

Literacy, numeracy and problem-solving skills – Foundation skills for a knowledge-based economy

[- Age and skills](#)

[- Skill gain and skill loss](#)

[- Other IALSS results](#)

Various processes including globalization, technological and labour force changes as well as the application of new work practices have led to major changes in the occupational composition of the labour force and in the tasks and skills required of workers. Not only has the share of jobs requiring advanced skills increased, so too have skill requirements risen within job groups, including those with medium or low skill requirements.

Canada, like other OECD countries, has evolved into a knowledge-based economy – one that places a premium on literacy, numeracy and problem-solving skills which are now regarded as essential, or foundation, skills for many jobs in today's labour market. But such skills are important not only from the point of view of the labour market, they are increasingly seen as important for an individual's ability to participate fully in modern society.

Often we hear that solid progress is being made on the education front. Canadian fifteen-year-olds compare well to their peers in other countries on international achievement tests, progress is being made in the reduction of drop-out rates and Canadian rates of participation in postsecondary education are high compared to most other countries. However, recent results from the International Adult Literacy and Skills Survey (IALSS) show there is little room for complacency.¹

The [International Adult Literacy and Skills Survey](#) tested more than 23,000 Canadians age 16 years or more in 2003 on their skills proficiency in four domains: prose, document, numeracy and problem-solving. Skills were rated on the basis of levels one to five, that is, lowest to highest. In Canada, about 42% of adults between the ages of 16 and 65 scored below Level 3 on the prose scale and about 50% scored below Level 3 on the numeracy scale. These individuals are likely to have difficulties coping with increasing literacy- and numeracy-related demands common in everyday life and work in a knowledge society and information economy.

The findings show that education has a strong and persistent effect on an individual's skills over time. We also note, however, that though education is important, some individuals with low levels of educational attainment perform better than others who have more education. In Canada, one-quarter of individuals who had completed some kind of postsecondary education scored in the bottom 25% of individuals, while one-quarter of those with less than a high school education scored among the top 25% of individuals.

Age and skills

Age is an important factor to consider when drawing conclusions about the distribution of skills in a population and when developing strategies to improve skills. Individuals acquire, develop, maintain and lose skills over their lifetime. While the physical effects of ageing have an impact on an individual's cognitive abilities, age also implies typical life experiences that occur at various stages of life, in early childhood, during schooling and the transition to work, throughout one's career and working life and other daily activities. Depending on the nature of those life experiences, an individual may experience skill gain or skill loss through time.

The IALSS results show that, compared to older age cohorts, younger cohorts tend to score higher and have larger proportions at higher levels of skill on each of the document, prose, numeracy and problem-solving scales. There is also a wider range in scores among older adults (aged 46 to 65) compared to 16 to 25-year olds. The accumulation of differing life experiences is likely to be an important factor explaining the wider variation in performance among older adults.

One explanation suggested in the literature is that as time progresses, adults may experience reduced cognitive performance as a result of the ageing processes. However, the research suggests that, depending on life experiences, cognitive performance may in fact be enhanced over time. Indeed, a number of studies suggest that one's life experiences can lead to an accumulation of knowledge and skills until an advanced age, after which they may begin to level off. The latter phenomenon is referred to as practice effects. The outcome of the interaction between ageing and practice effects depends on the extent and nature of an individual's life experiences.

Lower skills among older age groups may also be attributable to other types of effects. For example, most young people today receive more years of formal schooling than older individuals and more emphasis may be placed on the acquisition of cognitive skills now than in earlier periods. In fact, there are wide differences in educational attainment among individuals in different age groups, making this particular life experience a potentially major factor influencing the relationship between age and skills. In particular, younger adults are much more likely to have completed some kind of postsecondary education compared to their parents and grandparents. Finally, younger adults also benefit from more recent schooling.

Skill gain and skill loss

Differences in educational attainment account for an important part of the differences in skill levels across groups. The research shows that individuals who have completed college or university not only begin their working lives with higher skill levels, they also maintain those skills at a high level for many years. In part, this is due to the fact that they tend to be employed in occupations that demand the use of strong literacy, numeracy, document and problem-solving skills. Employers tend to focus their training efforts on these individuals. Furthermore, individuals with advanced education also tend to engage in learning activities on their own. The end result is that, through life experiences, the most highly skilled individuals tend to be the ones

who have access to further opportunities to add to their skills – what, in effect, becomes a virtuous circle.

According to the OECD, completion of high school is the minimum standard for successful labour market entry and continued employability. Youth and young adults aged 16 to 30 who have not completed high school and have not been in school for at least one year are referred to as early school leavers. In all countries, early school leavers are the most likely to have the lowest literacy scores when compared to those who have stayed in, or completed, high school. The IALSS results show that the likelihood of Canadian early school leavers achieving literacy scores in the lowest two levels on the problem-solving scale are about seven times that of individuals who had completed more than a high school education. Similarly, early school leavers were about five times more likely to score in the lowest two levels on the numeracy scale as those with more than a high school education.

The relationship between age, literacy skills and education level is shown in the chart below. To simplify the chart, this relationship is shown for only one of the literacy domains measured by IALSS, in this case prose literacy.

Figure 1. Prose literacy, by age and education level, Canada, 2003

Source: Based on data from the 2003 [International Adult Literacy and Skills Survey](#).

At age 20, young people have either recently left school or are students. Prose skill levels are highest for young adults with successively higher levels of education, with the difference between those with less than high school and those with university being a full proficiency level. With increasing age, skills drop steeply for early school leavers. That is not the case for the university- educated group, who instead see only a slow decrease in their skill levels with increasing age.

For young adults, low skill proficiencies are associated with serious risks in the transition from school to work. They are more likely to face difficulties entering the labour market and maintaining employment and their prospects for seeing increases in their earnings are limited. Furthermore, they are much less likely to be offered opportunities to participate in further education and learning opportunities throughout life. If, as is often the case, they are in jobs or in circumstances that require little use of skills, the skills they do have can deteriorate through time – what in this case becomes a vicious circle.

Of course, an individual' proficiency at reading, numeracy and problem-solving is not independent of level of education attained. Because skills are required to succeed in education – and increasingly so at progressively higher levels – higher skill proficiencies are likely to lead to enrolment in and completion of higher education. In fact, these two facets of the education-skills relationship reinforce each other: skills learned in school facilitate access to further schooling that in turn builds additional skill.

Simply stated, individuals with more years of schooling tend to consistently show higher skill proficiencies. Clearly, selection effects are at work – more able students are those who are likely to gain access to higher levels of education, thereby having the opportunity to add to their skills. But that is the danger that early school leavers face – without such opportunities, their skill levels are likely to remain low. That in turn reduces their chances of getting jobs that offer other opportunities for skill gain, or even maintenance, creating a cycle wherein they remain at the bottom of the skills distribution with all that implies for employment stability, increases in earnings and positive life chances.

Other IALSS results

This article considers only one aspect of the IALSS report, namely the educational determinants of skills. However, the IALSS study also provides important insights into the outcomes associated with varying skill levels. One key message is that ‘literacy pays.’ The likelihood of being employed/unemployed, of finding a job while being unemployed and of earning higher wages all are related to stronger literacy skills. The ability to use information and computer technologies, now regarded as essential in today’s economy and society, also increases with literacy skills. Finally, a positive relationship is found between literacy skills and health status. Future issues of Education Matters will explore the link between literacy and positive life outcomes in more detail.

Notes

1. This article is based on [Learning a Living: First Results of the Adult Literacy and Life Skills Survey](#) (2005). Statistics Canada Catalogue number 89-603-XWE. Ottawa and Paris: Statistics Canada and the Organisation for Economic Co-operation and Development.