifies the cut point between literacy Levels 2 and 3 as being a critical one.

The regression analysis of skill gain and loss reveals that the level to which workers are required to apply their cognitive skills explains a lot of the observed skill gain and loss. Workers who are required to use their skills in non-routine ways gain skills with time. Workers in jobs who are only required to apply their cognitive skills in routine ways tend to lose skill over time.

The theory that underpins the literacy measures assessed in ALL and PIAAC allows one to predict the relative difficulty of reading tasks to a high degree of precision (Statistics Canada, 2005). Careful application of the framework allows one to place both tasks and individuals on the same 500-point scale that is then divided into five proficiency levels that are meant to reflect points along the continuum where the nature of cognitive processing shifts. In the framework, task difficulty is predicted by four sets of variables – the type of requested information, the type of processing, the type of match and distracting information. Analysis of data from IALS, ALL and PIAAC identifies the cut point between literacy Levels 2 and 3 as being a critical one.

In cognitive terms, making the shift from Level 2 to 3 involves mastering conditional information, being able to summarize, compare and contrast and explain, being able to draw low level inferences and being able to ignore distracting information that is in close proximity to the needed information.

In biological terms, moving from Level 2 to 3 involves moving from the use f the recall processes in the back of the brain that allow routine procedural knowledge to be applied to the pre-frontal cortex that is used to apply fluid problem solving skills.

In curricular terms, moving from Level 2 to 3 involves moving from applying to analyzing in Bloom’s revised taxonomy.

The work related variables included in the regression analysis tap into behavioral dimensions of these concepts as they are applied at work and at home. More specifically, the variables reflect what is known in the literature as manifestations of “practice-engagement” theory that posits that, once acquired, observed skill level is a function of the incidence of use, the frequency of use, the range of content used and complexity of use (Reder, 2009). Adults with high levels of use will maintain or improve their skill level whereas adults with low levels of skill are likely to lose skill over time. Since jobs differ significantly in the skill demands that they place on workers it is of interest to know if these differences help explain who lost and who gained skill in the ALL/PIAAC synthetic dataset. Kjell Rubesson, a researcher at the University of British Columbia, has dubbed this effect “the long arm of the job”.

The first set of results explored the extent to which measures of the knowledge and skill intensity of the job explain skill levels.

**Figure 4.8 Impact of cognitive demands of the job on average literacy scores, adults aged 16 to 65, Canada, 2011**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter |  | Estimate | Biased | StdErr | tValue | Probt |
| WLIT1 | Index of engaging in formal learning contexts | 2.835386 | 0 | 0.62747966 | 4.52 | <.0001 |
| WLIT2 |  | -2.2793605 | 0 | 0.68887532 | -3.31 | 0.0009 |
| WLIT3 |  | 5.8235432 | 0 | 1.29820447 | 4.49 | <.0001 |
| E3SS | Index of numeracy engagement at work | -3.1654378 | 0 | 1.43675507 | -2.2 | 0.0276 |
| INFL1 | Index of engaging in formal learning contexts | 0.5042823 | 0 | 0.52272869 | 0.96 | 0.3347 |
| INFL2 |  | 2.0898614 | 0 | 0.51052489 | 4.09 | <.0001 |
| HLIT1 | Index of frequency and variety of reading | 2.6318662 | 0 | 0.58412176 | 4.51 | <.0001 |
| HLIT4 |  | 3.3953286 | 0 | 0.49504478 | 6.86 | <.0001 |
| CIVI1 | Index of engaging in community groups or organizations | 2.1817715 | 0 | 0.48122333 | 4.53 | <.0001 |
| F1B | During the last 12 months, did you take any education or training? | 2.1006566 | 0 | 5.69740337 | 0.37 | 0.7124 |
| F2 | During the last 12 months, that is, from currentMonth\LastYear to currentMonth\CurrentYear, did you take any courses as part of a program of studies toward a certificate, diploma or degree? | -2.1727473 | 0 | 1.28105013 | -1.7 | 0.0899 |
| EMPHRS | Number of hours employed at current or last main job | 0.000025 | 0 | 0.00048217 | 0.05 | 0.9587 |

The figure confirms that variables that associated with jobs with high cognitive demand are statistically significant predictors of literacy skill.

The second set of results explored the extent to which measures of knowledge and skill intensity of the job explain the skill gain and loss using an individually linked synthetic cohort of the 2003 and 2011 assessment cycles. This approach allows one to reconstruct an approximation of the entire distribution of individual skill gain and loss over the period.

The following variables were included in this regression analysis:

Index of learning at work

Index of readiness to learn

Skill use at work – index of ICT use at work

Skill use at home – index of ICT use at home

Skill use work - How often - Influencing people

Skill use at home – index of numeracy at home

Skill use at work – index of numeracy at work

Skill use at work - Index of use of planning skills at work

Skill use home – index of reading at home

Skill use work – index of reading at work

Skill use at work - Index of use of task discretion at work

Skill use at home – index of writing at home

Skill use at work – index of writing at work

Skill use at work - Time cooperating with co-workers

Skill use at work - How often - Sharing work-related info

Skill use at work - How often - Teaching people

Skill use at work - How often - Presentations

Skill use at work - How often - Selling

Skill use at work - How often - Advising people

Skill use at work - How often - Planning own activities

Skill use at work - How often - Planning others activities

Skill use at work - How often - Organising own time

Skill use at work - How often - Influencing people

Skill use at work - How often - Negotiating with people

Skill use at work - Problem solving - Simple problems

Skill use at work - Problem solving - Complex problems

Skill use at work - How often - Working physically for long

Skill use at work - How often - Using hands or fingers

Skill use at work - Not challenged enough

Skill use work - Need more training

The analysis, summarized in the following table, reveals

that a small number of variables had a statistically significant impact on the

magnitude of skill change. Variables having a statistically significant impact on the magnitude of skill loss included:

Gender

Age

Immigrant status

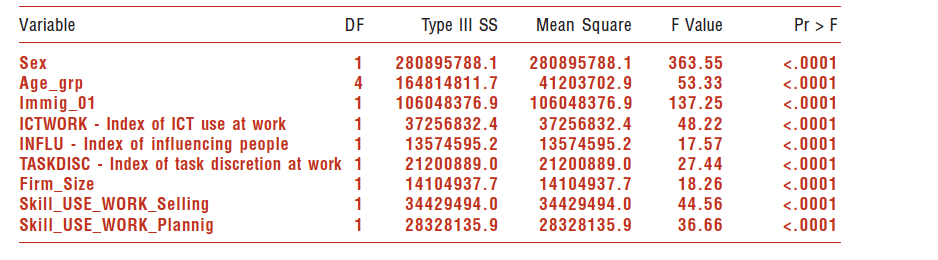
The use of information and communication technologies at work

Discretion over tasks at work

Selling at work

Planning at work strong

**Figure 4.9 Statistically significant predictors of skill gain and loss, 2003 – 2011, adults aged 16 to 55 in 2003, Canada**



The regression analysis suggests that skill gain and loss in adulthood is driven by the cognitive demand of the job. Workers in jobs that impose a high level of cognitive demand tend to gain skill whereas workers in jobs that impose low levels of cognitive demand tend to lose skill. It would seem that employers are, despite the fact that the overwhelming majority of jobs created since 1997 literacy levels 3, 4 and 5, employers are reducing the level of cognitive demand, including the literacy demand, of the majority of these jobs.

The large-scale, systematic reduction of the cognitive demand of jobs by employers is not unexpected. Analysis of data from the 1994 IALS and 2003 IALSS studies established that higher proportions of adults with literacy skill below Level 3 reduced rates of growth of labour productivity and GDP growth. Subsequent analysis tied this latter effect to employers adopting less cognitively demanding technologies of production, work organizations and work processes, a defensive response to large proportions of workers with low levels of literacy. This tactic served to reduce the costs of errors committed by low-skilled workers but resulted in a loss of significant economic output.. This relationship is illustrated in Figure 4.10 below.

**Figure 4.10 The cycle of skill loss**



The fact that the occupational demand for workers with Level 3, 4 and 5 literacy skill has been rising rapidly and the fact that workers with these skill levels are in short supply has been driving a rapid increase in the wage premium paid to workers with these levels of skill. The following chart and associated table documents the growth of real wages in jobs that demand different levels of cognitive skills. These shifts in the relative wages of workers in jobs that demand different levels of skill are large enough to have a material impact on annual earnings, to the point that these differences explain a significant proportion of the growth in individual income inequality over the period.

**Figure 4.11 Trends in average hourly wage in 2010 constant dollars by literacy skill levels demanded by the occupation, paid jobs, Canada, 1997 - 2015**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Literacy level demanded by the job** | | | |
| **Year** | 2 | 3 | 4 | 5 |
| 1999 | $12.71 | $16.34 | $21.06 | $27.16 |
| 2003 | $12.06 | $16.46 | $21.51 | $28.37 |
| 2007 | $12.18 | $16.87 | $22.53 | $29.28 |
| 2011 | $12.80 | $17.44 | $23.64 | $30.99 |
| 2015 | $12.87 | $17.80 | $24.57 | $31.49 |
| Implied Increase in the real hourly wage rates of paid employees by literacy level demanded by the job, 1995 – 2015 | $0.16 | $1.47 | $3.51 | $4.33 |
| Percent Increase in the real wage rates of paid employees by literacy level demanded by the job, 1995 – 2015 | 1% | 9% | 17% | 16% |
| Implied annual Increase in the real incomes of paid employees by literacy level demanded by the job, 1995 – 2015 | $324.86 | $2,990.40 | $7,169.45 | $8,828.64 |

Faced with the prospect of paying a significant premium for workers with the requisite literacy skill level, employers are choosing to dumb down their jobs. If this is an economically rationale behavior, the productivity penalty associated adopting this business tactic must be less than the extra wage cost of hiring workers with the requisite skill levels.

The rapid growth in jobs that require Levels 3, 4 and 5 literacy skill between 1997 and 2014 explains some, but not all, of the rapid increase in the real wages observed over the period. Some of the increase in the wage premia may reflect a concurrent increase in the knowledge and skill intensity of employment that occurred.

Alternately, some of the observed wage premia may indicate a shortage of literacy skills that is forcing employers to bid up the price paid for advanced literacy skills.

Whatever the motivation for this employer behavior, the associated loss of earnings potential is significant and appears to have shifted the relative wages of jobs demanding different levels of literacy skill in roughly the same way in all jurisdictions.

**Canada**

**Figure 4.12aTrend in average wage rates, adults aged 16 to 65 working in paid jobs, Newfoundland and Labrador, 1997 - 2014**

The following series of charts document trends in average rates for jobs that demand each level of literacy for each province. These estimates are based on estimates of employment by detailed occupation provided by Statistics Canada’s monthly Labour Force Survey so are not available for the three northern Territories.

**Newfoundland and Labrador**

**Figure 4.12b Trend in average wage rates, adults aged 16 to 65 working in paid jobs, Newfoundland and Labrador, 1997 - 2014**

**Nova Scotia**

**Figure 4.12c Trend in average wage rates, adults aged 16 to 65 working in paid jobs, Nova Scotia, 1997 - 2014**

**Prince Edward Island**

**Figure 4.12d Trend in average wage rates, adults aged 16 to 65 working in paid jobs, Prince Edward Island, 1997 - 2014**

**New Brunswick**

**Figure 4.12e Trend in average wage rates, adults aged 16 to 65 working in paid jobs, New Brunswick, 1997 - 2014**

**Quebec**

**Figure 4.12f Trend in average wage rates, adults aged 16 to 65 working in paid jobs, Quebec, 1997 - 2014**

**Ontario**

**Figure 4.12g Trend in average wage rates, adults aged 16 to 65 working in paid jobs, Ontario, 1997 - 2014**

**Manitoba**

**Figure 4.12h Trend in average wage rates, adults aged 16 to 65 working in paid jobs, Manitoba, 1997 - 2014**

**Saskatchewan**

**Figure 4.12i Trend in average wage rates, adults aged 16 to 65 working in paid jobs, Saskatchewan, 1997 - 2014**

**Alberta**

**Figure 4.12j Trend in average wage rates, adults aged 16 to 65 working in paid jobs, Alberta, 1997 - 2014**

**British Columbia**

**Figure 4.12k Trend in average wage rates, adults aged 16 to 65 working in paid jobs, British Columbia, 1997 - 2014**

Comparable estimates are not available for the Yukon, the Northwest Territories or Nunavut because these jurisdictions are not included in the coverage of the monthly Labour Force Survey.

Collectively, the results presented above reveal a strong upward trend in the size of the wage premia paid to higher levels of literacy skill, enough to explain virtually all of the increase in wage and income inequality observed over the past decade. Yet the results are somewhat paradoxical. On the one hand some adults are losing a large amount of literacy skill through a lack of use in jobs that notional demand much higher levels of skill. On the other hand wage premia to skill are rising rapidly, a finding that implies that skill shortages are leading to wage inflation. We believe that we are witnessing an increase in the heterogeneity of skill use within occupations that is rewarding the most literate and technically skilled. If substantiated, this finding carries important implications for credentialing systems, for the tools used to select job applicants and for social distribution of wage inequality.

The next set of results explore the extent to which the incidence of literacy skill shortage, and the depth of literacy skill shortage in points, explain the observed increase in average wage rates in jobs observed between 1997 and 2014.

Figure 4.13 plots the relationship between the observed increase in wage rates between 1997 and 2014 and the percentage of paid workers who do not have literacy skills below the minimum point threshold associated with their occupation in Employment and Social Development Canada’s Essential Skills Profiles.

**Figure 4.13a The relationship between the increase in wage rates and the proportion of workers in literacy skill shortage, all paid jobs, Canada, 1997 - 2014**

The figure reveals that the proportion of workers in occupational literacy skill shortage explains some, but not much, of the observed increase in wage rates.

Figure 4.13b plots the relationship between the observed increase in wage rates between 1997 and 2014 and the average depth of literacy skill shortage of paid workers who do not have literacy skills below the minimum point threshold associated with their occupation in Employment and Social Development Canada’s Essential Skills Profiles.

**Figure 4.13b The relationship between the increase in wage rates and the average depth of literacy skill shortage, paid jobs demanding Level 2 literacy skill, Canada, 1997 - 2014**

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The figure reveals that average depth of literacy shortage of workers in occupational literacy skill shortage explains slightly more of the observed increase in wage rates.

More specifically, deeper average shortages explain rising wages.

The foregoing results group all paid jobs together irrespective of the level of literacy proficiency demanded by the job. The next series of charts present parallel results by the level of literacy skill demanded by the job.

**Figure 4.13c The relationship between the increase in wage rates and the proportion of workers in literacy skill shortage, paid jobs that demand Level 2 literacy, Canada, 1997 - 2014**

**Figure 4.13d The relationship between the increase in wage rates and the average depth of literacy skill shortage, paid jobs demanding Level 2 literacy skill, Canada, 1997 - 2014**

**Figure 4.13e The relationship between the increase in wage rates and the proportion of workers in literacy skill shortage, paid jobs demanding Level 3 literacy, Canada, 1997 - 2014**

**Figure 4.13f The relationship between the increase in wage rates and the average depth of literacy skill shortage, paid jobs demanding Level 3 literacy skill, Canada, 1997 - 2014**

**Figure 4.13g The relationship between the increase in wage rates and the proportion of workers in literacy skill shortage, paid jobs demanding Level 4 literacy, Canada, 1997 - 2014**

**Figure 4.13h The relationship between the increase in wage rates and the average depth of literacy skill shortage, paid jobs demanding Level 4 literacy skill, Canada, 1997 - 2014**

**Figure 4.13i The relationship between the increase in wage rates and the proportion of workers in literacy skill shortage, paid jobs demanding Level 5 literacy, Canada, 1997 - 2014**

**Figure 4.13j The relationship between the increase in wage rates and the average depth of literacy skill shortage, paid jobs demanding Level 5 literacy skill, Canada, 1997 - 2014**

The figures reveal that the impact of the proportion of workers in literacy skill shortage, and the depth of literacy skill shortage, rises with the level of literacy skill demanded by the job. The analysis suggests that neither the proportion of workers in literacy skill shortage, nor the depth of literacy skill shortage, have had any impact on wage growth in jobs that demand Level 2 literacy skill. The level of impact rises as the level demanded. The results suggest that employers with Level 3, 4 and 5 jobs are bidding up wage rates in response to a relative shortage of workers with these skills. Increasing the supply of workers with these skill levels would reduce the rate of wage inflation and the associated growth in skill-based wage and income inequality.

It would also seem that wage increases in jobs that demand Level 2 skill are growing slowly because of downward pressure from automation and skilled foreign competition and employers reducing the cognitive demand of their jobs in response to high proportions of the workforce with Level 1 and 2 skills.

**The economic value of lost skill**

The literacy skill lost through lack of use at the workplace cost a significant amount to create and represents the loss of a non-trivial amount of lost earning potential.

Analysis of the 2003 IALSS data suggests that the gain of an additional point of literacy was associated with $155 in additional earnings per year after the impact of a wide range of other variables known to influence wages including education, age, gender, occupation, labour force status, immigrant status, Aboriginal status and mother tongue. This impact is stable over the full range of incomes, a finding that we interpret as indicating that literacy increases the productivity of all workers no matter what their occupational context.

This analysis was replicated with the 2011 PIAAC data. While literacy still has a stable and significant impact on earnings across the entire wage distribution the earnings vale of an additional point of literacy to $61 per point per year, or 61% of the 2003 value.

This finding was expected given the reduction in skill variance observed over the period as this affords smaller room for employers to discriminate the wages they pay on skill. Interestingly the marginal value of a point of literacy also holds for workers in occupational literacy shortage, balance and surplus. Workers in shortage lose $61 per point for each point that they are below the lower threshold of the Essential Skills level associated with their occupation whereas workers in literacy skill balance and surplus attract $61 more per point per year in additional wages for each point that they are above the minimum skill threshold. This finding suggests that literacy skill is a fundamental determinant of productivity.

This value provides a means to derive a first order approximation of the value of the lost skill.

Figure 4.14 provides estimates of the lost earnings value for selected population subgroups in Canada.

**Figure 4.14 Skill gain and loss inferred from change in cross sectional average scores 2003 - 2011, literacy for adults aged 16 to 55 in 2003, Canada**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | | | |
|  | **16-25 in IALSS/26-34 in PIAAC** | **26-35 in IALSS/36 - 45 in PIAAC** | **36-45 in IALSS/46-55 in PIAAC** | **46-55 in IALSS/56-65 in PIAAC** | **Total** |
| Change in average score in points | 3 | -8 | -7 | -17 |  |
| Population aged 16 -56 in 2003 | 4,189,936 | 4,344,379 | 5,256,357 | 4,544,042 | 18,334,714 |
| Total points gained/lost 2003-2011 | 14,127,165 | -35,308,593 | -38,565,734 | -75,972,156 |  |
| Earnings per point | $61 | $61 | $61 | $61 |  |
| Annual earnings value of skill gain/loss | $861,757,084 | -$2,153,824,159 | -$2,352,509,751 | -$4,634,301,533 | -$9,140,635,443 |
| Annual earnings gain/loss per person | $205.67 | $495.77 | $447.56 | $1,019.86 |  |
| Share of population | 23% | 24% | 29% | 25% |  |
| Share of lost earnings |  | 24% | 26% | 51% |  |

The figure suggests that skill loss is costing the economy $9.1 billion in lost earnings per year.

We view this as evidence of a serious market failure needs to be corrected to capture this lost value. Employers are adopting strategies that are undoubtedly sub-optimal over the long term.

The macro-economic analysis presented above implies that the market for skill will eventually adjust so the higher level and reduced variability of literacy skills.

So the real question for policy makers is how long this adjustment will take and what negative economic consequences need to be born until the market adjusts. Our analysis suggests that the rate of adjustment will be slow, if only because it will take educators some time to reduce the proportion of low skilled students leaving the K-12 and post-secondary education systems. Given the competitive environment in which Canada is operating it is inevitable that the Canadian economy will suffer the loss of a significant number of jobs and associated labour income. If we are right, a strong case can be made for government to intervene in the market by creating incentives for firms to create knowledge and skill rich jobs.

**Chapter 5 How the labour market matches workers with jobs**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**The size of literacy and numeracy skill shortages are amplified by inefficiencies in the processes that match workers with jobs. 40% of all workers have literacy skills below the level associated with their occupation in ESDC’s Essential Skills Profiles and 30% of all workers have literacy skills above the level associated with their occupation in ESDC’s Essential Skills Profiles. Workers in literacy skill surplus are likely to lose skills through a lack of use on the job.**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*end outtake box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

As noted above the labour market is responsible for matching the skills of available workforce to jobs. The overwhelming majority of employers rely on resumes and credentials to identify workers with the skills they need. Unfortunately, neither of these sources is a reliable indicator of an individual’s actual literacy and numeracy skill level, and are becoming less reliable over time.

Even in cases when employers have a clear indication of a job applicant’s literacy and numeracy level, their decision to hire someone with the right cognitive skills may erroneously be subordinated to their desire to hire individuals with the required technical skills and knowledge.

The result of this inefficiency in skills matching is that large percentages of workers in all occupations have literacy and numeracy skills. Specifically, 40% of all occupationally experienced adults aged 16 to 65 have literacy skills below the skill level associated with their occupation in ESDC’s Essential Skills Profiles

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*text box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**Essential Skills Profiles**

1. The estimates of literacy skill demand by occupation included in this report are based upon the ESDC’s Essential Skills Profiles (ES) by occupation. The ES Profiles include two literacy skills – reading text and using documents. This report uses the reading text profile data. Analyses based upon document use would give roughly the same results because of the high (95%) correlation between the two skill domains. At the time of writing ES Profiles were only available for a subset of occupations, mostly occupations from the higher end of the skill distribution. For those occupations that have yet to be profiled the level of prose literacy demand was set to be the average level possessed by workers employed as of May, 2011, the PIAAC reference period. This approach has little, if any material impact on the analyses as presented.

2. The ES profiles are of varying vintages and reflect skill demand at the point at which the occupation was profiled. Skill demand in particular occupations may have increased, or decreased, since the profile was undertaken in response to changes in technology, work organization or re-distributions of duties. It is generally assumed that the overall level of skill demand is rising in Canada. If this is the case, then the estimates of skill shortages presented in this report should be interpreted as the minimum level needed to eliminate literacy-based constraints on labour productivity. Nevertheless, literacy skill demand is falling in some industries and occupations, a fact that would tend to bias the estimates of skill demand upward.

Since the balance between these two trends is unknown the currency of the ES profiles will have an unknown effect on the reliability of the demand estimates used in this report.

3. The ES profiles identify two levels of prose literacy proficiency that are associated with satisfactory job performance – the level typically demanded by the job and a level needed on an occasional basis. In the ES schema this latter level is known as the complex level. For the purposes of this analysis skill shortages are defined using the more demanding complex level. This is also referred to as the peak or complex level in this report. In the aggregate complex levels of literacy demand exceed typical demand by roughly 8%. This increase translates into 20.6 literacy points per worker on the IALSS/ES proficiency scales, an amount equal to 41% of a PIAAC/ES proficiency level. Given that the average literacy point spread between workers skill levels and the complex level identified by the ES profiles was 35 points in 2006, applying the typical level of demand would reduce the depth of shortage but would have little impact on the estimated numbers of workers in shortage. Thus, the choice of complex level does not have a material impact on the estimated size of literacy skill shortages The ES profiles also identify a range of skill levels that are associated with satisfactory job performance. The current analysis uses the highest skill level demanded by the job. The choice of the most demanding level of literacy skill demand is justified by the impact that skill shortage will have on labour productivity levels in a period when the demand for literacy skill is expected to rise and literacy supply to remain flat.

Adopting the less demanding typical level would presume that there are no costs associated with workers failing to deal with the most difficult reading demands of their jobs, no matter how infrequent. An analogy is useful here. Viewed from the perspective of the frequency of tasks firemen need only to be able to eat and sleep. Occasionally, however, they are asked to carry people out of burning buildings – something that requires a high level of strength and skill. In the theory of skill this taps the dimension of criticality i.e. tasks that are critical to job performance but which arise infrequently.

4. The estimates of literacy skill supply by industry and occupation were based upon

literacy data derived from the 1994 IALS and 2003 IALSS reanalyzed to create a single literacy scale and using the lower mastery standard set for the 2011 PIAAC. The ES Profiles do not impose an explicit mastery level. Analysis of the 1994 IALS and the 2003 IALSS data showed that the threshold between Levels 2 and 3 was the point at which the likelihood of experiencing poor outcomes rose dramatically. The reduction of the mastery standard in PIAAC has moved this point of inflection up into the middle of Level 3.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*end text box\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

The following figures provide estimates of the proportions of adults aged 16 to 65 in selected occupations who have literacy skill below, at and above the proficiency level associated with their occupation in those occupations for which an Essential Skills profile is available, in 2011. Estimates are presented for Canada and the provinces. Estimates are not available for the 3 northern Territories as the populations are too small to support reliable estimates of employment by occupation.

**Figure 5.1a Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Canada, 2011**

**Figure 5.1b Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Newfoundland and Labrador, 2011**

**Figure 5.1c Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Nova Scotia, 2011**

**Figure 5.1d Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Prince Edward Island, 2011**

**Figure 5.1e Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, New Brunswick, 2011**

**Figure 5.1f Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Quebec, 2011**

**Figure 5.1g Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Ontario, 2011**

**Figure 5.1h Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Manitoba, 2011**

**Figure 5.1i Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Saskatchewan, 2011**

**Figure 5.1j Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Alberta, 2011**

**Figure 5.1k Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, British Columbia, 2011**

The charts reveal the same story for every jurisdiction i.e. that literacy skill shortages in occupations are significant with 40% of all occupationally experienced workers having literacy skill below the level associated with being fully productive. The proportion of workers in occupational literacy skill shortages varies significantly by occupation, with some occupations demanding high levels of literacy proficiency displaying the highest shortages. Analysis reveals that each point of literacy that a worker is below the minimum literacy level associated with their occupation is associated with a loss of $61 per year in income. Given that the total number of points of literacy is large, the total loss of income is material.

These data also raise an important question for policy, specifically how much of the increase in the growth of wage premia to literacy skill reported above is explained by the proportion of workers in literacy skill shortage, or the depth of their literacy skill shortage. The analysis reported above confirms that occupational literacy skill shortages, and the average depth of occupational literacy skill shortages, both have a significant impact on the growth of wage premia to literacy skill in jobs that demand Levels 3, 4 and 5.

Whatever one thinks about literacy and numeracy, the available evidence suggests that differences in skill are also associated with significant differences in individual outcomes. If given the choice, few adults would chose to have Level 1 and 2 skills, as they bear a disproportionate share of all the bad things that can happen to a body – they work less, earn less, are less healthy, participate less in formal education and are less engaged in society. Policies that serve to increase literacy skill demand, increase literacy skill supply and that reduce the variance in skills by reducing the proportion of adults with skills below Level 3 will have a positive impact on economic performance, population health, social development and government fiscal capacity.

**6. Conclusions, implications for policy and recommendations for additional research**

The average level of cognitive skill supply matters economically. Increases in the average skill level in the working age population explain more of differences in the rates of growth of GDP and labour productivity over the long term.

Notwithstanding the importance improvements average skill levels to achieving higher levels of growth, the distribution of cognitive skill supply also has a significant impact on differences in the rates of growth of GDP and labour productivity over the long term. Specifically, higher proportions of workers with literacy skill at Levels 1 and 2 reduce rates of GDP and labour productivity growth over the long run. Workers with Level 1 and 2 literacy skill are only able reliably handle the application of routine procedural knowledge.

Currently, fully half of the adult workforce has literacy skills below Level 3, a finding that suggests that up to 46% of workers could have literacy skills below the level demanded by their occupation. In reality, only 40% of workers have literacy skills below the level demanded by their occupation because the labour market tends to exclude workers with very low skill levels. This occupational literacy skill shortage reduces labour incomes by an estimated $148 billion per year. An additional 30% of workers have literacy skills above the level demanded by their occupation so are unable to capture the full economic potential of their technical skills and knowledge.

These findings carry a clear message for policy makers interested in realizing higher levels of economic growth, in reducing the negative impact that skill shortages have on our economic performance and in reducing the negative social impact of high levels of skill-based inequality. Policy should focus on increasing average skill levels and increases in the average are best achieved through investments that serve to reduce the proportion of the workforce that fall at Level 1 and 2. They also suggest that the proportion of workers with very high levels of technical and cognitive skills are not translating into higher rates of economic growth that should be the product of our supply of technical skills and knowledge.

Canadian policy makers are actively pursuing the first part of strategy. Collectively, provincial and federal governments have invested heavily in education including measures to increase the literacy and numeracy skills of elementary and secondary students, to increase secondary graduation rates and to increase post-secondary participation and graduation rates.

The economic demand for literacy skill has been rising steadily over the past two decades, to the point that fully 94% of all jobs require workers at literacy level 3 or better, higher enough to apply their technical skills and knowledge in non-routine ways.

Unfortunately, the available data suggest that our investments in education have yet to yield the improvement in average scores needed to meet the emerging demand. As of 2011 average literacy scores stood at 276, just above the lower threshold of Level 3.

More importantly, nor have our educational investments yielded material reductions in the proportion of the workforce with literacy skill below Level 3. As of 2015, roughly half of 16 year olds in Canada had literacy skill below Level 3.

This finding suggests that a minimum of 44% of youth leaving the secondary system do not have the literacy skills needed for the jobs they will eventually fill and that a minimum of 35% of youth who go on to post-secondary study do so without the minimum level needed to take full advantage of study at this level.

At this point the story becomes more complex. The available evidence suggests that the pursuit of post-secondary education generates additional literacy skill supply. Of central importance to policy, however, the supply of literacy skill is being eroded by skill loss. It appears that workers in jobs that demand high levels of cognitive skill use tend to gain skill over time whereas workers in jobs that impose low levels of cognitive skill demand tend to lose skill over time. On balance, a greater proportion of jobs impose low cognitive demands than high with the result that the supply of literacy skill is falling. The amount of skill loss occurring is sufficient to offset all of the literacy skill gain associated with 22.5 million person years of postsecondary education added between 2003 and 2011. It is inevitable, therefore, that occupational literacy skill shortages will grow.

The key new insight offered by the current analysis is that much of this skill loss is occurring in jobs that notionally require high levels of literacy skill and literacy skill use. Our review of the limited available evidence suggests that employers are reducing the cognitive demands of what should be cognitively demanding jobs in response to the fact that 40% of the workers lack the literacy skills to meet the full demands of their jobs. This employer behavior would not be a problem were it not for the fact that they sacrifice a significant amount of output per hour worked in doing so.

This finding carries several additional insights for policy.

First, it suggests that the Canadian economy will not realize it’s full economic potential unless employers increase the knowledge and skill intensity of their jobs. This is unlikely to happen until a way is found to reduce the proportion of the workforce with Level 1 and 2 skills. It is worth noting, however, that measures that precipitated significant reductions in the proportion of low-skilled workers could double current rates of productivity growth.

Second, neither the public, nor a significant proportion of students, will realize a full return on their investments in post-secondary education until the number of students with Level 1 and 2 skills is reduced.

Third, be aware that any investment in literacy skill upgrading will only yield the expected economic benefits unless enough skill is gained to move the learner into at least Level 3. Although recent research has established a recipe for achieving this level of skill gain, such gains are well beyond the quality or intensity of most literacy skill upgrading offered in community-based programs or in colleges.

Collectively, these insights suggest a need for the following policy measures:

Redouble efforts to reduce the proportion of primary and secondary students leaving with literacy skills below Level 3. Over the long term, such measures provide the most efficient means of reducing the proportion of low skilled youth entering the labour market.

Assess the literacy skills of students entering the post-secondary system and upgrade their literacy skills to Level 3 as needed. Such measures would reduce drop out rates and time to graduation and more efficient acquisition of technical skills and knowledge.

Assess the literacy skills of students at the point of graduation and issue a credential that certifies their level of skill. Such measures would precipitate an immediate reduction in the proportion of youth entering the labour force with low skills.

Even if implemented immediately, it will take some time for these measures to have a material impact on the size of occupational literacy skill shortages and on the magnitude of skill loss. In order to reduce the negative impact that literacy skill shortages and literacy skill loss has on our economic performance governments should address the problem of occupational skill shortages directly by:

Encouraging employers to assess and upgrade the literacy skill of their workers to the level notionally demanded by their occupations and to adjust their work organization, production processes and technologies to make them more knowledge and skill intense.

Making the funding that they provide for adult skill upgrading conditional on pre and post assessment and on meeting explicit skill gain targets. Programs failing to meet these efficiency targets should be denied funding.

It is worth noting in passing that that the changes that are transforming the global economy suggest that the economic cost of occupational literacy skill shortages could be significant if left unaddressed.

The automation of production processes will continue to place downward pressure on the demand for jobs and the wage rates of the workers in those jobs that only require the routine application of procedural knowledge – Level 2 in literacy skill terms.

The rapid growth in the global supply of both technical skills and knowledge and cognitive skills will also place downward pressure on the wages of workers in jobs that only require the routine application of procedural knowledge – Level 2 in literacy skill terms.

The emergence of global markets for inputs – capital, technology and raw materials – and falling barriers to trade suggest that that, going forward, productivity growth and our ability to compete will increasingly depend on how efficiently we transform inputs into output. Production efficiency depends critically upon whether we have the cognitive skills needed to apply our technical skills and knowledge to world- class levels.

It is also worth noting in passing that any investment in increasing the supply of the so called 21st century skills – critical thinking, innovation, entrepreneurship - will fail to yield the expected economic benefits or may only serve to amplify the levels of skill-based wage inequality documented in this report. Whatever the impact of these skills upon productivity growth it is difficult to believe that the supply of these skills can be increased much when fully half of the workforce has literacy and numeracy skills below Level 3.

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**Annex B: Statistical tables**

**Table 2.1 Distribution of paid jobs by literacy level demanded by the occupation, 1997 and 2014, Canada**

|  |  |  |
| --- | --- | --- |
|  | IALSS | PIAAC |
| age\_Group 1 | 27.35642998 | 23.37910144 |
| age\_Group 2 | 13.50443352 | 16.22114863 |
| age\_Group 3 | 7.240558727 | 13.56987477 |
| Immig\_01 0 | 35.90699999 | 11.16062833 |
| age\_Group 4 | 6.042589883 | 3.284116522 |
| Sex 1 | -6.387607568 | 0.942478317 |
| Employed\_01 0 | -10.50989301 | -7.465624664 |
| Educ\_3 2 | -25.45115449 | -20.98670137 |
| Educ\_3 1 | -57.54629702 | -52.89763146 |

**Table 2.2 Trend in employment levels by the literacy level demanded by the job, Canada, 1995 – 2015.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2010 | 2011 | 2012 | 2013 | 2014 |  |  |
| 2 | $15.73 | $16.22 | $15.82 | $14.60 | $14.20 | $16.19 | $15.53 | $13.39 | $15.31 | $14.04 | $15.36 | $14.20 | $13.53 | $13.32 | $15.93 | $14.11 | $14.21 | -$1.52 |  |
| 3 | $19.56 | $19.77 | $19.84 | $19.47 | $19.70 | $20.09 | $19.94 | $19.40 | $19.43 | $19.55 | $19.76 | $20.54 | $20.70 | $21.47 | $22.54 | $23.41 | $22.60 | $3.04 |  |
| 4 | $19.27 | $18.99 | $18.68 | $18.80 | $18.40 | $18.66 | $18.61 | $18.16 | $18.16 | $18.66 | $18.69 | $18.60 | $18.32 | $18.97 | $19.08 | $18.63 | $19.88 | $0.61 |  |
| 5 | $23.63 | $22.69 | $21.41 | $21.80 | $18.83 | $20.66 | $20.07 | $20.44 | $20.51 | $22.40 | $21.49 | $23.43 | $24.18 | $21.36 | $24.42 | $25.70 | $25.47 | $1.85 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Percent |
| 2 | 89,938 | 94,667 | 97,083 | 109,000 | 113,333 | 124,646 | 131,167 | 118,750 | 98,937 | 104,146 | 104,083 | 104,917 | 98,375 | 103,125 | 106,875 | 115,917 | 129,688 | 39,750 | 3.0% |
| 3 | 1,166,708 | 1,160,583 | 1,161,188 | 1,208,500 | 1,228,104 | 1,244,271 | 1,256,625 | 1,250,479 | 1,279,938 | 1,311,750 | 1,365,896 | 1,360,854 | 1,360,979 | 1,423,625 | 1,445,063 | 1,450,604 | 1,501,458 | 334,750 | 25.2% |
| 4 | 1,435,979 | 1,503,938 | 1,521,583 | 1,666,104 | 1,725,917 | 1,764,563 | 1,825,896 | 1,846,958 | 1,860,667 | 1,942,000 | 1,984,396 | 2,044,146 | 2,051,021 | 2,133,896 | 2,188,542 | 2,192,708 | 2,248,292 | 812,313 | 61.2% |
| 5 | 137,438 | 154,771 | 166,208 | 179,646 | 208,396 | 194,729 | 209,667 | 213,854 | 206,875 | 234,563 | 228,854 | 227,688 | 248,917 | 246,208 | 254,333 | 272,688 | 278,958 | 141,521 | 10.7% |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $4,158,395.83 | 1,328,333 |  |

**Figure 2.4a Trend in paid employment levels by the literacy level demanded by the job, Newfoundland and Labrador**, **1995 – 2014.**

**Too big – need graphics artist**

**Figure 2.4b Trend in paid employment levels by the literacy level demanded by the job, Nova Scotia**, **1995 – 2014.**

**Figure 2.4c Trend in paid employment levels by the literacy level demanded by the job, Prince Edward Island**, **1995 – 2014.**

**Figure 2.4d Trend in paid employment levels by the literacy level demanded by the job, New Brunswick**, **1995 – 2014.**

**Figure 2.4e Trend in paid employment levels by the literacy level demanded by the job, Quebec**, **1995 – 2014.**

**Figure 2.4f Trend in paid employment levels by the literacy level demanded by the job,**

**Ontario**, **1995 – 2014.**

**Figure 2.4g Trend in paid employment levels by the literacy level demanded by the job,** Manitoba, **1995 – 2014.**

**Figure 2.4h Trend in paid employment levels by the literacy level demanded by the job, Saskatchewan**, **1995 – 2014.**

**Figure 2.4i Trend in paid employment levels by the literacy level demanded by the job,** Alberta, **1995 – 2014.**

**Figure 2.4j Trend in paid employment levels by the literacy level demanded by the job, British Columbia, 1995 – 2014.**

**Chapter 3**

**Figure 3.1 Stock and flow: Understanding what changed Canada’s literacy skill profile since 1994**

**Table 2.3 Distribution of job creation by level of literacy skill demanded, paid employment, Canada, 1997 – 2014**

**Text table**

**Table 3.2a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Canada, 2003**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 133.12678 | 121.71802 | 154.3616652 |  | 144.01066 | 180.72105 | 168.5267485 |  | 138.6263 | 204.0474 | 199.7388847 |  | 150.48228 | 232.64617 | 223.5248527 |  | 138.61344 | 233.14267 | 244.8028875 |
| Q1 | 223.51744 | 184.27314 | 210.1928543 |  | 219.77362 | 247.4367 | 231.9250568 |  | 213.23183 | 260.155 | 245.7159104 |  | 232.35427 | 282.97413 | 268.9086931 |  | 210.28604 | 287.15554 | 290.384327 |
| Median | 270.30564 | 233.32049 | 243.2000589 |  | 270.63825 | 279.7268 | 266.5661867 |  | 270.52042 | 290.23309 | 275.4019341 |  | 261.11639 | 309.24198 | 297.8965655 |  | 243.65859 | 319.63525 | 316.1964692 |
| Q3 | 305.81201 | 273.75007 | 275.3619472 |  | 309.33571 | 306.84625 | 297.2082026 |  | 300.13789 | 316.76498 | 300.9999002 |  | 306.99408 | 335.48466 | 324.2639685 |  | 290.60479 | 339.96707 | 339.7759563 |
| Maximum | 344.93367 | 317.65729 | 314.659807 |  | 350.10647 | 343.18441 | 337.2790747 |  | 340.69334 | 349.39894 | 337.5555674 |  | 368.80043 | 365.99444 | 358.6802219 |  | 349.54195 | 380.0678 | 377.1616742 |

**Table 3.2b The distribution of literacy skill by age group, adults aged 16 to 65, Canada, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 137.92413 | 209.89291 | 195.6153112 |  | 138.8866 | 206.49722 | 201.8229766 |  | 155.14734 | 175.65644 | 186.136554 |  | 126.33433 | 175.6709 | 173.4053952 |  | 137.92359 | 137.12716 | 172.2669019 |
| Q1 | 218.03721 | 263.20415 | 248.7091168 |  | 226.71335 | 267.9849 | 254.5453494 |  | 220.65039 | 251.5367 | 247.5593379 |  | 212.64374 | 249.57802 | 234.4231113 |  | 206.10891 | 222.25022 | 229.8852126 |
| Median | 274.94445 | 291.26947 | 280.4635391 |  | 273.31624 | 295.83169 | 288.6624992 |  | 260.59472 | 285.77638 | 283.8325362 |  | 261.11639 | 283.31424 | 271.0550269 |  | 266.57306 | 266.20993 | 264.0992811 |
| Q3 | 304.6262 | 317.88331 | 307.7832202 |  | 306.23674 | 323.65009 | 319.2095436 |  | 299.82778 | 317.14312 | 313.6685749 |  | 298.79461 | 313.3002 | 303.1403492 |  | 309.2543 | 297.35332 | 295.9092365 |
| Maximum | 349.71281 | 357.45487 | 344.4994299 |  | 350.10647 | 358.42537 | 357.6653764 |  | 342.65256 | 355.7913 | 352.0763807 |  | 360.71612 | 350.33892 | 344.8746534 |  | 348.37167 | 338.2944 | 336.891481 |

**Table 3.2c The distribution of literacy skill by employment status, adults aged 16 to 65, Canada, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 134.96067 | 131.49214 | 158.7014288 |  | 142.36745 | 193.13299 | 194.9792392 |
| Q1 | 219.77362 | 204.41214 | 226.1747845 |  | 220.03017 | 259.0431 | 248.0505169 |
| Median | 271.38594 | 255.97519 | 263.4221774 |  | 267.07063 | 290.65353 | 282.0061334 |
| Q3 | 308.03421 | 292.5474 | 295.9466228 |  | 301.90001 | 318.51425 | 312.0057505 |
| Maximum | 345.42535 | 339.3281 | 337.2232847 |  | 350.10647 | 354.76938 | 350.6677239 |

**Table 3.2d The distribution of literacy skill by gender, adults aged 16 to 65, Canada, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 140.69799 | 161.63664 | 185.1783054 |  | 137.18607 | 155.16662 | 184.9979194 |
| Q1 | 221.22294 | 243.24243 | 243.2003596 |  | 219.77362 | 237.22713 | 241.8122653 |
| Median | 267.75727 | 280.34917 | 278.8143758 |  | 269.4203 | 279.58808 | 276.6953027 |
| Q3 | 304.50301 | 310.21409 | 310.2960095 |  | 306.73592 | 312.40629 | 307.169497 |
| Maximum | 356.06392 | 348.49271 | 349.9602394 |  | 344.37129 | 351.38923 | 345.9897785 |

**Table 3.2e The distribution of literacy skill by immigration status, adults aged 16 to 65, Canada, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 137.55349 | 177.69975 | 198.5962199 |  | 146.30569 | 123.84862 | 154.314254 |
| Q1 | 217.14008 | 250.15325 | 249.8787472 |  | 233.10196 | 200.53441 | 222.9443681 |
| Median | 269.02931 | 286.10952 | 282.7135966 |  | 265.59078 | 256.04589 | 260.8627984 |
| Q3 | 304.77188 | 315.38796 | 312.2602994 |  | 306.29673 | 291.97699 | 295.2883207 |
| Maximum | 348.37167 | 353.19526 | 350.3521957 |  | 355.55135 | 336.37696 | 337.6053614 |

**Table 3.2f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Canada, 2003 and 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 158.37164 | 185.8002326 |  | #N/A | 148.71695 | 170.6379184 |
| Q1 | #N/A | 240.53177 | 243.0544647 |  | #N/A | 222.92721 | 227.5902456 |
| Median | #N/A | 280.07387 | 278.2026827 |  | #N/A | 257.54503 | 263.971681 |
| Q3 | #N/A | 311.30028 | 309.1180178 |  | #N/A | 294.83708 | 295.8443598 |
| Maximum | #N/A | 350.23019 | 348.3434726 |  | #N/A | 335.87939 | 336.9810529 |

**Table 3.3a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 195.30109 | 119.71917 | 148.5525963 |  | 165.08589 | 193.16727 | 189.9190042 |  | #N/A | 209.39052 | 202.5026461 |  | #N/A | 260.07948 | 220.9990699 |  | #N/A | #N/A | 239.3826078 |
| Q1 | 195.30109 | 176.08813 | 200.8780942 |  | 165.08589 | 247.76073 | 230.9853887 |  | #N/A | 259.14379 | 239.5606192 |  | #N/A | 292.95767 | 264.3464411 |  | #N/A | #N/A | 289.7513073 |
| Median | 242.47706 | 220.39544 | 229.849486 |  | 222.38412 | 276.51965 | 264.0637533 |  | #N/A | 283.48777 | 266.2968415 |  | #N/A | 318.47193 | 293.5704272 |  | #N/A | #N/A | 315.6382442 |
| Q3 | 285.09563 | 257.90656 | 258.9318215 |  | 265.87946 | 303.2299 | 291.7757508 |  | #N/A | 310.58633 | 291.6654259 |  | #N/A | 338.49257 | 318.7409307 |  | #N/A | #N/A | 335.730573 |
| Maximum | 285.09563 | 301.12393 | 304.5668808 |  | 265.87946 | 336.43159 | 329.0648127 |  | #N/A | 340.27718 | 324.7580318 |  | #N/A | 370.35474 | 354.2846929 |  | #N/A | #N/A | 360.9190223 |

**Table 3.3b The distribution of literacy skill by age group, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 188.99496 | 212.25222 | 204.687386 |  | #N/A | 202.43632 | 198.6178509 |  | 188.81608 | 165.74574 | 195.141324 |  | #N/A | 171.82585 | 176.5808678 |  | #N/A | 123.0147 | 167.9326655 |
| Q1 | 188.99496 | 262.91814 | 246.3453449 |  | #N/A | 261.54219 | 249.1246552 |  | 188.81608 | 249.88009 | 243.1696937 |  | #N/A | 230.304 | 227.0697456 |  | #N/A | 193.16727 | 217.3462792 |
| Median | 248.4854 | 290.2754 | 278.1076236 |  | #N/A | 290.52231 | 284.5704196 |  | 247.13408 | 277.16879 | 276.0797764 |  | #N/A | 261.76661 | 260.5165607 |  | #N/A | 244.45288 | 245.8640992 |
| Q3 | 265.61274 | 318.78579 | 304.404646 |  | #N/A | 318.47193 | 314.8168304 |  | 291.0638 | 301.11911 | 307.3083019 |  | #N/A | 295.78081 | 293.3388206 |  | #N/A | 276.84154 | 277.4469659 |
| Maximum | 265.61274 | 347.60576 | 334.4946837 |  | #N/A | 354.5846 | 347.1465961 |  | 291.0638 | 341.15396 | 345.4215682 |  | #N/A | 342.24497 | 335.9357842 |  | #N/A | 327.37517 | 321.4096799 |

**Table 3.3c The distribution of literacy skill by employment status, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 121.25847 | 133.38654 | 168.7294887 |  | 161.53006 | 199.0567 | 196.5153798 |
| Q1 | 173.16431 | 201.09519 | 219.6848053 |  | 161.53006 | 254.92274 | 241.3379026 |
| Median | 235.55018 | 246.37889 | 252.1706018 |  | 247.13408 | 283.16855 | 275.6649074 |
| Q3 | 272.59157 | 284.30509 | 282.2792172 |  | 265.61274 | 315.99265 | 308.1557899 |
| Maximum | 316.80301 | 328.90484 | 321.3560907 |  | 265.61274 | 349.51999 | 345.4136346 |

**Table 3.3d The distribution of literacy skill by gender, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 165.08589 | 145.54354 | 178.9608919 |  | 106.39939 | 160.52099 | 190.0085636 |
| Q1 | 165.08589 | 220.87534 | 229.4219824 |  | 183.62988 | 235.38307 | 236.7326205 |
| Median | 242.47706 | 262.64553 | 265.2265792 |  | 233.28246 | 272.31735 | 269.528371 |
| Q3 | 266.07763 | 299.01742 | 301.0738722 |  | 269.39245 | 304.08525 | 299.015642 |
| Maximum | 266.07763 | 337.63347 | 339.2790646 |  | 310.86752 | 343.01409 | 338.627352 |

**Table 3.3e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 127.77562 | 152.0473 | 184.8668278 |  | #N/A | #N/A | 162.4184791 |
| Q1 | 170.62182 | 228.14286 | 232.7281096 |  | #N/A | #N/A | 227.0363255 |
| Median | 241.63564 | 267.99132 | 267.5552393 |  | #N/A | #N/A | 261.2953359 |
| Q3 | 269.39245 | 301.36602 | 299.8874467 |  | #N/A | #N/A | 294.266253 |
| Maximum | 321.48146 | 340.78546 | 338.6738651 |  | #N/A | #N/A | 332.0758173 |

**Table 3.3f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Newfoundland and Labrador, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 152.74143 | 185.9780685 |  | #N/A | #N/A | 178.8866422 |
| Q1 | #N/A | 228.59491 | 234.350699 |  | #N/A | #N/A | 220.739381 |
| Median | #N/A | 268.23449 | 269.2270778 |  | #N/A | #N/A | 254.0116756 |
| Q3 | #N/A | 301.77736 | 301.5029146 |  | #N/A | #N/A | 284.4493131 |
| Maximum | #N/A | 341.65902 | 339.8969653 |  | #N/A | #N/A | 330.6527584 |

**Table 3.4a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 112.16617 | 137.3098 | 155.0678853 |  | 209.59512 | 203.45235 | 196.1896927 |  | 253.99509 | 217.68157 | 204.4368624 |  | #N/A | 253.47502 | 220.0306584 |  | #N/A | 296.6624 | 255.1180759 |
| Q1 | 226.86546 | 197.35939 | 206.8789931 |  | 209.59512 | 253.70747 | 238.629791 |  | 253.99509 | 260.54384 | 242.1889121 |  | #N/A | 296.42352 | 266.1156619 |  | #N/A | 296.6624 | 292.0765415 |
| Median | 271.29703 | 240.4209 | 237.9632553 |  | 266.85532 | 282.6351 | 269.3655123 |  | 285.96437 | 291.443 | 271.1779919 |  | #N/A | 313.55408 | 297.9811966 |  | #N/A | 324.66451 | 314.0862626 |
| Q3 | 311.63021 | 274.36976 | 266.6294549 |  | 307.32615 | 306.7402 | 300.9485627 |  | 301.30871 | 316.04086 | 299.7013742 |  | #N/A | 335.44931 | 323.8001545 |  | #N/A | 343.89354 | 336.6670739 |
| Maximum | 350.63028 | 315.49615 | 306.27325 |  | 307.32615 | 341.92629 | 342.9891311 |  | 301.30871 | 358.1249 | 337.2337549 |  | #N/A | 364.13859 | 356.2223743 |  | #N/A | 343.89354 | 372.9436001 |

**Table 3.4b The distribution of literacy skill by age group, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 233.23051 | 206.45063 | 198.3737447 |  | 244.03083 | 233.49938 | 207.1577175 |  | 231.09722 | 190.81225 | 206.0825367 |  | #N/A | 193.39758 | 189.3753899 |  | #N/A | 182.28286 | 179.8010181 |
| Q1 | 233.23051 | 255.48619 | 243.5374275 |  | 244.03083 | 278.56509 | 256.9565549 |  | 231.09722 | 258.18828 | 251.8535952 |  | #N/A | 248.43666 | 234.4152191 |  | #N/A | 234.19405 | 228.329726 |
| Median | 284.74964 | 282.02023 | 273.1612722 |  | 275.13084 | 303.30917 | 291.9412131 |  | 247.02911 | 291.60743 | 288.02419 |  | #N/A | 289.6541 | 267.8875997 |  | #N/A | 266.72196 | 263.1003355 |
| Q3 | 338.39188 | 314.88825 | 299.3125903 |  | 306.28923 | 320.43865 | 319.7804583 |  | 282.93289 | 318.7874 | 318.1396955 |  | #N/A | 313.54872 | 305.2639616 |  | #N/A | 299.28361 | 294.9046316 |
| Maximum | 338.39188 | 352.74482 | 334.8473723 |  | 306.28923 | 360.22498 | 359.4012357 |  | 282.93289 | 352.7009 | 355.2049471 |  | #N/A | 352.92532 | 345.3371252 |  | #N/A | 350.27625 | 337.7672684 |

**Table 3.4c The distribution of literacy skill by employment status, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 166.39007 | 150.84221 | 178.4572618 |  | 148.32436 | 205.77952 | 201.8242097 |
| Q1 | 225.04604 | 222.13989 | 227.0561255 |  | 230.56859 | 264.14359 | 247.8087867 |
| Median | 273.71526 | 262.40451 | 260.829366 |  | 271.54662 | 296.09895 | 281.4677632 |
| Q3 | 307.32615 | 293.24636 | 292.6967305 |  | 298.26866 | 318.97165 | 312.7619818 |
| Maximum | 350.63028 | 335.44931 | 331.4513288 |  | 350.6726 | 360.22498 | 351.5696532 |

**Table 3.4d The distribution of literacy skill by gender, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 118.80276 | 170.82749 | 191.373029 |  | 187.11127 | 162.64142 | 197.8595372 |
| Q1 | 213.9672 | 245.46248 | 240.1360314 |  | 236.63958 | 243.50541 | 242.5010425 |
| Median | 265.32458 | 281.03741 | 276.7415433 |  | 274.9241 | 282.54512 | 274.31198 |
| Q3 | 295.89382 | 309.39516 | 310.7879173 |  | 311.09408 | 311.85516 | 305.4955373 |
| Maximum | 354.77527 | 359.37927 | 352.0713845 |  | 350.63028 | 347.05249 | 343.891668 |

**Table 3.4e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 161.78661 | 166.71785 | 194.6806779 |  | #N/A | 237.73381 | 209.4728531 |
| Q1 | 226.86546 | 244.66873 | 240.9100838 |  | #N/A | 237.73381 | 255.2714215 |
| Median | 273.71526 | 281.21309 | 274.9201839 |  | #N/A | 290.52177 | 292.8776042 |
| Q3 | 304.6487 | 310.75504 | 307.4792955 |  | #N/A | 319.15428 | 320.3058478 |
| Maximum | 350.63028 | 352.7009 | 346.5999157 |  | #N/A | 319.15428 | 357.4740968 |

**Table 3.4f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Nova Scotia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 166.30866 | 195.2995578 |  | #N/A | #N/A | 178.0619417 |
| Q1 | #N/A | 244.44431 | 241.9075641 |  | #N/A | #N/A | 225.7812931 |
| Median | #N/A | 281.8242 | 275.9209874 |  | #N/A | #N/A | 262.3854708 |
| Q3 | #N/A | 310.9725 | 308.6152026 |  | #N/A | #N/A | 295.4350291 |
| Maximum | #N/A | 352.7009 | 348.0088755 |  | #N/A | #N/A | 322.1017618 |

**Prince Edward Island**

**Table 3.5aThe distribution of literacy skill by educational attainment, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 260.27604 | 140.08526 | 138.6498401 |  | #N/A | 210.7895 | 198.5988151 |  | #N/A | 200.43801 | 211.7611447 |  | #N/A | 296.98858 | 236.7438808 |  | #N/A | #N/A | 231.6033519 |
| Q1 | 260.27604 | 195.58817 | 203.4589567 |  | #N/A | 255.26338 | 243.8701281 |  | #N/A | 259.81596 | 255.7891683 |  | #N/A | 296.98858 | 273.6236636 |  | #N/A | #N/A | 285.2086098 |
| Median | 293.47292 | 233.36815 | 243.237181 |  | #N/A | 279.18103 | 272.2398762 |  | #N/A | 287.48922 | 283.668826 |  | #N/A | 320.88641 | 298.7302143 |  | #N/A | #N/A | 310.0102249 |
| Q3 | 322.67102 | 267.46483 | 275.857007 |  | #N/A | 310.5949 | 304.0653575 |  | #N/A | 311.11282 | 305.4730545 |  | #N/A | 345.0922 | 322.6946019 |  | #N/A | #N/A | 328.332697 |
| Maximum | 322.67102 | 312.04851 | 310.0677547 |  | #N/A | 344.95991 | 340.7633869 |  | #N/A | 344.10617 | 338.4106343 |  | #N/A | 345.0922 | 358.9415345 |  | #N/A | #N/A | 361.985159 |

**Table 3.5b The distribution of literacy skill by age group, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 213.4316 | 207.6564631 |  | #N/A | 277.24913 | 183.1687572 |  | #N/A | 197.73592 | 204.6236705 |  | #N/A | 180.38898 | 179.9354926 |  | #N/A | 224.62131 | 176.2021174 |
| Q1 | #N/A | 247.99158 | 254.7983581 |  | #N/A | 277.24913 | 261.6622772 |  | #N/A | 257.82836 | 256.7537044 |  | #N/A | 253.31916 | 243.2449329 |  | #N/A | 224.62131 | 233.9195017 |
| Median | #N/A | 287.02593 | 285.1392869 |  | #N/A | 300.76293 | 291.8750192 |  | #N/A | 283.47277 | 286.9520704 |  | #N/A | 288.37349 | 273.7244645 |  | #N/A | 261.59575 | 271.5837519 |
| Q3 | #N/A | 320.88641 | 309.9089945 |  | #N/A | 322.19648 | 317.9653105 |  | #N/A | 312.52948 | 314.6115736 |  | #N/A | 310.19695 | 302.5859895 |  | #N/A | 289.01514 | 303.3408478 |
| Maximum | #N/A | 373.70115 | 340.3327854 |  | #N/A | 322.19648 | 359.8344859 |  | #N/A | 359.27858 | 350.9029241 |  | #N/A | 356.61077 | 340.9900924 |  | #N/A | 289.01514 | 344.5679418 |

**Table 3.5c The distribution of literacy skill by employment status, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 241.11075 | 150.46086 | 174.3908854 |  | 284.37097 | 200.43801 | 201.2108489 |
| Q1 | 241.11075 | 214.98162 | 231.7826538 |  | 284.37097 | 257.82836 | 256.5698801 |
| Median | 281.37752 | 257.85782 | 266.3721886 |  | 305.20036 | 289.9594 | 285.6695841 |
| Q3 | 313.67405 | 294.8103 | 300.3887345 |  | 322.66352 | 316.52236 | 312.8542184 |
| Maximum | 313.67405 | 337.06038 | 341.3367893 |  | 322.66352 | 358.8426 | 349.4604749 |

**Table 3.5d The distribution of literacy skill by gender, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 280.44183 | 156.28548 | 180.8886575 |  | 260.27604 | 181.58069 | 200.604521 |
| Q1 | 280.44183 | 230.25205 | 244.678976 |  | 260.27604 | 247.99158 | 253.5530092 |
| Median | 293.47292 | 274.25996 | 278.545277 |  | 293.58111 | 286.29644 | 283.6769554 |
| Q3 | 322.67102 | 301.41851 | 308.5085093 |  | 305.81201 | 316.48487 | 311.0211328 |
| Maximum | 322.67102 | 342.80038 | 348.6608791 |  | 305.81201 | 357.45487 | 346.261771 |

**Table 3.5e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 266.00426 | 172.27843 | 191.9905425 |  | #N/A | #N/A | 195.047084 |
| Q1 | 266.00426 | 236.08096 | 248.6448281 |  | #N/A | #N/A | 266.2855181 |
| Median | 299.11811 | 277.68403 | 280.8510872 |  | #N/A | #N/A | 298.6048329 |
| Q3 | 317.72263 | 308.88206 | 309.0993441 |  | #N/A | #N/A | 329.1505992 |
| Maximum | 317.72263 | 354.34412 | 346.6936729 |  | #N/A | #N/A | 359.889105 |

**Table 3.5f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Prince Edward Island, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 172.09847 | 192.2461402 |  | #N/A | #N/A | 146.547607 |
| Q1 | #N/A | 236.09542 | 249.6140705 |  | #N/A | #N/A | 224.7061063 |
| Median | #N/A | 278.47297 | 281.6184742 |  | #N/A | #N/A | 267.3994782 |
| Q3 | #N/A | 309.89005 | 310.1218638 |  | #N/A | #N/A | 289.8918915 |
| Maximum | #N/A | 354.34412 | 347.9724776 |  | #N/A | #N/A | 310.5349188 |

**New Brunswick**

**Table 3.6a The distribution of literacy skill by educational attainment, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 139.75855 | 124.47152 | 146.3952226 |  | 129.489 | 195.00008 | 193.5929033 |  | 171.47557 | 203.96652 | 206.0904 |  | 228.91198 | 224.4692 | 226.7063978 |  | #N/A | #N/A | 242.23935 |
| Q1 | 224.40707 | 182.83666 | 196.1897262 |  | 221.47146 | 240.11775 | 236.9666454 |  | 236.10881 | 257.44219 | 244.7087166 |  | 228.91198 | 282.69241 | 270.089009 |  | #N/A | #N/A | 281.8009623 |
| Median | 269.7663 | 224.62077 | 225.1735973 |  | 250.28715 | 269.91198 | 267.1999281 |  | 276.382 | 281.84563 | 271.1544636 |  | 299.1465 | 305.47191 | 296.9532777 |  | #N/A | #N/A | 312.2475945 |
| Q3 | 301.84538 | 263.25021 | 257.5391143 |  | 290.17417 | 295.28806 | 292.4972103 |  | 301.55401 | 311.32278 | 295.4588282 |  | 345.91167 | 337.6174 | 320.4004956 |  | #N/A | #N/A | 334.4613828 |
| Maximum | 339.73034 | 291.61761 | 294.9459282 |  | 335.4011 | 333.59453 | 328.5001112 |  | 332.33373 | 357.8164 | 332.0034723 |  | 345.91167 | 353.26917 | 356.5381293 |  | #N/A | #N/A | 360.4330382 |

**Table 3.6b The distribution of literacy skill by age group, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 129.489 | 226.74817 | 186.7581382 |  | 124.56739 | 214.68437 | 209.6950019 |  | 168.59512 | 176.36129 | 200.3741864 |  | 146.22428 | 180.04084 | 168.924116 |  | 224.40707 | 161.63664 | 175.2501479 |
| Q1 | 221.94493 | 264.98127 | 228.9411058 |  | 231.32271 | 263.23361 | 259.8466883 |  | 230.22741 | 242.22587 | 253.1272904 |  | 225.91692 | 232.30178 | 227.2004008 |  | 224.40707 | 218.94612 | 227.9387742 |
| Median | 266.42042 | 287.84861 | 264.537044 |  | 262.48324 | 283.77913 | 287.1249501 |  | 267.04707 | 276.57106 | 281.5659391 |  | 269.09466 | 269.56437 | 266.1668642 |  | 277.83989 | 262.24276 | 259.9686405 |
| Q3 | 296.63455 | 306.37653 | 295.6831098 |  | 305.27052 | 315.79395 | 311.1180179 |  | 309.06898 | 310.97624 | 309.243582 |  | 299.5557 | 291.45586 | 299.336018 |  | 304.63209 | 287.06128 | 287.8100269 |
| Maximum | 336.06953 | 351.13375 | 335.6668859 |  | 341.82988 | 341.25036 | 347.2734446 |  | 345.91167 | 358.78851 | 350.6027228 |  | 333.32727 | 337.6174 | 338.2681147 |  | 304.63209 | 329.26422 | 328.6389467 |

**Table 3.6c The distribution of literacy skill by employment status, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 134.62378 | 143.81035 | 168.156883 |  | 163.9847 | 192.69112 | 193.5964012 |
| Q1 | 223.74936 | 201.04966 | 222.3548842 |  | 225.72196 | 249.33003 | 244.0694116 |
| Median | 266.42042 | 248.28348 | 255.7420166 |  | 267.40859 | 280.23509 | 276.9759947 |
| Q3 | 304.41464 | 282.19752 | 285.9553339 |  | 299.1465 | 308.30629 | 306.6991126 |
| Maximum | 339.73034 | 337.6174 | 322.3424258 |  | 345.91167 | 346.85004 | 344.9781486 |

**Table 3.6d The distribution of literacy skill by gender, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 139.23634 | 162.12564 | 182.3176461 |  | 146.22428 | 166.38257 | 189.528642 |
| Q1 | 224.70593 | 228.11555 | 234.115988 |  | 225.9994 | 232.30178 | 240.3508808 |
| Median | 270.65646 | 267.66354 | 271.1023175 |  | 263.99844 | 269.68703 | 272.5663834 |
| Q3 | 306.21907 | 293.8623 | 302.3457489 |  | 298.89638 | 301.68738 | 300.0563871 |
| Maximum | 347.27744 | 346.96144 | 343.6417435 |  | 337.61419 | 343.07996 | 338.5036491 |

**Table 3.6e The distribution of literacy skill by immigrant status, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 141.39105 | 166.06817 | 184.9828836 |  | #N/A | 229.24673 | 201.418448 |
| Q1 | 225.66894 | 230.4379 | 236.5949591 |  | #N/A | 229.24673 | 257.0696829 |
| Median | 268.26019 | 269.35281 | 271.2187589 |  | #N/A | 260.33174 | 281.0806069 |
| Q3 | 302.64824 | 297.46472 | 301.2092109 |  | #N/A | 290.28772 | 303.1625023 |
| Maximum | 345.91167 | 343.7184 | 341.2438425 |  | #N/A | 290.28772 | 339.8537738 |

**Table 3.6f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, New Brunswick, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 165.40457 | 186.2641308 |  | #N/A | #N/A | 175.5096363 |
| Q1 | #N/A | 230.4379 | 237.9463905 |  | #N/A | #N/A | 222.2297537 |
| Median | #N/A | 268.62601 | 272.1613697 |  | #N/A | #N/A | 254.1666267 |
| Q3 | #N/A | 296.97572 | 301.4042058 |  | #N/A | #N/A | 278.3813073 |
| Maximum | #N/A | 343.7184 | 341.188358 |  | #N/A | #N/A | 326.6519442 |

**Quebec**

**Table 3.7a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 122.21291 | 126.66854 | 148.444198 |  | 129.7568 | 186.3234 | 173.0576349 |  | 170.47186 | 206.53311 | 191.1356523 |  | 258.77637 | 237.46601 | 218.602884 |  | #N/A | 215.69183 | 248.2157211 |
| Q1 | 229.03838 | 178.54599 | 198.6996842 |  | 221.15974 | 240.92115 | 230.920346 |  | 232.44853 | 256.65112 | 238.7186132 |  | 258.77637 | 277.57049 | 262.2984229 |  | #N/A | 287.69917 | 285.6009195 |
| Median | 283.98909 | 220.51703 | 230.7211827 |  | 279.87945 | 268.98379 | 263.5023662 |  | 286.4823 | 282.89433 | 268.4147801 |  | 283.87233 | 304.01455 | 290.9423758 |  | #N/A | 314.73293 | 313.9524268 |
| Q3 | 309.2543 | 255.37157 | 260.4638474 |  | 311.43311 | 294.53929 | 293.6743583 |  | 304.0831 | 310.59222 | 296.1272018 |  | 312.21455 | 325.76891 | 317.3020112 |  | #N/A | 341.82988 | 339.4830707 |
| Maximum | 358.80832 | 301.39065 | 301.6992989 |  | 360.71612 | 334.11674 | 331.3560823 |  | 342.01948 | 347.75948 | 333.3477521 |  | 312.21455 | 363.30949 | 353.206049 |  | #N/A | 382.43139 | 376.9350101 |

**Table 3.7b The distribution of literacy skill by age group, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 160.03252 | 210.98392 | 189.8887922 |  | 129.7568 | 191.32374 | 200.610567 |  | 160.93554 | 183.99088 | 188.8756929 |  | 204.65262 | 182.38248 | 171.3827588 |
| Q1 | 240.71977 | 265.13873 | 247.5573976 |  | 254.82526 | 256.57024 | 254.0936174 |  | 217.12884 | 244.05761 | 245.7879045 |  | 204.65262 | 241.92807 | 225.0359475 |
| Median | 279.83178 | 290.81742 | 278.342941 |  | 286.56585 | 288.60326 | 287.751628 |  | 275.69857 | 274.73236 | 281.1161208 |  | 241.88469 | 270.51881 | 261.2722855 |
| Q3 | 305.07235 | 318.49711 | 305.6832938 |  | 304.77188 | 315.05536 | 317.8323309 |  | 311.43311 | 304.89132 | 310.3747069 |  | 304.11042 | 298.85032 | 293.2789386 |
| Maximum | 342.01948 | 356.80733 | 339.4974807 |  | 336.69457 | 349.51088 | 357.0192452 |  | 343.31884 | 348.47397 | 349.7320018 |  | 304.11042 | 340.32753 | 337.2605659 |

**Table 3.7c The distribution of literacy skill by employment status, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 135.30238 | 139.79604 | 159.4295965 |  | 137.13359 | 195.55068 | 192.7657091 |
| Q1 | 227.12523 | 198.46058 | 220.0106791 |  | 237.93412 | 250.22555 | 244.1635963 |
| Median | 279.36367 | 244.07421 | 255.7411534 |  | 280.4595 | 279.8832 | 277.7103832 |
| Q3 | 309.73794 | 283.99123 | 287.8727478 |  | 304.77188 | 308.8992 | 307.6285101 |
| Maximum | 360.71612 | 329.90373 | 328.9271891 |  | 342.01948 | 348.47397 | 347.5086287 |

**Table 3.7d The distribution of literacy skill by gender, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 175.05657 | 168.49443 | 181.7107641 |  | 112.50359 | 158.57624 | 182.8441263 |
| Q1 | 241.88469 | 235.48269 | 237.516694 |  | 209.59994 | 225.96512 | 237.3548397 |
| Median | 283.87233 | 271.73676 | 273.1066021 |  | 278.72202 | 268.36089 | 271.0327934 |
| Q3 | 311.43311 | 302.16084 | 305.7657073 |  | 309.2543 | 300.09986 | 300.7144447 |
| Maximum | 360.71612 | 343.6718 | 347.1529697 |  | 336.69457 | 341.23001 | 339.8478044 |

**Table 3.7e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 132.95539 | 164.03451 | 189.0863307 |  | 254.82526 | 138.90106 | 146.7263178 |
| Q1 | 229.89802 | 234.7034 | 241.0502842 |  | 254.82526 | 206.59417 | 217.6532106 |
| Median | 280.1901 | 270.53702 | 274.5321921 |  | 283.42243 | 257.15833 | 258.958868 |
| Q3 | 309.2543 | 301.97017 | 304.9494181 |  | 311.43311 | 291.443 | 291.4446866 |
| Maximum | 354.02544 | 343.99744 | 344.5064994 |  | 311.43311 | 331.47196 | 335.30954 |

**Table 3.7f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Quebec, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 160.83913 | 182.5509327 |  | #N/A | #N/A | 170.4622233 |
| Q1 | #N/A | 230.12618 | 237.7191013 |  | #N/A | #N/A | 216.2246779 |
| Median | #N/A | 269.72452 | 272.3048931 |  | #N/A | #N/A | 251.7707993 |
| Q3 | #N/A | 301.01467 | 303.2166208 |  | #N/A | #N/A | 291.5748865 |
| Maximum | #N/A | 342.15017 | 343.8783848 |  | #N/A | #N/A | 340.12163 |

**Ontario**

**Table 3.8a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 131.3502 | 117.73906 | 157.6568014 |  | 150.67617 | 167.80565 | 161.8974642 |  | 125.64662 | 193.69965 | 202.2972544 |  | 104.99452 | 220.99692 | 225.2093728 |  | 210.28604 | 226.362 | 238.9430995 |
| Q1 | 233.79503 | 178.34728 | 220.5223106 |  | 227.6378 | 245.42446 | 231.9722915 |  | 197.4076 | 257.65536 | 248.3628615 |  | 207.53842 | 277.11523 | 269.6644731 |  | 210.28604 | 277.78901 | 294.6528139 |
| Median | 269.49475 | 231.99756 | 254.1796272 |  | 267.75727 | 280.16546 | 266.852746 |  | 256.30566 | 289.97653 | 275.8652016 |  | 258.78708 | 304.21272 | 299.2791096 |  | 243.65859 | 317.23577 | 317.7770752 |
| Q3 | 302.73822 | 278.27373 | 283.0853042 |  | 311.17174 | 307.45148 | 296.8250625 |  | 298.79461 | 315.79662 | 300.5515396 |  | 309.00203 | 332.33588 | 325.9202595 |  | 279.05356 | 335.93724 | 342.5728328 |
| Maximum | 345.27217 | 323.43799 | 322.2675067 |  | 345.84311 | 343.53683 | 336.5309419 |  | 327.45498 | 345.02847 | 337.6934225 |  | 389.4911 | 360.04663 | 359.2039677 |  | 279.05356 | 363.05454 | 381.0760618 |

**Table 3.8b The distribution of literacy skill by age group, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 122.84759 | 209.12968 | 201.1189859 |  | 137.9402 | 211.0182 | 203.8613071 |  | 140.69799 | 163.88294 | 189.5356192 |  | 130.26669 | 164.70561 | 174.6907416 |  | 154.3975 | 122.25629 | 160.8065291 |
| Q1 | 212.91582 | 259.90755 | 251.9409393 |  | 210.28604 | 271.76354 | 254.5034032 |  | 219.47422 | 248.63001 | 250.617247 |  | 232.3548 | 248.78319 | 239.7723129 |  | 207.53842 | 212.81353 | 230.3753464 |
| Median | 275.86782 | 290.24112 | 281.2970444 |  | 269.18839 | 296.41442 | 287.1790082 |  | 243.65859 | 284.02122 | 284.9054612 |  | 258.78708 | 284.4722 | 274.187989 |  | 238.54203 | 263.80081 | 268.3122548 |
| Q3 | 306.70003 | 312.78228 | 309.4338139 |  | 309.33571 | 323.63134 | 319.7941337 |  | 290.75369 | 319.24426 | 313.6402911 |  | 293.49862 | 309.32178 | 306.3225276 |  | 292.88376 | 299.94936 | 299.9096874 |
| Maximum | 359.05738 | 360.04663 | 346.0283198 |  | 350.10647 | 352.58093 | 359.411163 |  | 340.09347 | 354.08864 | 352.3830814 |  | 337.37103 | 347.02678 | 348.8417663 |  | 320.95229 | 338.46526 | 338.863109 |

**Table 3.8c The distribution of literacy skill by employment status, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 128.06324 | 121.02442 | 148.3770117 |  | 140.69799 | 179.80732 | 199.0020571 |
| Q1 | 230.32596 | 201.34692 | 228.8936375 |  | 212.64374 | 258.40841 | 251.2548619 |
| Median | 269.49475 | 254.97202 | 266.1646607 |  | 257.09352 | 290.40394 | 283.8021865 |
| Q3 | 306.79001 | 293.24957 | 298.6471202 |  | 298.31043 | 317.12865 | 313.6225705 |
| Maximum | 340.09347 | 343.11585 | 341.2425023 |  | 344.24382 | 352.10157 | 352.4497188 |

**Table 3.8d The distribution of literacy skill by gender, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 126.33433 | 149.66496 | 189.7611434 |  | 149.23381 | 148.96012 | 182.4448787 |
| Q1 | 210.28604 | 242.40208 | 247.3105481 |  | 233.10196 | 233.93803 | 243.9275145 |
| Median | 256.78609 | 281.55533 | 280.8231625 |  | 264.47459 | 279.58808 | 278.4686473 |
| Q3 | 298.79461 | 310.04323 | 311.8603445 |  | 301.15606 | 312.18455 | 309.0993035 |
| Maximum | 340.09347 | 343.59575 | 351.1884029 |  | 342.65256 | 351.43368 | 348.7930295 |

**Table 3.8e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 134.9687 | 184.65823 | 208.3778738 |  | 146.30569 | 119.45351 | 154.5626396 |
| Q1 | 212.51359 | 258.90063 | 257.4728773 |  | 233.10196 | 192.80306 | 226.1113862 |
| Median | 267.16383 | 291.53566 | 287.7381958 |  | 258.78708 | 251.94107 | 261.6107546 |
| Q3 | 304.17041 | 318.6053 | 316.7101508 |  | 298.79461 | 286.72492 | 294.6086053 |
| Maximum | 347.19978 | 353.1492 | 353.5271014 |  | 337.37103 | 332.46442 | 337.5431307 |

**Table 3.8f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Ontario, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 149.13633 | 186.6047231 |  | #N/A | #N/A | 180.773026 |
| Q1 | #N/A | 237.49493 | 245.6214013 |  | #N/A | #N/A | 240.7154292 |
| Median | #N/A | 280.60143 | 279.8345711 |  | #N/A | #N/A | 273.7816155 |
| Q3 | #N/A | 311.18352 | 310.6654183 |  | #N/A | #N/A | 300.3549023 |
| Maximum | #N/A | 348.97689 | 350.2044905 |  | #N/A | #N/A | 340.7695626 |

**Manitoba**

**Table 3.9a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 141.90737 | 133.15088 | 155.7779369 |  | 178.59527 | 192.42279 | 163.0518295 |  | #N/A | 205.82451 | 205.2454601 |  | #N/A | 248.05585 | 228.8258502 |  | #N/A | 279.5613 | 230.0106335 |
| Q1 | 211.95603 | 197.09159 | 214.2377871 |  | 178.59527 | 254.22379 | 235.7718727 |  | #N/A | 262.7114 | 249.929424 |  | #N/A | 290.16292 | 272.6694687 |  | #N/A | 279.5613 | 287.6393959 |
| Median | 253.4686 | 239.11565 | 247.3415438 |  | 232.84862 | 287.73774 | 269.9386575 |  | #N/A | 293.84944 | 278.4609287 |  | #N/A | 315.95248 | 301.0455919 |  | #N/A | 308.10598 | 315.2061216 |
| Q3 | 284.80534 | 279.44401 | 276.483106 |  | 270.10104 | 311.31796 | 302.7911843 |  | #N/A | 315.77359 | 305.2521048 |  | #N/A | 337.49529 | 326.7963342 |  | #N/A | 330.03495 | 335.6476433 |
| Maximum | 321.08726 | 317.28398 | 314.8421632 |  | 270.10104 | 347.06428 | 339.7487995 |  | #N/A | 347.20407 | 334.1396162 |  | #N/A | 374.15373 | 357.7677018 |  | #N/A | 330.03495 | 363.882066 |

**Table 3.9b The distribution of literacy skill by age group, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 178.7056 | 201.49421 | 204.4894402 |  | 199.44447 | 193.07515 | 188.4721861 |  | #N/A | 181.18649 | 178.8509121 |  | #N/A | 194.02798 | 171.1167948 |  | #N/A | 171.47825 | 168.1590578 |
| Q1 | 178.7056 | 262.46289 | 250.8432399 |  | 199.44447 | 268.68599 | 251.2321694 |  | #N/A | 254.22379 | 249.387886 |  | #N/A | 254.08346 | 233.8836198 |  | #N/A | 238.06374 | 233.7617398 |
| Median | 221.66374 | 290.27968 | 278.1764957 |  | 253.4686 | 294.75514 | 288.5420843 |  | #N/A | 291.57958 | 282.329217 |  | #N/A | 292.20355 | 274.1261047 |  | #N/A | 280.12422 | 270.4486761 |
| Q3 | 279.89016 | 318.08737 | 306.3091342 |  | 271.91993 | 323.99716 | 318.5887683 |  | #N/A | 314.98841 | 312.80074 |  | #N/A | 311.51184 | 310.1822507 |  | #N/A | 306.65183 | 298.7652663 |
| Maximum | 279.89016 | 354.26324 | 342.8966446 |  | 271.91993 | 363.51087 | 354.3961776 |  | #N/A | 346.88378 | 346.8465852 |  | #N/A | 349.39894 | 345.1920828 |  | #N/A | 344.60802 | 334.3114549 |

**Table 3.9c The distribution of literacy skill by employment status, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 134.96067 | 134.56861 | 151.6089936 |  | 138.8866 | 201.49421 | 189.9985207 |
| Q1 | 175.17226 | 202.43418 | 235.4853305 |  | 205.22786 | 260.61561 | 247.3043303 |
| Median | 256.44866 | 252.93514 | 267.3094179 |  | 256.81608 | 292.57311 | 281.7385291 |
| Q3 | 303.04672 | 292.23461 | 295.7338228 |  | 277.676 | 316.49022 | 312.7595347 |
| Maximum | 332.01291 | 336.22432 | 333.60108 |  | 313.43678 | 353.38058 | 347.9036797 |

**Table 3.9d The distribution of literacy skill by gender, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 134.96067 | 166.9021 | 181.328885 |  | 141.90737 | 161.18781 | 184.4596807 |
| Q1 | 198.05031 | 244.43949 | 240.8328178 |  | 208.87742 | 240.50981 | 248.927313 |
| Median | 263.89133 | 284.60824 | 275.5433049 |  | 253.4686 | 286.16844 | 280.7344321 |
| Q3 | 289.24759 | 307.47451 | 309.0053453 |  | 279.79911 | 313.78653 | 310.6541612 |
| Maximum | 321.08726 | 347.02625 | 347.6854128 |  | 332.01291 | 353.19526 | 344.4118498 |

**Table 3.9e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 141.90737 | 181.18649 | 198.3831057 |  | #N/A | 117.50126 | 143.9992775 |
| Q1 | 199.44447 | 250.77936 | 251.3810502 |  | #N/A | 189.22259 | 216.0508428 |
| Median | 256.44866 | 289.77033 | 283.176766 |  | #N/A | 244.49627 | 254.2196099 |
| Q3 | 284.80534 | 313.59264 | 312.0852717 |  | #N/A | 282.60671 | 296.5561084 |
| Maximum | 329.63218 | 352.99495 | 347.2942187 |  | #N/A | 330.03495 | 341.159009 |

**Table 3.9f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Manitoba, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 165.22032 | 185.2838652 |  | #N/A | 144.45574 | 168.2466886 |
| Q1 | #N/A | 243.3292 | 247.0906615 |  | #N/A | 219.42869 | 229.4297322 |
| Median | #N/A | 285.34201 | 280.9034309 |  | #N/A | 256.41653 | 263.7087836 |
| Q3 | #N/A | 310.75558 | 311.8046603 |  | #N/A | 293.91693 | 292.6160112 |
| Maximum | #N/A | 349.32128 | 347.1266995 |  | #N/A | 335.5109 | 332.3957064 |

**Saskatchewan**

**Table 3.10a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 123.68794 | 145.31163 | 155.4644567 |  | 169.65668 | 179.35581 | 182.4678712 |  | 199.159 | 231.37359 | 205.6247998 |  | #N/A | 269.16321 | 221.0957832 |  | #N/A | #N/A | 270.1462187 |
| Q1 | 174.65327 | 211.41936 | 206.170242 |  | 221.4104 | 260.90215 | 233.6184491 |  | 199.159 | 268.2543 | 246.4062184 |  | #N/A | 309.35124 | 272.4925497 |  | #N/A | #N/A | 298.4018929 |
| Median | 241.01113 | 252.41829 | 239.1762697 |  | 262.60964 | 287.76237 | 265.9542049 |  | 255.31534 | 296.57188 | 277.1614907 |  | #N/A | 329.50471 | 298.6471491 |  | #N/A | #N/A | 323.3845115 |
| Q3 | 284.56379 | 277.26841 | 271.4963504 |  | 296.69668 | 318.60101 | 294.0135278 |  | 288.35742 | 320.67699 | 301.2346881 |  | #N/A | 349.73209 | 321.0902085 |  | #N/A | #N/A | 345.0548594 |
| Maximum | 324.46206 | 324.18301 | 310.5439735 |  | 345.62298 | 344.48269 | 334.6800224 |  | 288.35742 | 350.03738 | 331.7920081 |  | #N/A | 385.29577 | 356.7450511 |  | #N/A | #N/A | 364.6813758 |

**Table 3.10b The distribution of literacy skill by age group, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 125.30598 | 247.07892 | 189.1018598 |  | 194.71729 | 208.68085 | 201.6781184 |  | 220.23691 | 236.20254 | 180.6732169 |  | #N/A | 219.67132 | 179.4251705 |  | #N/A | 218.26912 | 179.0159415 |
| Q1 | 181.36163 | 272.06562 | 241.4749082 |  | 194.71729 | 270.48828 | 252.5699057 |  | 220.23691 | 278.95233 | 236.5607106 |  | #N/A | 263.64549 | 237.2084074 |  | #N/A | 253.99187 | 234.2030684 |
| Median | 250.34981 | 292.83073 | 272.6342808 |  | 242.28478 | 310.61579 | 284.4366542 |  | 261.54862 | 298.02496 | 280.2550854 |  | #N/A | 300.0297 | 275.5856042 |  | #N/A | 276.36057 | 267.6864706 |
| Q3 | 294.32934 | 324.35547 | 299.1874018 |  | 284.38008 | 328.88609 | 311.5435297 |  | 304.37233 | 324.92696 | 308.3218922 |  | #N/A | 321.65178 | 304.4085037 |  | #N/A | 302.70715 | 297.7192806 |
| Maximum | 331.02741 | 348.41934 | 334.2844675 |  | 284.38008 | 355.48708 | 347.349447 |  | 304.37233 | 365.44491 | 347.1950582 |  | #N/A | 357.64715 | 348.655595 |  | #N/A | 374.79323 | 336.0785522 |

**Table 3.10c The distribution of literacy skill by employment status, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 117.7878 | 151.79825 | 169.3472492 |  | 151.1175 | 233.30228 | 191.7761925 |
| Q1 | 181.58551 | 220.0457 | 224.5717008 |  | 213.11025 | 267.53874 | 245.0001649 |
| Median | 245.64887 | 262.59143 | 261.4453952 |  | 260.28943 | 296.68543 | 278.8156124 |
| Q3 | 286.95362 | 307.78783 | 292.9328475 |  | 295.66994 | 328.04949 | 306.9725948 |
| Maximum | 340.1556 | 337.34371 | 330.3152094 |  | 331.22291 | 364.50548 | 346.7922578 |

**Table 3.10d The distribution of literacy skill by gender, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 129.77073 | 169.43976 | 187.4141246 |  | 123.68794 | 184.38401 | 185.4994934 |
| Q1 | 221.38362 | 252.09532 | 239.403851 |  | 194.71729 | 257.35275 | 242.1317452 |
| Median | 253.17884 | 283.22747 | 273.996321 |  | 257.13208 | 292.01502 | 278.0246849 |
| Q3 | 286.43784 | 315.76127 | 303.121605 |  | 296.69668 | 322.14988 | 306.5282285 |
| Maximum | 326.54767 | 352.60075 | 341.3831993 |  | 348.339 | 364.88146 | 346.4765852 |

**Table 3.10e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 126.93956 | 179.09926 | 192.6178893 |  | #N/A | #N/A | 143.9701999 |
| Q1 | 209.56298 | 257.86746 | 244.8597267 |  | #N/A | #N/A | 204.1403121 |
| Median | 253.92332 | 289.37399 | 278.1014897 |  | #N/A | #N/A | 244.0158262 |
| Q3 | 293.96085 | 320.72626 | 305.9626419 |  | #N/A | #N/A | 288.9091034 |
| Maximum | 331.22291 | 357.2101 | 345.048764 |  | #N/A | #N/A | 328.9641467 |

**Table 3.10f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Saskatchewan, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 179.09926 | 190.656932 |  | #N/A | 152.41686 | 165.4505046 |
| Q1 | #N/A | 256.5772 | 244.3728921 |  | #N/A | 227.22431 | 213.4053863 |
| Median | #N/A | 288.18925 | 278.3833181 |  | #N/A | 258.40681 | 249.6444815 |
| Q3 | #N/A | 320.67699 | 306.5608295 |  | #N/A | 295.34162 | 282.1042719 |
| Maximum | #N/A | 357.2101 | 345.089103 |  | #N/A | 336.93184 | 328.5648794 |

**Alberta**

**Table 3.11a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 151.48653 | 127.3209 | 172.6868477 |  | 144.01066 | 215.69236 | 176.3003548 |  | 234.18548 | 212.41879 | 199.377452 |  | 231.45125 | 257.73784 | 223.0356347 |  | #N/A | 298.5402 | 248.3712949 |
| Q1 | 197.66843 | 201.61686 | 218.4113248 |  | 224.96731 | 261.25458 | 233.0729058 |  | 234.18548 | 267.89974 | 249.3167603 |  | 231.45125 | 297.29708 | 274.7056434 |  | #N/A | 298.5402 | 289.6783707 |
| Median | 272.51391 | 253.8087 | 249.3224703 |  | 278.72149 | 286.85882 | 269.0879456 |  | 266.74606 | 298.95744 | 280.5288249 |  | 258.94026 | 322.20183 | 305.0192084 |  | #N/A | 320.81785 | 312.3312665 |
| Q3 | 296.47601 | 289.58876 | 282.7186843 |  | 303.4993 | 314.84808 | 299.1544173 |  | 306.29673 | 323.28642 | 301.9447272 |  | 306.99408 | 343.93746 | 329.1086839 |  | #N/A | 346.78309 | 332.1275418 |
| Maximum | 344.93367 | 328.39602 | 318.809848 |  | 344.49662 | 347.83928 | 341.4806792 |  | 306.29673 | 350.6426 | 337.0420274 |  | 306.99408 | 380.17117 | 363.9463386 |  | #N/A | 346.78309 | 363.0822659 |

**Table 3.11b The distribution of literacy skill by age group, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 144.83066 | 221.85977 | 202.1799382 |  | 190.77743 | 236.93309 | 196.7586881 |  | 250.18163 | 193.13299 | 182.7608157 |  | 232.09611 | 196.96626 | 176.5413956 |  | 208.28612 | 162.82299 | 188.7530974 |
| Q1 | 222.58336 | 266.60252 | 249.8383837 |  | 190.77743 | 274.49187 | 252.388679 |  | 250.18163 | 265.79377 | 245.6252497 |  | 232.09611 | 261.59522 | 243.4167021 |  | 208.28612 | 237.64169 | 233.2845543 |
| Median | 281.51409 | 296.09038 | 283.6439198 |  | 266.74606 | 304.45909 | 293.6415114 |  | 278.98661 | 297.36296 | 284.2371217 |  | 277.56245 | 297.76412 | 278.3955809 |  | 265.51097 | 280.98599 | 266.4471096 |
| Q3 | 306.58917 | 323.70365 | 311.1473443 |  | 306.99408 | 329.32635 | 321.9763849 |  | 295.5671 | 320.96353 | 314.7384691 |  | 309.34964 | 326.15187 | 307.7991169 |  | 312.88137 | 308.49375 | 298.9566159 |
| Maximum | 349.71281 | 353.45931 | 348.9729497 |  | 306.99408 | 363.42143 | 362.9890996 |  | 295.5671 | 359.12647 | 350.161567 |  | 309.34964 | 361.35348 | 345.6668208 |  | 312.88137 | 347.03482 | 341.9498174 |

**Table 3.11c The distribution of literacy skill by employment status, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 144.8253 | 146.81023 | 178.1132742 |  | 144.01066 | 206.30816 | 193.8047201 |
| Q1 | 220.46025 | 221.85977 | 232.1555252 |  | 229.72127 | 266.60252 | 248.1386614 |
| Median | 270.30564 | 268.57138 | 268.9612063 |  | 277.54049 | 297.84553 | 284.7886877 |
| Q3 | 300.28893 | 308.20988 | 300.300914 |  | 309.34964 | 325.12566 | 314.1627975 |
| Maximum | 341.14646 | 354.62906 | 345.0825188 |  | 362.85905 | 355.23053 | 352.2411043 |

**Table 3.11d The distribution of literacy skill by gender, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 144.83066 | 171.22544 | 191.7045773 |  | 137.92359 | 177.79241 | 190.3262626 |
| Q1 | 220.62682 | 257.51129 | 245.8629036 |  | 232.09611 | 255.51351 | 244.12201 |
| Median | 274.37458 | 291.75365 | 283.5217049 |  | 272.51391 | 291.35034 | 280.3330352 |
| Q3 | 306.29673 | 319.38031 | 314.847764 |  | 306.89231 | 321.96135 | 309.621038 |
| Maximum | 362.85905 | 355.91663 | 355.3035108 |  | 349.71281 | 354.02276 | 346.8243712 |

**Table 3.11e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 140.32575 | 206.26745 | 204.2355025 |  | 249.2588 | 113.34127 | 168.5563746 |
| Q1 | 225.59717 | 263.56943 | 254.7220603 |  | 249.2588 | 206.712 | 219.3304002 |
| Median | 270.30564 | 296.23981 | 287.4341471 |  | 280.53395 | 265.37011 | 254.7805362 |
| Q3 | 303.4993 | 324.10481 | 315.7417639 |  | 310.14982 | 296.52422 | 295.7876801 |
| Maximum | 354.21665 | 358.0451 | 354.7825867 |  | 310.14982 | 341.3848 | 338.3894114 |

**Table 3.11f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Alberta, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 175.063 | 191.769043 |  | #N/A | #N/A | 171.8248469 |
| Q1 | #N/A | 256.43474 | 245.8338787 |  | #N/A | #N/A | 232.1492719 |
| Median | #N/A | 291.75365 | 282.6418337 |  | #N/A | #N/A | 270.4447058 |
| Q3 | #N/A | 320.19442 | 312.6023948 |  | #N/A | #N/A | 304.2576283 |
| Maximum | #N/A | 354.62906 | 351.2831392 |  | #N/A | #N/A | 347.3028393 |

**British Columbia**

**Table 3.12a The distribution of literacy skill by educational attainment, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 153.79014 | 118.10059 | 147.4585365 |  | 175.62163 | 178.09662 | 154.5400855 |  | 240.64371 | 206.4683 | 205.922677 |  | #N/A | 232.17163 | 226.8158984 |  | #N/A | 299.35753 | 228.9908947 |
| Q1 | 206.44848 | 198.27794 | 211.8433271 |  | 233.97445 | 256.18568 | 228.7695372 |  | 240.64371 | 267.46215 | 255.1855074 |  | #N/A | 285.70193 | 274.5091842 |  | #N/A | 299.35753 | 282.12438 |
| Median | 265.63844 | 248.59037 | 249.3794237 |  | 283.4942 | 292.85376 | 267.0257595 |  | 279.13015 | 294.77281 | 286.5798367 |  | #N/A | 321.59875 | 301.4900544 |  | #N/A | 330.78907 | 314.1425356 |
| Q3 | 303.36755 | 287.69917 | 279.7336673 |  | 314.56582 | 313.78545 | 301.4283364 |  | 329.27601 | 321.99135 | 313.5875954 |  | #N/A | 345.3268 | 326.7695165 |  | #N/A | 347.08141 | 337.1846882 |
| Maximum | 342.81056 | 332.89504 | 313.0496016 |  | 365.95802 | 349.09847 | 340.356766 |  | 329.27601 | 357.92834 | 347.1867388 |  | #N/A | 376.70317 | 358.6979101 |  | #N/A | 347.08141 | 360.6987879 |

**Table 3.12b The distribution of literacy skill by age group, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 252.29349 | 198.12583 | 187.5608025 |  | 246.48976 | 196.38782 | 204.4638483 |  | 194.37397 | 184.40864 | 172.0932952 |  | 191.42069 | 186.37107 | 157.3849349 |  | #N/A | 152.21226 | 177.748267 |
| Q1 | 252.29349 | 261.28404 | 247.4861092 |  | 246.48976 | 273.82291 | 257.2628389 |  | 194.37397 | 266.13923 | 238.790554 |  | 191.42069 | 260.155 | 233.3364987 |  | #N/A | 235.26685 | 238.4792762 |
| Median | 281.19809 | 296.0486 | 283.4754403 |  | 283.4942 | 301.93643 | 290.6497499 |  | 248.47736 | 300.88344 | 285.9682979 |  | 261.11639 | 297.57881 | 272.1001249 |  | #N/A | 280.94315 | 273.5119125 |
| Q3 | 307.0321 | 322.92221 | 308.8215583 |  | 315.33387 | 336.72456 | 320.6757341 |  | 286.47962 | 328.45279 | 318.4231966 |  | 305.80237 | 326.40413 | 304.7078854 |  | #N/A | 305.34604 | 305.041944 |
| Maximum | 307.0321 | 355.3339 | 344.1870239 |  | 315.33387 | 375.72357 | 350.0343181 |  | 286.47962 | 363.03687 | 353.612803 |  | 305.80237 | 360.10447 | 342.4572347 |  | #N/A | 340.49838 | 346.6338126 |

**Table 3.12c The distribution of literacy skill by employment status, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 150.80364 | 145.17773 | 162.6065079 |  | 153.77782 | 208.48161 | 188.3866846 |
| Q1 | 222.22665 | 216.74053 | 228.1382245 |  | 216.02229 | 270.17067 | 248.1115248 |
| Median | 281.70744 | 269.81771 | 270.0256552 |  | 273.85398 | 301.89144 | 283.933521 |
| Q3 | 307.0321 | 301.83681 | 304.1148798 |  | 314.56582 | 328.93483 | 314.3330648 |
| Maximum | 344.13884 | 343.96317 | 340.4585343 |  | 365.95802 | 365.90821 | 351.1511399 |

**Table 3.12d The distribution of literacy skill by gender, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 150.80364 | 178.62794 | 174.9780184 |  | 164.76667 | 154.34073 | 185.8363907 |
| Q1 | 242.66345 | 254.95595 | 244.9859131 |  | 216.02229 | 248.2733 | 241.164768 |
| Median | 280.15903 | 288.24548 | 283.2688858 |  | 270.30618 | 292.57579 | 279.1827766 |
| Q3 | 306.08517 | 320.02035 | 312.3307893 |  | 315.92784 | 322.78617 | 311.5927416 |
| Maximum | 369.1941 | 361.11032 | 348.8801637 |  | 349.54195 | 358.42537 | 348.0547218 |

**Table 3.12e The distribution of literacy skill by immigrant status, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | 153.77782 | 203.11117 | 202.5436577 |  | 234.05586 | 131.39787 | 148.2270855 |
| Q1 | 216.02229 | 267.52589 | 256.1866621 |  | 234.05586 | 208.48161 | 219.6687516 |
| Median | 272.57176 | 299.66871 | 288.6780927 |  | 282.18413 | 265.14087 | 261.5676391 |
| Q3 | 306.58274 | 326.86582 | 317.9089891 |  | 323.08236 | 301.29585 | 297.050484 |
| Maximum | 352.07265 | 362.03048 | 353.2269202 |  | 323.08236 | 349.45518 | 335.2902748 |

**Table 3.12f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, British Columbia, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |  |
|  | IALS | IALSS | PIAAC |  | IALS | IALSS | PIAAC |
| Minimum | #N/A | 168.36964 | 181.4733126 |  | #N/A | #N/A | 177.486361 |
| Q1 | #N/A | 251.64756 | 243.2437723 |  | #N/A | #N/A | 235.694415 |
| Median | #N/A | 290.41198 | 281.546383 |  | #N/A | #N/A | 271.1818791 |
| Q3 | #N/A | 321.99135 | 312.2416942 |  | #N/A | #N/A | 297.9592828 |
| Maximum | #N/A | 358.61765 | 348.8494524 |  | #N/A | #N/A | 334.4827211 |

**Nunavut**

**Table 3.13a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  | |  | HS GRAD | | | |  |  | | SOME PSE | | |  | |  | Bach. Degree | | | |  | |  | Grad. Degree |
|  | IALSS | PIAAC |  | IALSS | | | PIAAC |  | IALSS | | | PIAAC | |  | IALSS | | PIAAC | | |  | IALSS | PIAAC | | | |
| Minimum | 108.60123 | 117.6049002 |  | 187.54992 | | | 164.7075046 |  | 229.23655 | | | 159.64505 | |  | 299.06777 | | 190.1504199 | | |  | 233.8093013 | | |
| Q1 | 162.91725 | 157.5153848 |  | 238.88909 | | | 218.6930618 |  | 229.23655 | | | 205.4862172 | |  | 299.06777 | | 244.0792861 | | |  | 273.3201151 | | |
| Median | 201.07323 | 188.5416393 |  | 279.25334 | | | 247.9485541 |  | 270.00785 | | | 234.2752366 | |  | 323.69669 | | 279.6881085 | | |  | 304.5864754 | | |
| Q3 | 233.93375 | 221.1743962 |  | 300.76829 | | | 275.1033333 |  | 301.48278 | | | 258.538916 | |  | 338.09891 | | 310.0112437 | | |  | 325.9813377 | | |
| Maximum | 278.22445 | 268.3189365 |  | 333.01823 | | | 318.5467917 |  | 301.48278 | | | 306.9159842 | |  | 338.09891 | | 345.7990788 | | |  | 352.8327165 | | |

**Table 3.13b The distribution of literacy skill by age group, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |
|  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC |
| Minimum | 116.23885 | 125.7558985 | #N/A |  | 137.66061 | 131.3603601 | #N/A |  | 118.24413 | 133.460276 | #N/A |  | 213.56711 | 130.2503224 |
| Q1 | 190.61086 | 172.9660034 | #N/A |  | 187.62598 | 181.8897764 | #N/A |  | 187.54992 | 176.9722501 | #N/A |  | 213.56711 | 178.2074537 |
| Median | 222.70548 | 207.6822186 | #N/A |  | 246.95894 | 227.023783 | #N/A |  | 233.71254 | 213.9896454 | #N/A |  | 265.22229 | 224.1528606 |
| Q3 | 266.57574 | 246.1133738 | #N/A |  | 299.06777 | 265.2701504 | #N/A |  | 281.8617 | 259.8469462 | #N/A |  | 293.45363 | 263.7135322 |
| Maximum | 320.91265 | 295.8000617 | #N/A |  | 332.96413 | 328.6266058 | #N/A |  | 338.09891 | 320.0355082 | #N/A |  | 293.45363 | 312.9233315 |

**Table 3.13c The distribution of literacy skill by employment status, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  | |
|  | IALSS | PIAAC |  | IALSS | PIAAC | |
| Minimum | 108.30558 | 123.4626568 |  | 137.83093 | 134.5190306 | |
| Q1 | 163.65263 | 164.5098299 |  | 213.62067 | 189.7135431 | |
| Median | 208.35735 | 197.9834428 |  | 259.77954 | 233.181495 | |
| Q3 | 244.81869 | 230.8320048 |  | 303.62892 | 271.4931228 | |
| Maximum | 291.54048 | 288.9713689 |  | 341.43032 | 326.2366089 | |

**Table 3.13d The distribution of literacy skill by gender, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  | |
|  | IALSS | PIAAC |  | IALSS | PIAAC | |
| Minimum | 120.01482 | 127.4019624 |  | 115.15855 | 129.6264082 | |
| Q1 | 190.61086 | 177.9638234 |  | 178.9493 | 175.658494 | |
| Median | 230.69445 | 219.1859462 |  | 232.47371 | 213.7459065 | |
| Q3 | 279.36474 | 257.5067476 |  | 282.37319 | 259.9190484 | |
| Maximum | 327.42605 | 314.8209443 |  | 327.33393 | 315.8646987 | |

**Table 3.13e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  | Immigrant |  |
|  | IALSS | PIAAC |  | IALSS | PIAAC |
| Minimum | 118.3791 | 128.2429483 |  | #N/A | 180.4786932 |
| Q1 | 182.8056 | 176.257876 |  | #N/A | 255.3252395 |
| Median | 228.85789 | 215.5806647 |  | #N/A | 281.3145602 |
| Q3 | 279.36474 | 255.9861331 |  | #N/A | 315.4214709 |
| Maximum | 327.42605 | 313.3754895 |  | #N/A | 345.921151 |

**Table 3.13f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Nunavut, 1994, 2003, 2011**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  | Aboriginal |  |
|  | IALSS | PIAAC |  | IALSS | PIAAC |
| Minimum | 118.77544 | 202.3572563 |  | #N/A | 126.204935 |
| Q1 | 187.31105 | 263.3882409 |  | #N/A | 170.8959592 |
| Median | 231.02491 | 296.4054461 |  | #N/A | 207.4150525 |
| Q3 | 279.83714 | 319.6804252 |  | #N/A | 242.9530681 |
| Maximum | 327.42605 | 350.7342139 |  | #N/A | 289.1030449 |

**Northwest Territories**

**Table 3.14a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LT HS |  |  |  | HS GRAD | |  |  | SOME PSE | |  |  | Bach. Degree | |  |  | Grad. Degree | |
|  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC |
| Minimum | 130.51949 | 126.5907127 | #N/A |  | 192.22408 | 176.7776296 | #N/A |  | 216.37418 | 181.0139238 | #N/A |  | 241.17074 | 208.0747196 | #N/A |  | #N/A | 233.3283716 |
| Q1 | 189.25259 | 180.4967482 | #N/A |  | 257.78551 | 216.6278434 | #N/A |  | 265.55061 | 225.8900237 | #N/A |  | 300.77632 | 253.5237393 | #N/A |  | #N/A | 294.8453684 |
| Median | 237.82754 | 214.7765584 | #N/A |  | 291.01238 | 253.0561082 | #N/A |  | 292.30317 | 255.1412333 | #N/A |  | 320.62289 | 288.2083518 | #N/A |  | #N/A | 320.7949755 |
| Q3 | 279.79857 | 252.3087162 | #N/A |  | 312.90279 | 286.5805002 | #N/A |  | 315.29209 | 288.0365796 | #N/A |  | 348.95065 | 320.2803752 | #N/A |  | #N/A | 343.0298538 |
| Maximum | 305.53832 | 302.1969822 | #N/A |  | 338.16853 | 328.6268548 | #N/A |  | 344.82333 | 329.9966221 | #N/A |  | 375.80498 | 356.2098095 | #N/A |  | #N/A | 373.2239252 |

**Table 3.14b The distribution of literacy skill by age group, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 16-25 |  |  |  | 26-35 |  |  |  | 36-45 |  |  |  | 46-55 |  |  |  | 56-65 |  |  |
|  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC | #N/A |
| Minimum | 189.04424 | 158.9521339 | #N/A |  | 183.55329 | 185.4633233 | #N/A |  | 177.85186 | 138.3808644 | #N/A |  | 176.68211 | 136.2598254 | #N/A |  | 247.93748 | 162.8169374 | #N/A |
| Q1 | 248.69964 | 215.686028 | #N/A |  | 252.85534 | 226.1806302 | #N/A |  | 245.66601 | 210.8672027 | #N/A |  | 261.63753 | 203.952468 | #N/A |  | 247.93748 | 207.8355324 | #N/A |
| Median | 281.24897 | 251.8621346 | #N/A |  | 296.99715 | 265.7255148 | #N/A |  | 287.5717 | 264.2028102 | #N/A |  | 297.08499 | 248.1732905 | #N/A |  | 280.40273 | 240.2634765 | #N/A |
| Q3 | 306.51686 | 287.7595257 | #N/A |  | 325.05336 | 304.4008206 | #N/A |  | 316.78159 | 302.3260927 | #N/A |  | 320.99728 | 284.942902 | #N/A |  | 304.30323 | 284.6481782 | #N/A |
| Maximum | 334.48309 | 331.8902302 | #N/A |  | 358.48375 | 348.4650947 | #N/A |  | 364.36086 | 348.6807388 | #N/A |  | 350.33838 | 338.0882249 | #N/A |  | 304.30323 | 334.7872559 | #N/A |

**Table 3.14c The distribution of literacy skill by employment status, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Not Employed | |  |  | Employed |  |
|  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC |
| Minimum | 130.52699 | 142.8912952 | #N/A |  | 189.46843 | 167.6964833 |
| Q1 | 193.03283 | 194.8289904 | #N/A |  | 259.65475 | 226.2582918 |
| Median | 254.58103 | 226.3122979 | #N/A |  | 296.12519 | 264.1010871 |
| Q3 | 289.31239 | 266.9144044 | #N/A |  | 320.03749 | 302.4146906 |
| Maximum | 330.25669 | 316.637442 | #N/A |  | 358.23631 | 347.5112256 |

**Table 3.14d The distribution of literacy skill by gender, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Male |  |  |  | Female |  |
|  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC |
| Minimum | 174.8177 | 160.3054116 | #N/A |  | 157.46166 | 151.3002856 |
| Q1 | 240.31485 | 212.9846266 | #N/A |  | 244.65748 | 215.606549 |
| Median | 287.9809 | 254.4753366 | #N/A |  | 287.41156 | 254.5877136 |
| Q3 | 311.33992 | 295.7891046 | #N/A |  | 315.51061 | 292.823431 |
| Maximum | 349.34324 | 346.4001048 | #N/A |  | 362.87619 | 338.2641117 |

**Table 3.14e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Not Immigrant | |  |  | Immigrant |  |
|  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC |
| Minimum | 164.11913 | 154.8655949 | #N/A |  | 222.59782 | 171.9872806 |
| Q1 | 244.56857 | 213.6037951 | #N/A |  | 222.59782 | 219.3244221 |
| Median | 286.99861 | 252.9942336 | #N/A |  | 290.95186 | 272.692249 |
| Q3 | 314.45442 | 291.9861689 | #N/A |  | 310.46421 | 311.2516482 |
| Maximum | 354.3875 | 341.0531053 | #N/A |  | 310.46421 | 353.7571539 |

**Table 3.14f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Northwest Territories, 1994, 2003, 2011**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Not Aboriginal | |  |  | Aboriginal |  |
|  | IALSS | PIAAC | #N/A |  | IALSS | PIAAC |
| Minimum | 168.43659 | 195.8675997 | #N/A |  | #N/A | 138.9798401 |
| Q1 | 241.96128 | 247.1704425 | #N/A |  | #N/A | 194.893277 |
| Median | 287.5717 | 283.1671271 | #N/A |  | #N/A | 229.3053784 |
| Q3 | 314.32373 | 314.201405 | #N/A |  | #N/A | 263.6481239 |
| Maximum | 354.3875 | 354.3862358 | #N/A |  | #N/A | 315.3800878 |

**Yukon**

**Table 3.15a The distribution of literacy skill by educational attainment, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Table 3.15b The distribution of literacy skill by age group, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Table 3.15c The distribution of literacy skill by employment status, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Table 3.15d The distribution of literacy skill by gender, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Table 3.15e The distribution of literacy skill by immigrant status, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

**Table 3.15f The distribution of literacy skill by Aboriginal status, adults aged 16 to 65, Yukon, 1994, 2003, 2011**

Table 5.1a Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Canada, 2011

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G7 Occupations in travel and accommodati | 11724.70028 | 37097.92651 | 104385.7962 |
| G5 Occupations in food and beverage serv | 23613.51533 | 65097.99359 | 199924.7537 |
| G3 Cashiers | 34748.12305 | 96649.81976 | 248824.098 |
| G9 Sales and service occupations, n.e.c. | 175799.6448 | 408054.1352 | 862564.2345 |
| G4 Chefs and cooks | 39336.54585 | 81113.89132 | 165279.6003 |
| H0 Contractors and supervisors in trades | 25796.70157 | 59642.41678 | 59926.11545 |
| G8 Childcare and home support workers | 52390.15873 | 90555.8857 | 151826.2778 |
| D1 Nurse supervisors and registered nurs | 66166.57588 | 157047.2827 | 99315.78903 |
| I2 Primary production labourers | 38069.25732 | 61918.30808 | 61093.95154 |
| G0 Sales and service supervisors | 36780.98223 | 52536.24817 | 64014.36127 |
| H7 Transportation equipment operators an | 134104.6016 | 229949.3542 | 186279.1464 |
| J2 Assemblers in manufacturing | 55672.96287 | 78887.5438 | 76280.84078 |
| G6 Occupations in protective services | 88236.33901 | 111431.0331 | 122612.6436 |
| E1 Teachers and professors | 211163.795 | 323234.8499 | 233582.2391 |
| J3 Labourers in processing, manufacturin | 66704.93997 | 86823.60915 | 78065.1836 |
| H6 Heavy equipment and crane operators, | 38830.37564 | 52169.42883 | 42184.15029 |
| D3 Assisting occupations in support of h | 96583.17239 | 160096.5817 | 64449.68936 |
| B1 Finance and insurance administration | 87288.29018 | 112317.5576 | 58329.42435 |
| B0 Professional occupations in business | 168312.9393 | 203228.6081 | 124520.1719 |
| H3 Machinists, metal forming, shaping an | 74275.39507 | 68294.37359 | 63470.9649 |
| B5 Clerical occupations | 613073.604 | 511052.7527 | 567675.6435 |
| A3 Other managers, n.e.c. | 228505.1408 | 232916.7056 | 163921.3843 |
| B4 Clerical supervisors | 36261.77761 | 40804.97573 | 19591.12231 |
| H8 Trades helpers, construction and tran | 171028.8088 | 157634.3676 | 102283.1262 |
| F1 Technical occupations in art, culture | 149185.1329 | 142670.4413 | 72952.97291 |
| B2 Secretaries | 100450.9308 | 100515.6725 | 39798.35754 |
| I0 Occupations unique to agriculture, ex | 124411.2171 | 100139.5944 | 57066.00602 |
| E0 Judges, lawyers, psychologists, social | 207041.2914 | 165330.0712 | 92492.39946 |
| B3 Administrative and regulatory occupat | 232613.4731 | 179357.1124 | 89714.89924 |
| G1 Wholesale, technical, insurance, real | 174672.6376 | 133827.5326 | 60685.72681 |
| I1 Occupations unique to forestry operat | 60971.42887 | 42144.56143 | 24848.23562 |
| D0 Professional occupations in health | 108624.595 | 77666.93509 | 31134.81671 |
| F0 Professional occupations in art and c | 127922.1146 | 72767.80618 | 50945.51752 |
| A2 Managers in retail trade, food and ac | 273011.6546 | 180222.104 | 68484.68662 |
| D2 Technical and related occupations in | 148440.2578 | 96661.19863 | 32904.00987 |
| A1 Specialist managers | 237167.7727 | 127743.1309 | 76567.45029 |
| J1 Machine operators in manufacturing | 177110.1858 | 97115.15149 | 35077.87152 |
| C1 Technical occupations related to natu | 355979.3896 | 173122.3261 | 51898.17918 |
| E2 Paralegals, social services workers a | 300177.6424 | 133815.7754 | 47623.2682 |
| J0 Supervisors in manufacturing | 43727.2927 | 21570.8418 | 4415.657998 |
| H4 Mechanics | 237709.7929 | 115255.2361 | 25874.81248 |
| H1 Construction trades | 299422.5142 | 144426.2216 | 32360.57393 |
| H5 Other trades, n.e.c. | 90771.20803 | 25845.50331 | 25201.44819 |
| C0 Professional occupations in natural a | 497165.2546 | 149487.153 | 50566.57793 |
| H2 Stationary engineers, power station o | 168464.8705 | 35166.63333 | 14814.97632 |
| G2 Retail salespersons and sales clerks | 606783.9374 | 158119.9603 | 3242.378072 |

Table 5.1b Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Newfoundland and Labrador, 2011

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G5 Occupations in food and beverage serv | 287.6951197 | 1106.770633 | 2421.615478 |
| G7 Occupations in travel and accommodati | 178.0382572 | 764.9581131 | 1367.654327 |
| G3 Cashiers | 696.2959398 | 2282.690579 | 4924.087299 |
| G9 Sales and service occupations, n.e.c. | 2661.450077 | 7187.111406 | 11797.60347 |
| G4 Chefs and cooks | 656.39956 | 1461.026069 | 2426.09831 |
| H3 Machinists, metal forming, shaping an | 580.3031935 | 1503.435814 | 1273.252707 |
| D1 Nurse supervisors and registered nurs | 1410.730991 | 3318.968574 | 1910.623163 |
| H7 Transportation equipment operators an | 1998.08077 | 3664.152121 | 2842.796015 |
| H0 Contractors and supervisors in trades | 557.6408042 | 882.2333661 | 794.333057 |
| G8 Childcare and home support workers | 2573.069998 | 3234.508009 | 4281.322884 |
| J2 Assemblers in manufacturing | 178.0529877 | 334.4211409 | 172.3997715 |
| I2 Primary production labourers | 734.207551 | 1133.444908 | 783.5968102 |
| G6 Occupations in protective services | 1339.70972 | 1857.576943 | 1595.675404 |
| H6 Heavy equipment and crane operators, | 1271.941712 | 1849.616711 | 1383.615139 |
| G0 Sales and service supervisors | 698.1795736 | 902.5391967 | 848.2723846 |
| J3 Labourers in processing, manufacturin | 1285.357257 | 1761.550869 | 1128.593185 |
| E1 Teachers and professors | 3709.992187 | 5188.060902 | 2715.860255 |
| D3 Assisting occupations in support of h | 1507.683056 | 2289.405837 | 774.7141249 |
| B0 Professional occupations in business | 1554.773834 | 2021.72269 | 763.1294369 |
| B1 Finance and insurance administration | 877.704807 | 912.2114064 | 529.9494489 |
| H8 Trades helpers, construction and tran | 3749.384008 | 3966.302804 | 1792.01833 |
| B5 Clerical occupations | 9220.64649 | 6831.96383 | 6367.798225 |
| I0 Occupations unique to agriculture, ex | 752.3440662 | 644.5417326 | 431.4691042 |
| B4 Clerical supervisors | 588.1009226 | 588.2032552 | 170.7318375 |
| B2 Secretaries | 1278.807957 | 1172.605913 | 476.0626144 |
| F0 Professional occupations in art and c | 1040.858899 | 769.3762604 | 423.1306366 |
| A3 Other managers, n.e.c. | 3369.168504 | 2384.646843 | 1455.118466 |
| D0 Professional occupations in health | 1563.194982 | 1241.973685 | 405.4050329 |
| F1 Technical occupations in art, culture | 1884.336038 | 1425.97719 | 474.1230812 |
| E0 Judges, lawyers, psychologists, socia | 3148.971495 | 2182.319059 | 921.7455284 |
| G1 Wholesale, technical, insurance, real | 1554.520711 | 1073.029606 | 273.8579535 |
| A1 Specialist managers | 2239.458705 | 1189.230155 | 707.8233048 |
| B3 Administrative and regulatory occupat | 3511.720476 | 2208.121958 | 718.8674946 |
| D2 Technical and related occupations in | 2747.263316 | 1751.389629 | 384.4343298 |
| C1 Technical occupations related to natu | 6626.725185 | 3565.469057 | 926.7059989 |
| A2 Managers in retail trade, food and ac | 4425.00039 | 2206.175898 | 753.4327314 |
| J0 Supervisors in manufacturing | 389.3342165 | 214.5981126 | 20.6890448 |
| H5 Other trades, n.e.c. | 1313.013375 | 387.7592439 | 330.5134089 |
| E2 Paralegals, social services workers a | 3705.89474 | 1466.772489 | 375.3871784 |
| H4 Mechanics | 4094.627688 | 1709.785502 | 228.9783752 |
| I1 Occupations unique to forestry operat | 6917.031112 | 2277.791064 | 760.5359266 |
| J1 Machine operators in manufacturing | 4459.195072 | 1572.66651 | 323.7121743 |
| C0 Professional occupations in natural a | 4646.305757 | 1250.493056 | 565.0032271 |
| H1 Construction trades | 7371.09499 | 2453.277426 | 426.77112 |
| H2 Stationary engineers, power station o | 3744.256223 | 797.6937928 | 192.3307839 |
| G2 Retail salespersons and sales clerks | 8401.596627 | 1591.67111 | 48.23178569 |

Table 5.1c Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Nova Scotia, 2011

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G5 Occupations in food and beverage serv | 485.8593339 | 1611.837698 | 5122.770422 |
| G7 Occupations in travel and accommodati | 271.6592573 | 927.4896029 | 2585.265545 |
| G3 Cashiers | 1114.048908 | 3558.007826 | 8506.325985 |
| G4 Chefs and cooks | 797.2574292 | 2352.324692 | 5086.122551 |
| G9 Sales and service occupations, n.e.c. | 4044.944054 | 12395.22137 | 24865.60919 |
| H0 Contractors and supervisors in trades | 561.5800756 | 1657.316532 | 1311.961705 |
| G8 Childcare and home support workers | 1699.753955 | 3141.967091 | 4923.043973 |
| J2 Assemblers in manufacturing | 516.0614811 | 1256.644275 | 1089.472165 |
| D1 Nurse supervisors and registered nurs | 2160.779667 | 5090.330467 | 3421.016323 |
| G0 Sales and service supervisors | 1124.681994 | 2098.811298 | 2286.842224 |
| J3 Labourers in processing, manufacturin | 1295.642727 | 2366.751192 | 1901.758638 |
| H7 Transportation equipment operators an | 3135.093116 | 5554.044084 | 4684.936029 |
| I2 Primary production labourers | 1355.22512 | 2214.409599 | 1829.565657 |
| E1 Teachers and professors | 6161.59574 | 8649.428761 | 7344.833175 |
| D3 Assisting occupations in support of h | 2585.77192 | 4242.306527 | 2003.066573 |
| H3 Machinists, metal forming, shaping an | 1335.307035 | 1572.33312 | 1483.50906 |
| B0 Professional occupations in business | 3373.064229 | 4055.663236 | 2981.84678 |
| H6 Heavy equipment and crane operators, | 1530.207882 | 1791.009418 | 1328.549954 |
| B5 Clerical occupations | 15854.96075 | 14380.64899 | 17061.4494 |
| G6 Occupations in protective services | 4651.313074 | 4802.308985 | 3964.100805 |
| B1 Finance and insurance administration | 2339.775515 | 2575.70105 | 1584.253898 |
| B4 Clerical supervisors | 952.112904 | 1002.278834 | 639.3449635 |
| A3 Other managers, n.e.c. | 6350.919287 | 6341.044438 | 4471.167969 |
| H8 Trades helpers, construction and tran | 4626.5565 | 4355.137887 | 2942.624443 |
| B2 Secretaries | 2294.215637 | 2238.799765 | 1174.048781 |
| I0 Occupations unique to agriculture, ex | 2634.064692 | 2175.379529 | 1457.352655 |
| B3 Administrative and regulatory occupat | 5573.502659 | 4413.066174 | 2348.900537 |
| E0 Judges, lawyers, psychologists, socia | 5275.040607 | 3915.592462 | 2417.161023 |
| G1 Wholesale, technical, insurance, real | 3999.215013 | 3132.846628 | 1435.657254 |
| F1 Technical occupations in art, culture | 4056.603859 | 3002.657151 | 1555.468735 |
| F0 Professional occupations in art and c | 2731.962289 | 1693.483894 | 1335.877068 |
| D0 Professional occupations in health | 3181.891743 | 2365.709374 | 989.125624 |
| D2 Technical and related occupations in | 4306.504752 | 3104.523113 | 1301.110557 |
| A1 Specialist managers | 4761.710502 | 2978.333239 | 1778.253706 |
| A2 Managers in retail trade, food and ac | 8518.056111 | 4538.646118 | 1949.345621 |
| J1 Machine operators in manufacturing | 4848.914134 | 2764.448188 | 839.2958338 |
| J0 Supervisors in manufacturing | 1117.981461 | 608.7170826 | 153.8541275 |
| C1 Technical occupations related to natu | 9614.424573 | 4946.668169 | 1550.354298 |
| H5 Other trades, n.e.c. | 2147.62421 | 758.046703 | 652.7839999 |
| E2 Paralegals, social services workers a | 7788.674516 | 3327.586373 | 1514.793531 |
| H4 Mechanics | 6731.031433 | 3326.39924 | 671.6819345 |
| I1 Occupations unique to forestry operat | 6470.207211 | 2743.052286 | 1078.58731 |
| H1 Construction trades | 9825.842061 | 4082.27547 | 745.3936547 |
| C0 Professional occupations in natural a | 9221.407834 | 2848.119611 | 1263.740703 |
| H2 Stationary engineers, power station o | 5248.727095 | 972.4885037 | 491.1538284 |
| G2 Retail salespersons and sales clerks | 16082.45044 | 4129.164742 | 99.63396399 |

**Table 5.1d Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Prince Edward Island, 2011**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G5 Occupations in food and beverage serv | 35.28575023 | 393.6350387 | 929.9204994 |
| G7 Occupations in travel and accommodati | 30.71069309 | 179.285609 | 401.6721193 |
| G4 Chefs and cooks | 79.79730138 | 305.6699981 | 903.478181 |
| G9 Sales and service occupations, n.e.c. | 664.2282987 | 2171.70994 | 4516.58 |
| G3 Cashiers | 187.9573681 | 417.5539653 | 1321.202766 |
| G8 Childcare and home support workers | 159.3184525 | 353.7214675 | 678.4642951 |
| D1 Nurse supervisors and registered nurs | 267.6659271 | 1106.359397 | 501.0899881 |
| H0 Contractors and supervisors in trades | 94.02910379 | 312.2815725 | 153.9262436 |
| H7 Transportation equipment operators an | 498.202069 | 1238.569495 | 1019.808675 |
| H3 Machinists, metal forming, shaping an | 126.6778951 | 258.164272 | 277.0719628 |
| G0 Sales and service supervisors | 128.7210877 | 201.711782 | 316.2500512 |
| H6 Heavy equipment and crane operators, | 145.6028251 | 316.7875424 | 214.9830606 |
| B4 Clerical supervisors | 112.0379598 | 299.9543858 | 88.44904835 |
| G6 Occupations in protective services | 220.7529238 | 349.7912198 | 353.4464714 |
| J3 Labourers in processing, manufacturin | 265.4695732 | 461.340962 | 378.8919276 |
| E1 Teachers and professors | 853.7853215 | 1566.997773 | 915.7059012 |
| J2 Assemblers in manufacturing | 81.00343524 | 110.3160653 | 117.3733995 |
| D3 Assisting occupations in support of h | 397.214447 | 757.6967879 | 256.3796574 |
| I2 Primary production labourers | 445.8358921 | 547.0388906 | 565.5475973 |
| H8 Trades helpers, construction and tran | 657.8482742 | 1027.144401 | 528.8453638 |
| B2 Secretaries | 299.4854525 | 526.4032514 | 113.8666678 |
| B1 Finance and insurance administration | 340.4426385 | 533.5521658 | 169.5685549 |
| A3 Other managers, n.e.c. | 713.5814346 | 927.2188526 | 485.9836143 |
| B0 Professional occupations in business | 475.182485 | 588.8924227 | 264.7378668 |
| I0 Occupations unique to agriculture, ex | 966.4329663 | 1095.32444 | 566.6132252 |
| B5 Clerical occupations | 2985.278728 | 2209.924683 | 2422.206254 |
| A1 Specialist managers | 483.5187406 | 526.4024095 | 192.2990302 |
| E0 Judges, lawyers, psychologists, social | 781.7032132 | 779.5286859 | 354.9639431 |
| F1 Technical occupations in art, culture | 552.9405955 | 542.8290302 | 153.1397835 |
| F0 Professional occupations in art and c | 347.4487849 | 230.2738009 | 100.1453104 |
| A2 Managers in retail trade, food and ac | 1120.162016 | 734.4805861 | 306.3101876 |
| J0 Supervisors in manufacturing | 101.2978421 | 89.60221206 | 4.230517984 |
| B3 Administrative and regulatory occupant | 1334.833267 | 814.1169527 | 344.777525 |
| I1 Occupations unique to forestry operat | 1781.440898 | 1169.506999 | 364.8887965 |
| H4 Mechanics | 892.1701792 | 633.8001836 | 130.3605785 |
| H1 Construction trades | 1197.268661 | 874.0686395 | 109.3609899 |
| G1 Wholesale, technical, insurance, real | 549.4999589 | 338.9872287 | 94.74439781 |
| D2 Technical and related occupations in | 653.0122046 | 362.3199132 | 131.7898612 |
| C1 Technical occupations related to natu | 1197.725524 | 636.0058277 | 217.4718463 |
| J1 Machine operators in manufacturing | 1162.412075 | 721.2901614 | 75.54431319 |
| H5 Other trades, n.e.c. | 322.0157927 | 103.090465 | 72.89589156 |
| E2 Paralegals, social services workers a | 1551.437658 | 540.2766205 | 233.4677814 |
| C0 Professional occupations in natural a | 1147.393134 | 438.0279128 | 132.024193 |
| D0 Professional occupations in health | 509.7166933 | 168.1463633 | 45.93885728 |
| H2 Stationary engineers, power station o | 862.2965468 | 182.1561582 | 26.0860003 |
| G2 Retail salespersons and sales clerks | 2533.564098 | 509.6857613 | 31.6797212 |

**Table 5.1e Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, New Brunswick, 2011**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G7 Occupations in travel and accommodati | 299.076637 | 1052.831657 | 2254.914876 |
| G5 Occupations in food and beverage serv | 392.5906837 | 1087.662373 | 2978.295127 |
| G3 Cashiers | 1230.453265 | 3528.680764 | 6627.781633 |
| G4 Chefs and cooks | 706.3016848 | 2113.280291 | 3461.67036 |
| G9 Sales and service occupations, n.e.c. | 4042.344551 | 11322.20814 | 19023.03821 |
| D1 Nurse supervisors and registered nurs | 1745.189143 | 4433.727944 | 2712.754379 |
| G8 Childcare and home support workers | 1934.664164 | 3570.119032 | 4247.137015 |
| H0 Contractors and supervisors in trades | 768.0807906 | 1681.472778 | 1361.497911 |
| H7 Transportation equipment operators an | 3671.551762 | 6125.867561 | 3722.662558 |
| J2 Assemblers in manufacturing | 549.892387 | 822.3388528 | 611.7940367 |
| H6 Heavy equipment and crane operators, | 1447.840805 | 2503.531017 | 1071.30279 |
| J3 Labourers in processing, manufacturin | 2180.065743 | 2908.911074 | 2438.108543 |
| E1 Teachers and professors | 5033.188316 | 7336.609443 | 4412.237242 |
| G0 Sales and service supervisors | 1240.494422 | 1402.698757 | 1435.954149 |
| H3 Machinists, metal forming, shaping an | 1537.51023 | 1926.57 | 1484.97995 |
| I2 Primary production labourers | 1378.902388 | 1709.275696 | 1318.653894 |
| B0 Professional occupations in business | 2384.239 | 3346.695107 | 1582.103371 |
| D3 Assisting occupations in support of h | 3263.18703 | 4703.561659 | 1428.91273 |
| B5 Clerical occupations | 14715.8596 | 12151.93389 | 14930.01185 |
| G6 Occupations in protective services | 3657.126834 | 3780.3062 | 2608.530152 |
| H8 Trades helpers, construction and tran | 4447.253114 | 4684.906438 | 2852.954515 |
| B1 Finance and insurance administration | 1896.072528 | 2152.615537 | 1058.849002 |
| A3 Other managers, n.e.c. | 4851.148676 | 4846.8432 | 2567.232197 |
| B4 Clerical supervisors | 1104.754064 | 1200.401252 | 399.3253655 |
| B2 Secretaries | 2515.96483 | 2393.193869 | 746.6832937 |
| I0 Occupations unique to agriculture, ex | 2394.849415 | 1980.001881 | 1000.304065 |
| E0 Judges, lawyers, psychologists, socia | 4328.152288 | 3094.133677 | 1422.552255 |
| D0 Professional occupations in health | 2236.683578 | 1762.850388 | 508.5687104 |
| F1 Technical occupations in art, culture | 3006.723294 | 2233.056129 | 760.8468963 |
| G1 Wholesale, technical, insurance, real | 3180.269997 | 2275.605858 | 803.1973765 |
| B3 Administrative and regulatory occupat | 4299.507254 | 2827.758071 | 1205.886364 |
| A1 Specialist managers | 3914.720016 | 2032.116867 | 1424.543055 |
| D2 Technical and related occupations in | 4084.528246 | 2436.97832 | 712.9246725 |
| F0 Professional occupations in art and c | 1991.665285 | 1071.302377 | 459.4349351 |
| A2 Managers in retail trade, food and ac | 6312.733424 | 3555.752708 | 971.3782611 |
| I1 Occupations unique to forestry operat | 4603.105094 | 2171.492885 | 766.2844486 |
| H5 Other trades, n.e.c. | 1529.917867 | 479.8423802 | 463.1191716 |
| E2 Paralegals, social services workers a | 5625.795903 | 2592.56318 | 793.5564823 |
| C1 Technical occupations related to natu | 8143.195249 | 3847.133425 | 888.737167 |
| J0 Supervisors in manufacturing | 1116.887866 | 512.8092042 | 78.83027282 |
| J1 Machine operators in manufacturing | 5057.667799 | 2112.596026 | 534.909632 |
| H4 Mechanics | 6546.975643 | 2603.487732 | 543.6665185 |
| H1 Construction trades | 8645.813307 | 3136.337605 | 629.1870779 |
| C0 Professional occupations in natural a | 7213.852656 | 1672.494759 | 467.8962151 |
| H2 Stationary engineers, power station o | 4697.212526 | 957.6656859 | 311.3635045 |
| G2 Retail salespersons and sales clerks | 13029.6166 | 2545.098712 | 42.22890196 |

**Figure 5.1f Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Quebec, 2011**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G7 Occupations in travel and accommodati | 2784.857956 | 8655.762312 | 20354.94829 |
| G5 Occupations in food and beverage serv | 7323.30333 | 19443.32724 | 46869.45303 |
| G3 Cashiers | 9876.137912 | 26708.33674 | 61525.43428 |
| G9 Sales and service occupations, n.e.c. | 47300.16382 | 107327.7707 | 188077.9499 |
| G4 Chefs and cooks | 11784.22113 | 23586.45346 | 38615.35192 |
| H0 Contractors and supervisors in trades | 5303.495238 | 11754.27581 | 9509.409797 |
| G8 Childcare and home support workers | 10106.14055 | 15213.80467 | 21077.77812 |
| D1 Nurse supervisors and registered nurs | 16717.19785 | 36300.87324 | 18280.85437 |
| H7 Transportation equipment operators an | 34384.7009 | 57328.65715 | 37967.93346 |
| J2 Assemblers in manufacturing | 13378.40919 | 19922.21019 | 15215.83405 |
| G0 Sales and service supervisors | 9452.541511 | 11749.46545 | 12074.90275 |
| G6 Occupations in protective services | 21427.40529 | 25303.77164 | 25838.7885 |
| H6 Heavy equipment and crane operators, | 9371.26534 | 12610.7718 | 8934.856609 |
| J3 Labourers in processing, manufacturin | 22129.44777 | 28802.27183 | 21770.89115 |
| I2 Primary production labourers | 7153.321101 | 9645.273513 | 6599.676414 |
| E1 Teachers and professors | 58958.69919 | 78982.88011 | 46036.88046 |
| B0 Professional occupations in business | 39677.41395 | 47716.59882 | 27333.5547 |
| B1 Finance and insurance administration | 16800.03914 | 20516.20857 | 9522.966869 |
| D3 Assisting occupations in support of h | 31137.22083 | 42941.42353 | 12546.65769 |
| B5 Clerical occupations | 146710.7075 | 120570.3031 | 119668.5194 |
| A3 Other managers, n.e.c. | 44684.58693 | 43074.94098 | 26600.07296 |
| H3 Machinists, metal forming, shaping an | 21731.28325 | 16859.18033 | 12770.53736 |
| B4 Clerical supervisors | 9572.708139 | 8931.962002 | 3960.265487 |
| B2 Secretaries | 42126.56983 | 38724.52104 | 13789.77479 |
| H8 Trades helpers, construction and tran | 43045.0267 | 33336.61581 | 17344.14142 |
| F1 Technical occupations in art, culture | 42265.60124 | 34222.95266 | 14520.60833 |
| I0 Occupations unique to agriculture, ex | 25351.83852 | 19365.55956 | 9854.216656 |
| E0 Judges, lawyers, psychologists, socia | 47222.11491 | 35521.75612 | 17040.16638 |
| B3 Administrative and regulatory occupat | 53473.35778 | 40798.01145 | 18461.49582 |
| G1 Wholesale, technical, insurance, real | 42757.18524 | 29425.76977 | 11239.27875 |
| D0 Professional occupations in health | 26424.26814 | 17761.56911 | 6891.165912 |
| I1 Occupations unique to forestry operat | 11326.0544 | 6269.127096 | 2775.86342 |
| A1 Specialist managers | 49068.02946 | 25963.42945 | 13039.27939 |
| D2 Technical and related occupations in | 38467.57549 | 23584.60499 | 6363.727541 |
| F0 Professional occupations in art and c | 36087.06281 | 17083.03088 | 9841.976146 |
| A2 Managers in retail trade, food and ac | 64600.46457 | 36782.76116 | 11405.29371 |
| J1 Machine operators in manufacturing | 51304.50804 | 26127.74344 | 8529.957829 |
| H1 Construction trades | 64585.03315 | 31756.22579 | 5994.313576 |
| H5 Other trades, n.e.c. | 21567.51348 | 6232.364481 | 6080.522096 |
| E2 Paralegals, social services workers a | 87706.91764 | 37117.64838 | 12480.36653 |
| H4 Mechanics | 62252.0721 | 27873.49154 | 6819.620531 |
| C1 Technical occupations related to natu | 93082.64146 | 39266.55353 | 10262.44454 |
| J0 Supervisors in manufacturing | 13861.70131 | 5967.214982 | 1074.899631 |
| C0 Professional occupations in natural a | 114315.6149 | 30618.68674 | 9222.833883 |
| H2 Stationary engineers, power station o | 32402.39346 | 7857.274646 | 3348.65285 |
| G2 Retail salespersons and sales clerks | 152610.7732 | 30999.64969 | 573.4301721 |

**Figure 5.1g Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Ontario, 2011**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G7 Occupations in travel and accommodati | 3618.095221 | 13241.12294 | 38577.73293 |
| G5 Occupations in food and beverage serv | 7351.435517 | 21114.61227 | 69122.55707 |
| G3 Cashiers | 11013.82494 | 33775.55589 | 93144.51167 |
| G9 Sales and service occupations, n.e.c. | 59751.13368 | 151146.5801 | 330840.3302 |
| G4 Chefs and cooks | 12410.37638 | 26109.26226 | 56902.01918 |
| G8 Childcare and home support workers | 18271.92957 | 34852.01213 | 58219.88603 |
| H0 Contractors and supervisors in trades | 8829.483001 | 20171.82212 | 20848.45262 |
| I2 Primary production labourers | 10951.67076 | 22335.17497 | 23533.38043 |
| D1 Nurse supervisors and registered nurs | 25102.27022 | 54558.72286 | 36034.13864 |
| G0 Sales and service supervisors | 12637.79594 | 18807.41947 | 24959.11504 |
| H7 Transportation equipment operators an | 45200.8866 | 83299.469 | 67347.37556 |
| G6 Occupations in protective services | 30445.70032 | 40110.27802 | 48271.89027 |
| E1 Teachers and professors | 79328.10451 | 126145.7152 | 102035.918 |
| J2 Assemblers in manufacturing | 31780.92546 | 44445.23168 | 46000.52011 |
| J3 Labourers in processing, manufacturin | 25891.82096 | 34431.94591 | 32962.97677 |
| D3 Assisting occupations in support of h | 29750.51292 | 52562.4075 | 24809.9695 |
| H6 Heavy equipment and crane operators, | 10033.22978 | 12475.58383 | 10512.26184 |
| B1 Finance and insurance administration | 34316.88883 | 43440.29738 | 24282.50594 |
| B0 Professional occupations in business | 72670.59248 | 84894.20257 | 52522.36521 |
| B5 Clerical occupations | 235217.3996 | 201121.4953 | 234031.7426 |
| B4 Clerical supervisors | 13526.36007 | 16309.27151 | 8183.879218 |
| A3 Other managers, n.e.c. | 91036.14091 | 94130.8202 | 68099.25378 |
| I1 Occupations unique to forestry operat | 5261.53191 | 5111.996319 | 3777.22337 |
| F1 Technical occupations in art, culture | 57556.20781 | 58474.0706 | 31848.72881 |
| H8 Trades helpers, construction and tran | 64273.58825 | 58595.04818 | 38444.6671 |
| I0 Occupations unique to agriculture, ex | 31972.55244 | 28681.23042 | 18377.74682 |
| B2 Secretaries | 29743.06231 | 30316.02701 | 13191.41896 |
| H3 Machinists, metal forming, shaping an | 29616.12388 | 22950.40649 | 18794.36444 |
| E0 Judges, lawyers, psychologists, social | 86073.87099 | 69275.15963 | 41114.08137 |
| G1 Wholesale, technical, insurance, real | 71063.28351 | 58875.10902 | 29498.33864 |
| B3 Administrative and regulatory occupant | 91820.1566 | 69702.65165 | 36737.69852 |
| D0 Professional occupations in health | 40051.84109 | 29144.53193 | 12209.50296 |
| F0 Professional occupations in art and c | 52549.18652 | 29697.00989 | 23526.79917 |
| A2 Managers in retail trade, food and ac | 101133.0329 | 69141.87247 | 29563.40076 |
| D2 Technical and related occupations in | 51455.13614 | 32866.89956 | 11815.95168 |
| A1 Specialist managers | 111102.1006 | 56239.33785 | 34864.84161 |
| J1 Machine operators in manufacturing | 64472.90766 | 36161.98006 | 15648.75009 |
| C1 Technical occupations related to natu | 122657.7178 | 63634.16848 | 20412.74449 |
| H4 Mechanics | 78237.95479 | 40014.14171 | 9110.178095 |
| J0 Supervisors in manufacturing | 17160.18042 | 8896.259315 | 1846.977699 |
| E2 Paralegals, social services workers a | 108190.4754 | 48864.83658 | 17708.79634 |
| H1 Construction trades | 96498.93317 | 44444.42757 | 10157.49218 |
| H5 Other trades, n.e.c. | 32845.03963 | 9257.315438 | 8107.786458 |
| C0 Professional occupations in natural a | 221077.9628 | 64147.54814 | 18933.27986 |
| H2 Stationary engineers, power station o | 56334.40043 | 12192.99267 | 5569.75965 |
| G2 Retail salespersons and sales clerks | 225374.4024 | 67206.29981 | 1362.768021 |

**Figure 5.1h Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Manitoba, 2011**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G7 Occupations in travel and accommodati | 340.5470904 | 1333.89873 | 3548.406596 |
| G3 Cashiers | 854.3461688 | 3461.400223 | 8311.708285 |
| G5 Occupations in food and beverage serv | 814.0092005 | 2327.661004 | 8020.622332 |
| G4 Chefs and cooks | 887.8268283 | 3227.861325 | 6246.670716 |
| G9 Sales and service occupations, n.e.c. | 5558.591171 | 15714.96419 | 32174.07241 |
| G8 Childcare and home support workers | 2767.020508 | 5394.324542 | 9312.913494 |
| H0 Contractors and supervisors in trades | 988.4121039 | 2489.680932 | 2020.091709 |
| D1 Nurse supervisors and registered nurs | 2774.069149 | 6599.640712 | 4749.151766 |
| I2 Primary production labourers | 1350.424784 | 2524.253042 | 2357.706868 |
| H7 Transportation equipment operators an | 5020.573347 | 9402.817755 | 7512.520398 |
| G0 Sales and service supervisors | 1303.616139 | 1789.664982 | 2485.439948 |
| E1 Teachers and professors | 7051.303744 | 11056.63715 | 8633.862472 |
| G6 Occupations in protective services | 3633.112978 | 4793.082831 | 5281.126551 |
| H6 Heavy equipment and crane operators, | 1354.0643 | 2226.496318 | 1526.209874 |
| J2 Assemblers in manufacturing | 2160.885502 | 2880.679341 | 2677.510903 |
| J3 Labourers in processing, manufacturin | 1893.096974 | 2497.540496 | 2371.202754 |
| D3 Assisting occupations in support of h | 4583.883351 | 8277.628304 | 3172.971755 |
| B1 Finance and insurance administration | 3058.295226 | 4533.823322 | 2210.663594 |
| B0 Professional occupations in business | 4399.852959 | 5561.310253 | 3531.602567 |
| H8 Trades helpers, construction and tran | 5139.196178 | 6065.816265 | 4037.192521 |
| H3 Machinists, metal forming, shaping an | 2509.638348 | 2452.487935 | 2234.637333 |
| B5 Clerical occupations | 22423.11678 | 19924.08554 | 21353.55628 |
| A3 Other managers, n.e.c. | 7413.84018 | 7691.414206 | 5764.487741 |
| B4 Clerical supervisors | 1384.129852 | 1627.785728 | 825.2582075 |
| B2 Secretaries | 2434.159088 | 2879.584877 | 1163.729782 |
| F1 Technical occupations in art, culture | 3583.7296 | 3501.334373 | 1996.626113 |
| I0 Occupations unique to agriculture, ex | 8595.859138 | 7297.671665 | 4185.158497 |
| E0 Judges, lawyers, psychologists, socia | 6727.907403 | 5490.754435 | 2779.230597 |
| G1 Wholesale, technical, insurance, real | 4871.255339 | 4036.537384 | 1687.068307 |
| F0 Professional occupations in art and c | 3168.000751 | 2071.910846 | 1502.340632 |
| I1 Occupations unique to forestry operat | 1832.542707 | 1333.299445 | 684.6978487 |
| B3 Administrative and regulatory occupat | 7570.542975 | 5405.01331 | 2552.91731 |
| D0 Professional occupations in health | 4046.076222 | 3185.470561 | 1046.425727 |
| A1 Specialist managers | 5885.528929 | 3788.591057 | 2212.237787 |
| A2 Managers in retail trade, food and ac | 8688.740058 | 6188.729007 | 2261.937992 |
| D2 Technical and related occupations in | 5109.26146 | 3521.554941 | 1141.685492 |
| J1 Machine operators in manufacturing | 6705.426116 | 4015.894232 | 1148.317915 |
| E2 Paralegals, social services workers a | 10848.11454 | 6235.213408 | 1853.213224 |
| J0 Supervisors in manufacturing | 1557.158934 | 819.0309265 | 185.1120717 |
| H1 Construction trades | 10314.9071 | 5228.237671 | 1395.658061 |
| C1 Technical occupations related to natu | 11214.85194 | 5383.148242 | 1676.730072 |
| H5 Other trades, n.e.c. | 3107.071876 | 887.2895296 | 760.9426615 |
| H4 Mechanics | 9603.330078 | 4264.763969 | 811.7252798 |
| C0 Professional occupations in natural a | 11492.48649 | 3852.316242 | 1136.398546 |
| H2 Stationary engineers, power station o | 6003.795142 | 1328.279847 | 536.9359755 |
| G2 Retail salespersons and sales clerks | 18460.3899 | 5033.272231 | 74.03231266 |

**Figure 5.1i Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Saskatchewan, 2011**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G7 Occupations in travel and accommodati | 321.8683065 | 1277.844616 | 2263.756823 |
| G5 Occupations in food and beverage serv | 853.1521804 | 2536.491406 | 6056.230897 |
| G3 Cashiers | 1232.868543 | 3300.049328 | 6260.905274 |
| G9 Sales and service occupations, n.e.c. | 6337.784953 | 15315.86354 | 25436.53551 |
| G4 Chefs and cooks | 1345.272511 | 3026.24659 | 5047.600436 |
| H0 Contractors and supervisors in trades | 1025.121113 | 2632.48118 | 2265.919017 |
| G8 Childcare and home support workers | 1845.617575 | 3419.50182 | 4581.855628 |
| J2 Assemblers in manufacturing | 571.8140322 | 1051.390706 | 968.1133977 |
| J3 Labourers in processing, manufacturin | 817.253203 | 1694.382465 | 1125.172043 |
| D1 Nurse supervisors and registered nurs | 2855.101232 | 6822.064959 | 2548.949763 |
| I2 Primary production labourers | 1643.189393 | 3162.136628 | 2147.202248 |
| H7 Transportation equipment operators an | 5654.703636 | 9211.413146 | 6254.063322 |
| H3 Machinists, metal forming, shaping an | 2086.304545 | 3244.154244 | 2448.734064 |
| G0 Sales and service supervisors | 1401.371969 | 1722.506621 | 1620.926765 |
| H6 Heavy equipment and crane operators, | 2009.561042 | 2793.051044 | 1836.202318 |
| E1 Teachers and professors | 7460.666124 | 11730.44997 | 4946.762902 |
| G6 Occupations in protective services | 3191.479578 | 3621.072132 | 3176.439718 |
| D3 Assisting occupations in support of h | 4212.209271 | 6506.629795 | 1751.806539 |
| B0 Professional occupations in business | 3789.295614 | 4696.462543 | 1950.285926 |
| H8 Trades helpers, construction and tran | 5483.777412 | 5622.560066 | 3470.863653 |
| B1 Finance and insurance administration | 3475.804384 | 4011.089051 | 1265.755216 |
| B5 Clerical occupations | 19970.47261 | 14867.27928 | 13513.4694 |
| B4 Clerical supervisors | 1186.118541 | 1271.806804 | 413.0114885 |
| A3 Other managers, n.e.c. | 7160.012472 | 6716.906556 | 3435.272543 |
| I1 Occupations unique to forestry operat | 3491.14262 | 3174.697596 | 1585.58083 |
| F1 Technical occupations in art, culture | 3182.754642 | 2964.621783 | 886.7788088 |
| B2 Secretaries | 2715.232943 | 2507.982005 | 660.3128881 |
| F0 Professional occupations in art and c | 2540.100409 | 1848.482022 | 737.6578927 |
| B3 Administrative and regulatory occupat | 7091.542693 | 5174.005217 | 1586.889016 |
| E0 Judges, lawyers, psychologists, socia | 6341.744253 | 4436.811495 | 1337.795599 |
| I0 Occupations unique to agriculture, ex | 19858.9444 | 13136.70007 | 4942.44191 |
| A1 Specialist managers | 5436.317634 | 3058.69415 | 1421.74321 |
| G1 Wholesale, technical, insurance, real | 4800.264062 | 2846.635916 | 888.8145179 |
| D2 Technical and related occupations in | 5187.399321 | 3285.889886 | 680.7727778 |
| J1 Machine operators in manufacturing | 4000.299904 | 2363.416394 | 671.0592755 |
| A2 Managers in retail trade, food and ac | 9328.62028 | 5091.51709 | 1254.221388 |
| D0 Professional occupations in health | 3928.421941 | 1967.057573 | 459.3177455 |
| C1 Technical occupations related to natu | 9012.896645 | 4340.617104 | 854.3575389 |
| H5 Other trades, n.e.c. | 2534.413726 | 816.0131 | 566.1771436 |
| E2 Paralegals, social services workers a | 9196.851607 | 3509.329889 | 871.5801631 |
| J0 Supervisors in manufacturing | 1039.880888 | 422.1103331 | 51.19168361 |
| H1 Construction trades | 12049.36248 | 4515.214278 | 811.6062215 |
| H4 Mechanics | 9606.814359 | 3343.991887 | 397.2996749 |
| C0 Professional occupations in natural a | 10102.03645 | 2400.433291 | 683.7690801 |
| H2 Stationary engineers, power station o | 6817.162314 | 1152.202391 | 345.4416254 |
| G2 Retail salespersons and sales clerks | 18142.43464 | 2328.192432 | 23.21970237 |

**Figure 5.1j Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Alberta, 2011**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G5 Occupations in food and beverage serv | 2390.801766 | 6780.313626 | 23992.33415 |
| G7 Occupations in travel and accommodati | 1535.255807 | 4468.059945 | 13727.95499 |
| G3 Cashiers | 3883.420418 | 8980.949631 | 25081.6647 |
| G9 Sales and service occupations, n.e.c. | 20513.47475 | 38997.20318 | 96882.36161 |
| G4 Chefs and cooks | 4327.268394 | 7402.489396 | 17433.32974 |
| D1 Nurse supervisors and registered nurs | 5815.664958 | 17975.11101 | 14128.61368 |
| H0 Contractors and supervisors in trades | 4115.742227 | 9822.804739 | 12232.83398 |
| G8 Childcare and home support workers | 5772.593672 | 9782.10991 | 19071.9442 |
| I2 Primary production labourers | 5206.243225 | 9241.447861 | 10657.51569 |
| G0 Sales and service supervisors | 4188.644598 | 6870.601591 | 8300.722763 |
| H7 Transportation equipment operators an | 16807.44932 | 27717.23307 | 26779.23464 |
| E1 Teachers and professors | 18667.53559 | 32670.86164 | 25553.14053 |
| H6 Heavy equipment and crane operators, | 6307.919188 | 9229.445585 | 8851.373525 |
| D3 Assisting occupations in support of h | 8567.558012 | 17103.82108 | 7270.485412 |
| G6 Occupations in protective services | 9223.585367 | 12389.49213 | 13307.10048 |
| H3 Machinists, metal forming, shaping an | 9382.981777 | 11098.13233 | 14831.37266 |
| J2 Assemblers in manufacturing | 2763.872972 | 3329.941028 | 3771.861661 |
| J3 Labourers in processing, manufacturin | 3880.514699 | 4677.934389 | 4809.440165 |
| B0 Professional occupations in business | 19029.2975 | 24406.78665 | 16255.36805 |
| B1 Finance and insurance administration | 11526.85835 | 15517.8595 | 8401.753376 |
| I1 Occupations unique to forestry operat | 10447.92563 | 11793.93787 | 8883.004537 |
| H8 Trades helpers, construction and tran | 17807.49328 | 19263.74907 | 14485.67007 |
| A3 Other managers, n.e.c. | 28635.69976 | 30702.80457 | 23313.24543 |
| B4 Clerical supervisors | 3962.532865 | 4860.8168 | 2350.725094 |
| B5 Clerical occupations | 70156.74271 | 57891.31233 | 66593.01357 |
| B2 Secretaries | 7515.923467 | 9151.307697 | 3610.418615 |
| F1 Technical occupations in art, culture | 12861.77186 | 14059.56183 | 7618.692356 |
| B3 Administrative and regulatory occupat | 26011.69371 | 25088.47825 | 12461.51472 |
| E0 Judges, lawyers, psychologists, socia | 20390.48209 | 18245.85473 | 10684.94379 |
| I0 Occupations unique to agriculture, ex | 18583.05388 | 15794.94833 | 9450.835125 |
| F0 Professional occupations in art and c | 9455.36864 | 6175.764921 | 4811.9597 |
| G1 Wholesale, technical, insurance, real | 18643.22629 | 13892.35027 | 6503.833963 |
| D0 Professional occupations in health | 11920.06295 | 8736.470122 | 3838.114799 |
| A1 Specialist managers | 25150.58683 | 15589.07672 | 10815.98997 |
| A2 Managers in retail trade, food and ac | 30606.56835 | 22613.42437 | 8208.361157 |
| D2 Technical and related occupations in | 16923.37421 | 12349.31885 | 4676.730922 |
| J1 Machine operators in manufacturing | 16234.97557 | 10651.92544 | 3426.359676 |
| C1 Technical occupations related to natu | 47307.82397 | 23761.62761 | 7718.128837 |
| J0 Supervisors in manufacturing | 4033.641613 | 2111.0837 | 536.3768441 |
| E2 Paralegals, social services workers a | 26673.05617 | 12778.34322 | 4501.809523 |
| H4 Mechanics | 31821.60567 | 15476.57254 | 3584.31614 |
| H1 Construction trades | 43708.52204 | 20982.18742 | 5170.695323 |
| H5 Other trades, n.e.c. | 12678.70283 | 3188.719253 | 3673.204598 |
| C0 Professional occupations in natural a | 63325.02204 | 21208.80782 | 9275.447681 |
| G2 Retail salespersons and sales clerks | 69348.99413 | 18322.73288 | 307.8233208 |
| H2 Stationary engineers, power station o | 29852.3121 | 5503.844529 | 2047.777955 |

**Figure 5.1k Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, British Columbia, 2011**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sum of Individual\_Short | Sum of Individual\_BAlance | Sum of Individual\_Excess |
| G5 Occupations in food and beverage serv | 3597.850454 | 8593.800956 | 34045.86255 |
| G7 Occupations in travel and accommodati | 2252.276194 | 5079.584429 | 18902.80946 |
| G3 Cashiers | 4493.766573 | 10365.73752 | 32669.18005 |
| G9 Sales and service occupations, n.e.c. | 24084.95137 | 45468.96644 | 127129.8353 |
| G4 Chefs and cooks | 6159.753131 | 11296.87729 | 28785.65161 |
| G8 Childcare and home support workers | 7048.78508 | 11453.88143 | 25071.90368 |
| H0 Contractors and supervisors in trades | 3408.764126 | 8106.651397 | 9274.67836 |
| D1 Nurse supervisors and registered nurs | 7136.343541 | 20548.26204 | 14857.02677 |
| G0 Sales and service supervisors | 4472.81418 | 6900.053805 | 9573.813959 |
| G6 Occupations in protective services | 10061.60274 | 14072.14411 | 17856.0929 |
| H7 Transportation equipment operators an | 17184.86079 | 25852.51727 | 27770.50439 |
| E1 Teachers and professors | 23274.08159 | 39160.95948 | 30494.12014 |
| D3 Assisting occupations in support of h | 10336.28068 | 20464.19289 | 10347.11847 |
| J2 Assemblers in manufacturing | 3658.833455 | 4674.286711 | 5650.367894 |
| I2 Primary production labourers | 7674.129029 | 9291.988655 | 11204.04401 |
| H3 Machinists, metal forming, shaping an | 5314.310347 | 6338.778207 | 7784.159983 |
| H6 Heavy equipment and crane operators, | 4970.051241 | 5950.091694 | 6294.004398 |
| J3 Labourers in processing, manufacturin | 7034.162892 | 7191.727438 | 9135.409534 |
| B1 Finance and insurance administration | 12434.31706 | 17829.13949 | 9193.299798 |
| B0 Professional occupations in business | 20532.50471 | 25615.17431 | 17171.08292 |
| B4 Clerical supervisors | 3778.59852 | 4659.755868 | 2515.935528 |
| A3 Other managers, n.e.c. | 33345.04382 | 35484.42566 | 27284.14895 |
| B5 Clerical occupations | 73691.10904 | 60022.88837 | 70777.47436 |
| F1 Technical occupations in art, culture | 19774.42243 | 22000.02378 | 13017.89031 |
| H8 Trades helpers, construction and tran | 21159.17384 | 20226.54687 | 16077.28871 |
| B2 Secretaries | 9302.348568 | 10462.19632 | 4817.107186 |
| E0 Judges, lawyers, psychologists, socia | 25706.05738 | 21754.24561 | 14020.90574 |
| I0 Occupations unique to agriculture, ex | 13233.37221 | 9895.63153 | 6780.602148 |
| I1 Occupations unique to forestry operat | 8360.831995 | 5956.367117 | 4066.127362 |
| B3 Administrative and regulatory occupat | 30876.61949 | 22349.60348 | 13034.62865 |
| F0 Professional occupations in art and c | 17569.54516 | 11967.11406 | 8090.31145 |
| G1 Wholesale, technical, insurance, real | 23160.5149 | 17834.67321 | 8230.847374 |
| D0 Professional occupations in health | 14595.15428 | 11225.44501 | 4673.85855 |
| A2 Managers in retail trade, food and ac | 37405.24818 | 28988.30788 | 11667.15083 |
| D2 Technical and related occupations in | 19215.40502 | 13285.35549 | 5610.337801 |
| A1 Specialist managers | 28509.24758 | 16055.15159 | 9871.988571 |
| J1 Machine operators in manufacturing | 18695.89722 | 10560.13258 | 3861.036796 |
| H1 Construction trades | 44174.03839 | 26521.40978 | 6793.460763 |
| J0 Supervisors in manufacturing | 3325.871313 | 1917.308813 | 455.8628642 |
| H4 Mechanics | 27283.16805 | 15764.06912 | 3520.123614 |
| C1 Technical occupations related to natu | 45656.94793 | 23224.46441 | 7151.315118 |
| H5 Other trades, n.e.c. | 12579.1492 | 3630.996909 | 4450.646726 |
| E2 Paralegals, social services workers a | 37669.73447 | 17011.36746 | 7141.113885 |
| C0 Professional occupations in natural a | 53802.56654 | 20776.6947 | 8713.94081 |
| G2 Retail salespersons and sales clerks | 81933.50109 | 25222.33748 | 671.2831014 |
| H2 Stationary engineers, power station o | 21977.75086 | 4112.387427 | 1921.415084 |

**Figure 5.1l Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Nunavut, 2011**

**Estimates are too small for publication**

**Figure 5.1m Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Northwest Territories, 2011**

**Estimates are too small for publication**

**Figure 5.1n Proportions of workers by literacy skill shortage, surplus and balance, by occupation, occupationally experienced adults, aged 16 to 65, Yukon, 2011**

**Estimates are too small for publication**

1. **Why More Education Will Not Solve Rising Inequality (and May Make It Worse)** *Kelly Foley and David A. Green* [↑](#footnote-ref-1)
2. Estimates of the demand for literacy skill are not available for the 3 northern territories because Labour Force Survey estimates of employment by 4-digit occupation are not available. [↑](#footnote-ref-2)
3. The estimates of literacy skill supply are based upon 1994 IALS and 2003 IALSS data that combines their prose literacy and document literacy scales into a single reading scale and that are based on the less demanding response proficiency level adopted by PIAAC. [↑](#footnote-ref-3)
4. The Educational Testing Service equated the IALS and PISA scales. [↑](#footnote-ref-4)
5. Recent immigrants are those immigrants arriving in the five years in preceding the 1994 IALS, 2003 IALSS and 2011 PIAAC assessments . [↑](#footnote-ref-5)
6. Bow Valley College’s PRIME Suite of web-based, adaptive assessments of Essential Skills are world class. [↑](#footnote-ref-6)