2

Proficiency in Key Information-Processing Skills among Working-Age Adults

This chapter gives an overview of the level and distribution of proficiency in key information-processing skills among the adult populations of countries participating in the Survey of Adult Skills (PIAAC). Results are presented separately for literacy, numeracy and problem solving in technology-rich environments. The presentation shows how adults are distributed across the different proficiency levels, the mean proficiency of adults, and the variations in proficiency across the population. To help readers interpret the findings, the results are linked to descriptions of what adults with particular scores can do.

The Survey of Adult Skills (PIAAC) assesses the proficiency of adults in literacy, numeracy and problem solving in technology-rich environments. These are considered to be "key information-processing skills" in that they are:

- necessary for fully integrating and participating in the labour market, education and training, and social and civic life;
- highly transferable, in that they are relevant to many social contexts and work situations; and
- "learnable" and, therefore, subject to the influence of policy.

At the most fundamental level, literacy and numeracy skills constitute a foundation for developing higher-order cognitive skills, such as analytic reasoning, and are essential for gaining access to and understanding specific domains of knowledge. In addition, these skills are relevant across the range of life contexts, from education through work to home and social life and interaction with public authorities. The capacity to manage information and solve problems in technology-rich environments – that is, to access, evaluate, analyse and communicate information through the use of digital devices and applications – is becoming a necessity as information and communication technology (ICT) applications permeate the workplace, the classroom and lecture hall, the home, and social interaction more generally. Individuals who are highly proficient in the skills measured by the Survey of Adult Skills are likely to be able to make the most of the opportunities created by the technological and structural changes discussed in the previous chapter; those who struggle to use new technologies are likely to be at considerable risk of losing out.

This chapter shows the level and distribution of proficiency in information-processing skills among the adult populations of the countries participating in the survey (see Box 2.1). To help readers interpret the findings, the results are linked to descriptions of what adults with particular scores can do in concrete terms. The relationships between proficiency and socio-demographic characteristics and other factors influencing the development and maintenance of skills are explored later in this report (see Chapters 3 and 5), as is the relationship between proficiency and economic and social outcomes (see Chapter 6).

The results should be of concern to many governments. First, in most countries there are significant proportions of adults with low proficiency in literacy and in numeracy. Across the countries involved in the study, between 4.9% and 27.7% of adults are proficient at the lowest levels in literacy and 8.1% to 31.7% are proficient at the lowest levels in numeracy. At these levels, adults can regularly complete tasks that involve very few steps, limited amounts of information presented in familiar contexts with little distracting information present, and that involve basic cognitive operations, such as locating a single piece of information in a text or performing basic arithmetic operations, but have difficulty with more complex tasks.

Second, in many countries, large proportions of the population do not have experience with, or lack the basic skills needed to use ICTs for many everyday tasks. At a minimum, this ranges from less than 7% of the 16-65 year-old population in countries such as the Netherlands, Norway and Sweden to around 23% or higher in Italy, Korea, Poland, the Slovak Republic and Spain. Even among adults with computer skills, most scored at the lowest level of the problem solving in technology-rich environments scale. At this level, individuals are able to use familiar and widely available computer applications to access and use information to solve problems that involve explicit goals and the application of explicit criteria, and whose solution involves few steps. Only between 2.9% and 8.8% of the population demonstrate the highest level of proficiency on the problem solving in technology-rich environments scale, where tasks require the ability to use a wider range of applications in less familiar contexts, and to solve problems involving complex pathways to solutions that require navigating around impasses.

Box 2.1. **A context for cross-national comparisons of proficiency**

The Survey of Adult Skills was designed to ensure that the comparisons of proficiency in literacy, numeracy and problem solving in technology-rich environments are as robust as possible. Considerable effort was expended to make the content of the assessment equivalent in difficulty in each of the 34 language versions and to standardise implementation in the 24 participating countries, for example, in terms of sample design and field operations. The quality-assurance and quality-control procedures put in place are among the most comprehensive and stringent ever implemented for an international household-based survey. The details of the technical standards guiding the design and implementation of the survey can be found in the *Reader's Companion* to this report (OECD, 2013) and in the *Technical Report of the Survey of Adult Skills* (OECD, 2013, forthcoming).

Interpreting differences in results among countries is nonetheless a challenging task, particularly as the Survey of Adult Skills covers adults born between 1947 and 1996 who started their schooling from the early 1950s to the

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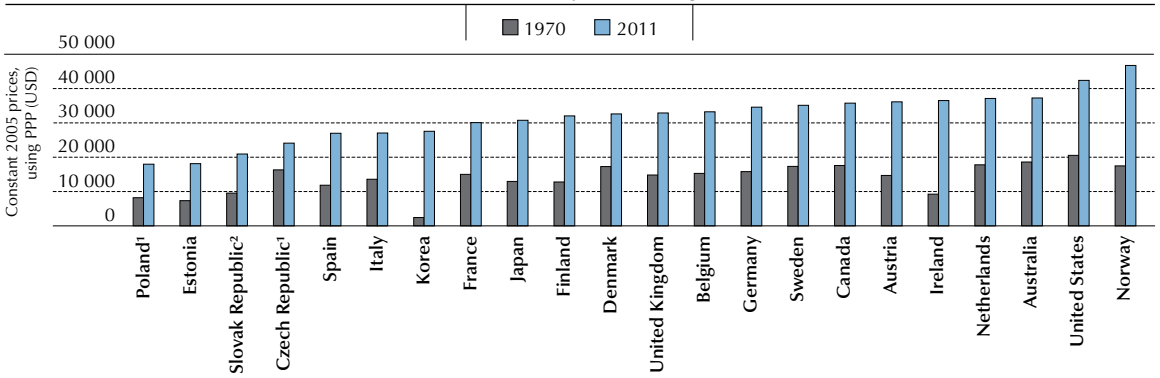
early 2000s and who entered the labour market from the early 1960s to the present day. The results observed for each participating country, at least at the aggregate level reported in this chapter, represent the outcomes of a period of history that extends as far back as the immediate post-war era, which has been marked by significant social, political and economic change. For this reason, the results of the Survey of Adult Skills should not be interpreted only, or even primarily, in light of current policy settings or those of the recent past, important as these may be. The opportunities to develop, enhance and maintain the skills assessed will have varied significantly between countries over this period, and among different age cohorts within countries, depending on the evolution of education and training systems and policies, the path of national economic development, and changes in social norms and expectations.

The diversity of the countries in the Survey of Adult Skills is evident in the different starting points and pace of economic development since the 1950s, the timing and extent of educational expansion, and the growth of the immigrant population. As Figure "a" below illustrates, while there has been an overall increase in GDP per capita from 1970 to 2011 in all of the participating countries, Ireland, Korea and Norway have seen particularly large increases during the period. At the same time, some participating countries, such as Korea and Poland, have seen rapid educational expansion (Figure "b" below) from a relatively low starting point, reflected in larger differences in the rates of tertiary attainment between older and younger age groups, while other countries, such as Canada and the United States, have had high levels of participation at the tertiary level throughout the post-war period.

■ Figure a ■

GDP per capita, USD

Constant 2005 prices, using PPP



1. Year of reference 1990.
2. Year of reference 1992.

Countries are ranked in ascending order of the GDP per capita in 2011.

Source: OECD National Accounts; Table B2.1 in Annex B.

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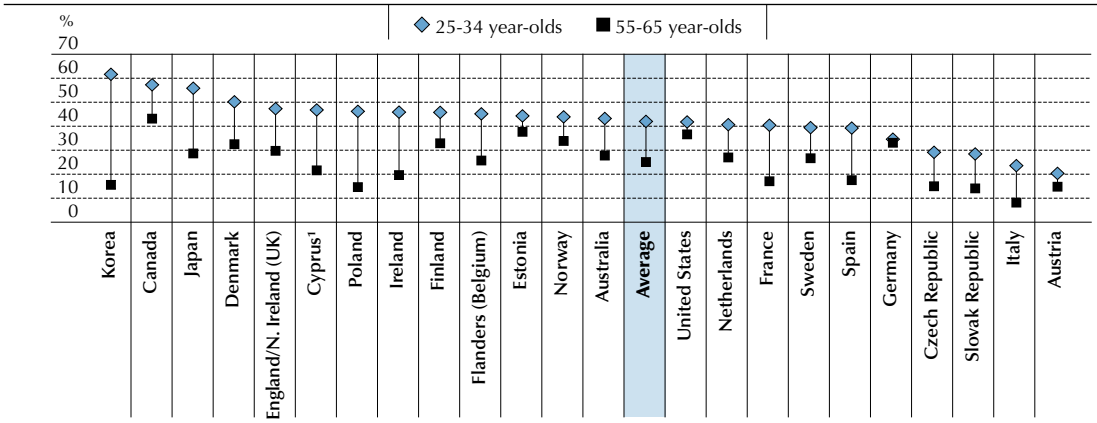
■ Figure b ■

Population with tertiary education

Percentage, by age group



1. See notes at the end of this chapter.

Countries are ranked in descending order of the percentage of 25-34 year-olds with tertiary education.

Source: Survey of Adult Skills (PIAAC) (2012), Table B2.2 in Annex B.

StatLink http://dx.doi.org/10.1787/888932900726

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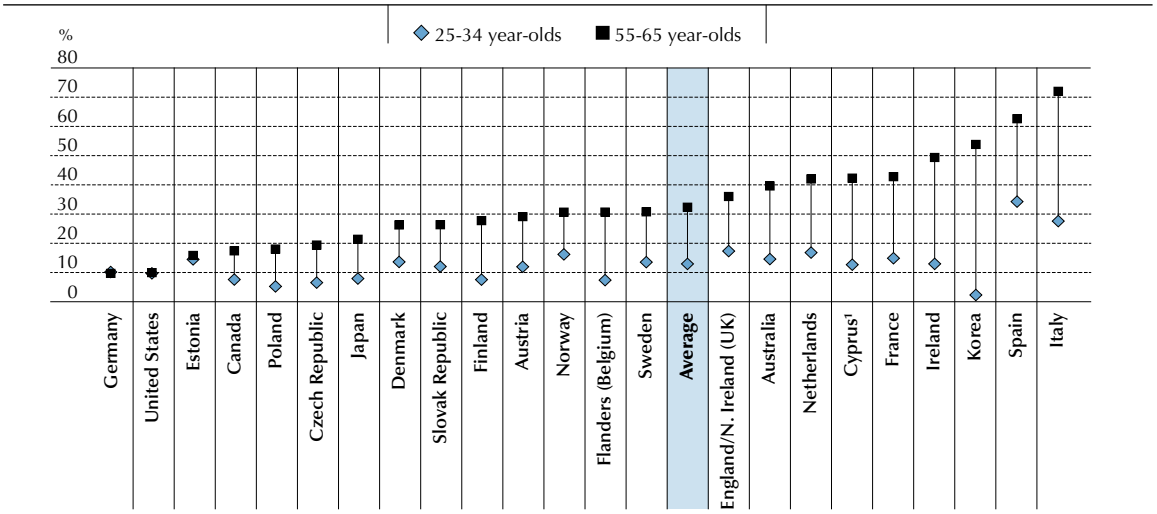
By contrast, in some participating countries, large proportions of older adults have not completed upper secondary education (Figure "c" below). This proportion is as large as around 72% in Italy and more than 40% in France, Ireland, Korea, the Netherlands and Spain. While some of these countries, such as Ireland and Korea, have seen substantial decreases in the proportion of young adults without upper secondary education, more than 25% of young adults in Italy and Spain have not attained upper secondary education.

The proportion of the population that is foreign-born adds to the diversity of country contexts. As shown in Figure "d" below, more than 15% of the total population in Australia, Austria, Canada, Estonia and Ireland were foreign-born, compared to less than 5% of the population in Finland in 2009. Ireland and Spain reported particularly large increases in their immigrant populations between 1996 and 2009.

■ Figure c ■

Population without upper secondary education

Percentage, by age group



1. See notes at the end of this chapter.

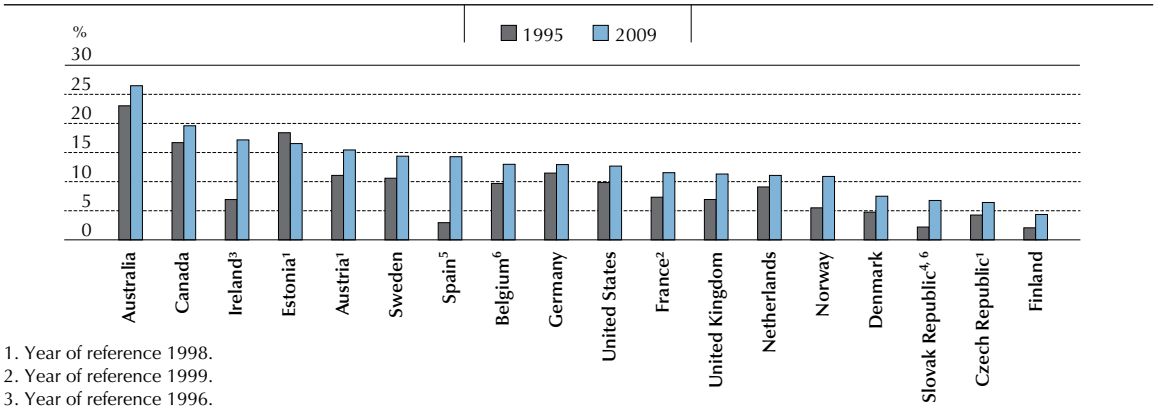
Countries are ranked in ascending order of the percentage of 55-65 year-olds without upper secondary education.

Source: Survey of Adult Skills (PIAAC) (2012), Table B2.2 in Annex B.

StatLink http://dx.doi.org/10.1787/888932900745

■ Figure d ■

Foreign-born population as a percentage of total population



1. Year of reference 1998.
2. Year of reference 1999.
3. Year of reference 1996.
4. Year of reference 2001.
5. Year of reference 1996.
6. Year of reference 2008.
7. See notes at the end of this chapter.

Countries are ranked in descending order of the percentage of foreign-born population in 2009.

Note: Data are not available for Italy, Poland, Japan, Korea and Cyprus.[7]

Source: OECD International Migration Database, Table B2.3 in Annex B.

StatLink http://dx.doi.org/10.1787/888932900764

DEFINING LITERACY, NUMERACY AND PROBLEM SOLVING IN TECHNOLOGY-RICH ENVIRONMENTS

The skills assessed in the Survey of Adult Skills are each defined by a framework that guided the development of the assessment and provides a reference point for interpreting results. Each framework defines the skills assessed in terms of:

- **content** – the texts, artefacts, tools, knowledge, representations and cognitive challenges that constitute the corpus to which adults must respond or use when they read, act in a numerate way or solve problems in technology-rich environments;
- **cognitive strategies** – the processes that adults must bring into play to respond to or use given content in an appropriate manner; and
- **context** – the different situations in which adults have to read, display numerate behaviour, and solve problems.

Table 2.1 provides an overview of each of the three domains, including a definition of the skills in question and the content, cognitive strategies and contexts related to each. More information on the definition of these skills can be found in Chapter 1 of the *Reader's Companion* to this report (OECD, 2013).

Table 2.1
Summary of assessment domains in the Survey of Adult Skills (PIAAC)

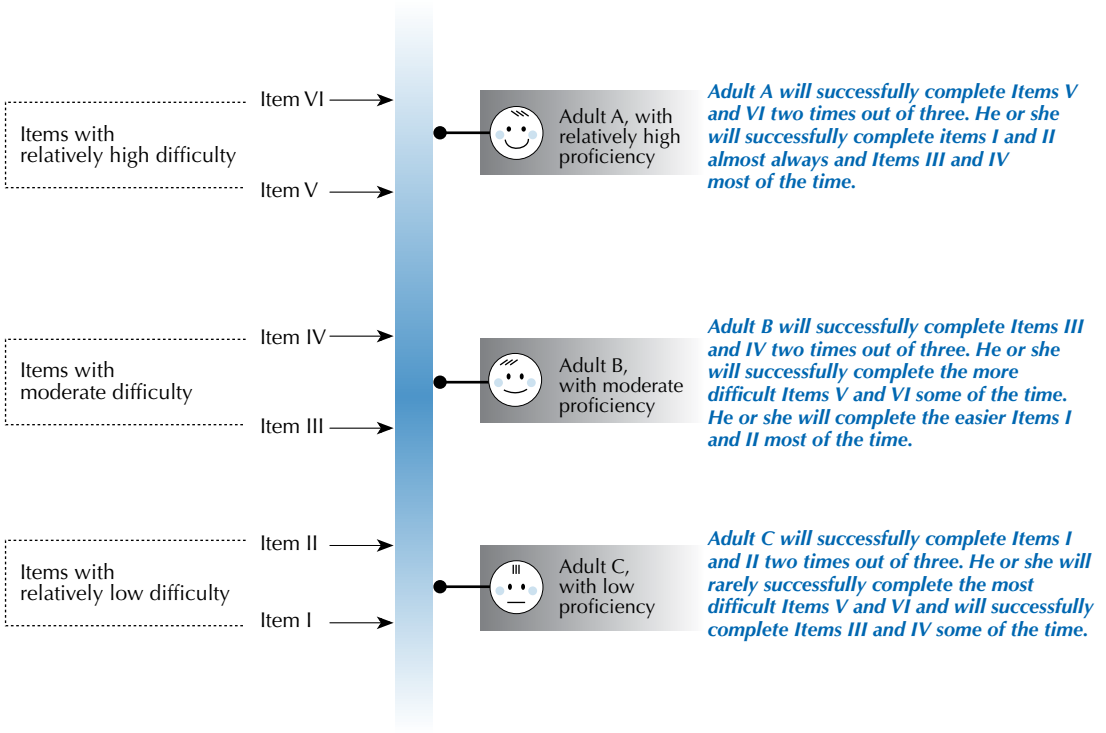
	Literacy	Numeracy	Problem solving in technology-rich environments
Definition	Literacy is defined as the ability to understand, evaluate, use and engage with *written texts* to participate in society, to achieve one's goals, and to develop one's knowledge and potential. Literacy encompasses a range of skills from the decoding of written words and sentences to the comprehension, interpretation, and evaluation of complex texts. It does not, however, involve the production of text (writing[1]). Information on the skills of adults with low levels of proficiency is provided by an assessment of reading components that covers text vocabulary, sentence comprehension and passage fluency.	Numeracy is defined as the ability to access, use, interpret and communicate mathematical information and ideas in order to engage in and manage the mathematical demands of a range of situations in adult life. To this end, numeracy involves managing a situation or solving a problem in a real context, by responding to mathematical content/information/ideas represented in multiple ways.	Problem solving in technology-rich environments is defined as the ability to use digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks. The assessment focuses on the abilities to solve problems for personal, work and civic purposes by setting up appropriate goals and plans, and accessing and making use of information through computers and computer networks.
Content	Different types of text. Texts are characterised by their medium (print-based or digital) and by their format: ▪ Continuous or prose texts ▪ Non-continuous or document texts ▪ Mixed texts ▪ Multiple texts	Mathematical content, information and ideas: ▪ Quantity and number ▪ Dimension and shape ▪ Pattern, relationships and change ▪ Data and chance Representations of mathematical information: ▪ Objects and pictures ▪ Numbers and symbols ▪ Visual displays (e.g. diagrams, maps, graphs, tables) ▪ Texts ▪ Technology-based displays	Technology: ▪ Hardware devices ▪ Software applications ▪ Commands and functions ▪ Representations (e.g. text, graphics, video) Tasks: ▪ Intrinsic complexity ▪ Explicitness of the problem statement
Cognitive strategies	▪ Access and identify ▪ Integrate and interpret (relating parts of text to one another) ▪ Evaluate and reflect	▪ Identify, locate or access ▪ Act upon and use (order, count, estimate, compute, measure, model) ▪ Interpret, evaluate and analyse ▪ Communicate	▪ Set goals and monitor progress ▪ Plan ▪ Acquire and evaluate information ▪ Use information
Contexts	▪ Work-related ▪ Personal ▪ Society and community ▪ Education and training	▪ Work-related ▪ Personal ▪ Society and community ▪ Education and training	▪ Work-related ▪ Personal ▪ Society and community

REPORTING THE RESULTS

In each of the three domains assessed, proficiency is considered as a continuum of ability involving the mastery of information-processing tasks of increasing complexity. The results are represented on a 500-point scale. At each point on the scale, an individual with a proficiency score of that particular value has a 67% chance of successfully completing test items located at that point. This individual will also be able to complete more difficult items (those with higher values on the scale) with a lower probability of success and easier items (those with lower values on the scale) with a greater chance of success.

This is illustrated in Box 2.2. For example, Adult C, with low proficiency will be able to successfully complete items I and II around two-thirds of the time. He or she will also be able to complete items of moderate difficulty some of the time and very difficult items only rarely. Adult A, with high proficiency, will be able to successfully complete items V and VI two-thirds of the time, items III and IV most of the time, and items I and II almost always.

Box 2.2. **Relationship between difficulty of assessment items and proficiency of adults on the literacy, numeracy and problem solving in technology-rich environments scales**



The proficiency scale in each of the domains assessed can be described in relation to the items that are located at the different points on the scale according to their difficulty (see Chapter 4 of the *Reader's Companion* to this report [OECD, 2013]). The scales have been divided into "proficiency levels", defined by particular score-point ranges and the level of difficulty of the tasks within these ranges. The descriptors provide a summary of the types of tasks that can be successfully completed by adults with proficiency scores in a particular range. In other words, they suggest what adults with particular proficiency scores in a particular skills domain can do. Six proficiency levels are defined for literacy and numeracy (Levels 1 through 5 plus below Level 1) and four for problem solving in technology-rich environments (Levels 1 through 3 plus below Level 1).[2] The value ranges defining the levels and their respective descriptors are presented in Tables 2.2, 2.3 and 2.4 in this chapter and in Chapter 4 of the *Reader's Companion* to this report (OECD, 2013).[3]

Tasks located at a particular proficiency level can be successfully completed by the "average" person at that level approximately two-thirds of the time. However, a person with a score at the bottom of the level would successfully complete tasks at that level only about half the time and someone with a score at the top of the level would successfully complete tasks at the level about 80% of the time.

In this report, proficiency levels have a *descriptive* purpose. They are intended to aid the interpretation and understanding of the reporting scales by describing the attributes of the tasks that adults with particular proficiency scores can typically successfully complete. In particular, they have no *normative* element and should not be understood as "standards" or "benchmarks" in the sense of defining levels of proficiency appropriate for particular purposes (e.g. access to post-secondary education or fully participating in a modern economy) or for particular population groups.[4]

In order to interpret differences in scores between countries or groups, it is useful to have a reference point to help illustrate what score-point differences of different magnitudes mean. A possible reference point is provided by the differences in the proficiency scores of individuals similar in all respects other than their level of completed education. The average score-point difference associated with an additional year of completed education or training (i.e. between a person who has completed n years of education and one who has completed n+1 years) is approximately 7 score points, on average, on both the literacy and numeracy scales.[5] One standard deviation on the literacy scale (47.7 score points) and the numeracy scale (52.6 score points) is thus the approximate equivalent of the average difference in score points associated with a difference of seven years of education.

Non-response represents a potential source of bias in any survey. Considerable efforts were made by the countries participating in the Survey of Adult Skills to reduce the level of non-response and to minimise its effects. Response rates varied between 45% and 75%. All countries with response rates of less than 70% were required to undertake extensive analyses of the bias associated with non-response. The outcome of these analyses was that the bias associated with non-response is regarded as being minimal to low in most countries. Nonetheless, readers should be aware that non-response was present in all countries and that response rates varied between the countries participating in the survey. Both the response rates for individual participating countries and a discussion of the potential bias associated with non-response can be found in Chapter 3 of the *Reader's Companion* to this report (OECD, 2013).

PROFICIENCY IN LITERACY

The Survey of Adult Skills defines literacy as the ability to understand, evaluate, use and engage with written texts to participate in society, achieve one's goals, and develop one's knowledge and potential. In the survey, the term "literacy" refers to the reading of written texts; it does not involve either the comprehension or production of spoken language or the production of text (writing). In addition, given the growing importance of digital devices and applications as a means of generating, accessing and storing written text, the reading of digital texts is an integral part of literacy measured in the Survey of Adult Skills (see Box 2.3). Digital texts are texts that are stored as digital information and accessed in the form of screen-based displays on devices such as computers and smart phones. Digital texts have a range of features that distinguish them from print-based texts: in addition to being displayed on screens, these include hypertext links to other documents, specific navigation features (e.g. scroll bars, use of menus) and interactivity. The Survey of Adult Skills is the first international assessment of adult literacy to cover this dimension of reading.

Box 2.3. Reading on a screen or on paper: Does it affect proficiency in literacy?

Literacy and numeracy assessments in the Survey of Adult Skills were available in both a computer-based and a paper-based version. On average across countries, 74% of respondents took the computer-based assessment and some 21% took the paper-based assessment as they had no or very low computer skills or expressed a preference to do so (see Figure "a" in this box).

The computer-based and paper-based assessments of literacy differ in two main ways. First, the paper-based assessment tests the reading of *print* texts exclusively whereas the computer-based version covers the reading of *digital texts*, such as simulated websites, results pages from search engines and blog posts, in addition to the reading of *print texts* presented on a screen. Second, the response modes differ. In the paper-based test, respondents provide written answers in paper test booklets. In the computer-based test, responding to the assessment tasks involves interacting with text and visual displays on a computer screen using devices such as a keyboard and a mouse, and functions such as highlighting and drag and drop.

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The difference in format and content of the computer-based and paper-based versions of the literacy assessment raises two important questions. First, to what extent are the results from the computer-based and paper-based versions of the assessment comparable? Second, given that the computer-based assessment covers the reading of digital texts that are not covered in the paper-based version, is the comparability of results between countries affected by the fact that varying proportions of the population in the participating countries took the computer-based version?

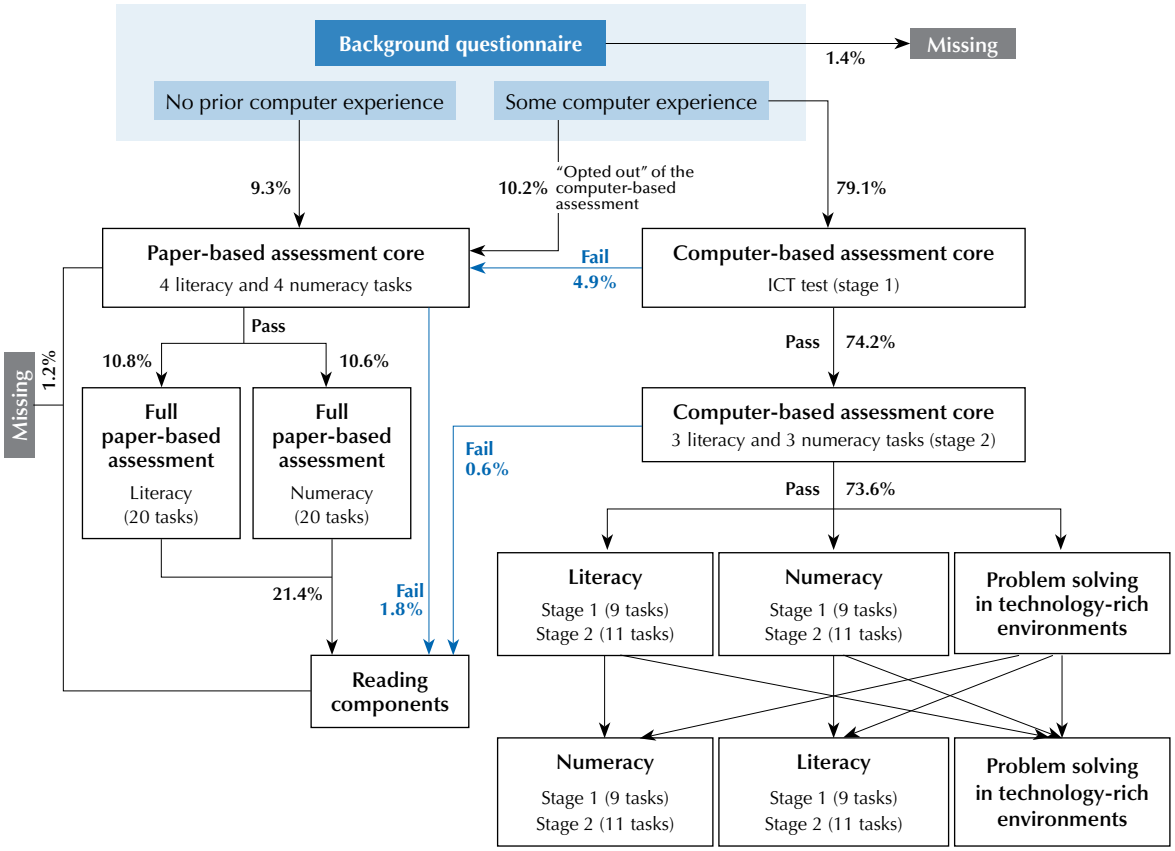
The extent to which the mode of delivery of the assessment affected results was examined in the field test for the survey that took place in 2010 using a design that randomly assigned participants to the computer-based and paper-based versions of the assessment. The analysis of the field test results concluded that difficulty and discrimination of most of the test items common to the two versions was largely unaffected by the mode in which the test was taken.

The field test analysis also concluded that the paper-based and computer-based items could be placed on the same scale. In other words, the processes of understanding the meaning of text are fundamentally the same for all types of text. The reading of printed texts and the reading of digital texts involves the same cognitive operations. The difficulty of assessment tasks involving print-based and digital texts is related to the same factors, such as the amount of distracting information.

Analysis of the results from the Survey of Adult Skills show that there are no systematic differences between the scores of adults who took the paper-based assessment and those who took the computer-based assessment when socio-demographic factors (age, educational attainment, immigrant background and gender) are controlled for (see Table B2.6 in Annex B).

■ Figure a ■

Percentage of respondents taking different pathways in the Survey of Adult Skills (PIAAC)



Note: The figures presented in this diagram are based on the average of OECD countries participating in the Survey of Adult Skills (PIAAC).

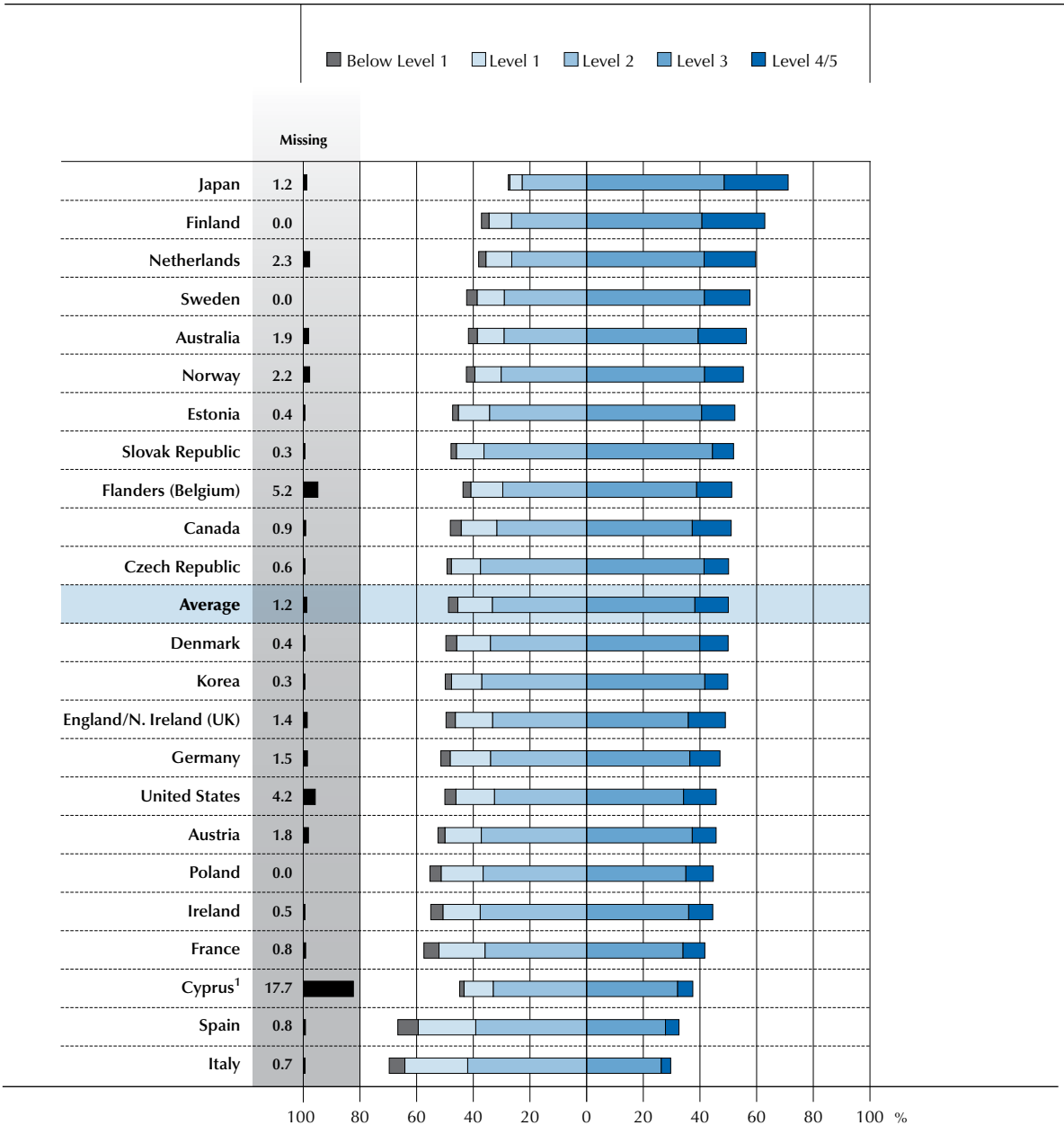
WHAT ADULTS CAN DO AT DIFFERENT LEVELS OF LITERACY PROFICIENCY

Figure 2.1 presents the percentage of adults aged 16-65 in each participating country who score at each of the six levels of proficiency (Levels 1 through 5 and below Level 1) on the literacy scale. The features of the tasks at these levels are described in detail in Table 2.2 and examples of literacy items are described in Box 2.4.

■ Figure 2.1 ■

Literacy proficiency among adults

Percentage of adults scoring at each proficiency level in literacy



1. See notes at the end of this chapter.

Notes: Adults in the missing category were not able to provide enough background information to impute proficiency scores because of language difficulties, or learning or mental disabilities (referred to as literacy-related non-response).

Countries are ranked in descending order of the combined percentage of adults scoring at Level 3 and Level 4/5.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.1.

StatLink http://dx.doi.org/10.1787/888932900365

Table 2.2
Description of proficiency levels in literacy

Level	Score range	Percentage of adults scoring at each level (average)	Types of tasks completed successfully at each level of proficiency
Below Level 1	Below 176 points	3.3%	The tasks at this level require the respondent to read brief texts on familiar topics to locate a single piece of specific information. There is seldom any competing information in the text and the requested information is identical in form to information in the question or directive. The respondent may be required to locate information in short continuous texts. However, in this case, the information can be located as if the text were non-continuous in format. Only basic vocabulary knowledge is required, and the reader is not required to understand the structure of sentences or paragraphs or make use of other text features. Tasks below Level 1 do not make use of any features specific to digital texts.
1	176 to less than 226 points	12.2%	Most of the tasks at this level require the respondent to read relatively short digital or print continuous, non-continuous, or mixed texts to locate a single piece of information that is identical to or synonymous with the information given in the question or directive. Some tasks, such as those involving non-continuous texts, may require the respondent to enter personal information onto a document. Little, if any, competing information is present. Some tasks may require simple cycling through more than one piece of information. Knowledge and skill in recognising basic vocabulary determining the meaning of sentences, and reading paragraphs of text is expected.
2	226 to less than 276 points	33.3%	At this level, the medium of texts may be digital or printed, and texts may comprise continuous, non-continuous, or mixed types. Tasks at this level require respondents to make matches between the text and information, and may require paraphrasing or low-level inferences. Some competing pieces of information may be present. Some tasks require the respondent to ▪ cycle through or integrate two or more pieces of information based on criteria; ▪ compare and contrast or reason about information requested in the question; or ▪ navigate within digital texts to access and identify information from various parts of a document.
3	276 to less than 326 points	38.2%	Texts at this level are often dense or lengthy, and include continuous, non-continuous, mixed, or multiple pages of text. Understanding text and rhetorical structures become more central to successfully completing tasks, especially navigating complex digital texts. Tasks require the respondent to identify, interpret, or evaluate one or more pieces of information, and often require varying levels of inference. Many tasks require the respondent to construct meaning across larger chunks of text or perform multi-step operations in order to identify and formulate responses. Often tasks also demand that the respondent disregard irrelevant or inappropriate content to answer accurately. Competing information is often present, but it is not more prominent than the correct information.
4	326 to less than 376 points	11.1%	Tasks at this level often require respondents to perform multiple-step operations to integrate, interpret, or synthesise information from complex or lengthy continuous, non-continuous, mixed, or multiple type texts. Complex inferences and application of background knowledge may be needed to perform the task successfully. Many tasks require identifying and understanding one or more specific, non-central idea(s) in the text in order to interpret or evaluate subtle evidence-claim or persuasive discourse relationships. Conditional information is frequently present in tasks at this level and must be taken into consideration by the respondent. Competing information is present and sometimes seemingly as prominent as correct information.
5	Equal to or higher than 376 points	0.7%	At this level, tasks may require the respondent to search for and integrate information across multiple, dense texts; construct syntheses of similar and contrasting ideas or points of view; or evaluate evidence based arguments. Application and evaluation of logical and conceptual models of ideas may be required to accomplish tasks. Evaluating reliability of evidentiary sources and selecting key information is frequently a requirement. Tasks often require respondents to be aware of subtle, rhetorical cues and to make high-level inferences or use specialised background knowledge.

Note: The percentage of adults scoring at different levels of proficiency adds up to 100% when the 1.2% of literacy-related non-respondents across countries are taken into account. Adults in this category were not able to complete the background questionnaire due to language difficulties or learning and mental disabilities (see section on literacy-related non-response).

Box 2.4. Examples of literacy items

Items that exemplify the pertinent features of the proficiency levels in the domain of literacy are described below (see also Table 4.2 in the *Reader's Companion* to this report [OECD, 2013]).

Below Level 1: Election results (Item ID: C302BC02)
Cognitive strategies: Access and identify
Text format: Mixed
Medium: Print
Context: Society and community
Difficulty score: 162

The stimulus consists of a short report of the results of a union election containing several brief paragraphs and a simple table identifying the three candidates in the election and the number of votes they received. The test-taker is asked to identify which candidate received the fewest votes. He or she needs to compare the number of votes that the three candidates received and identify the name of the candidate who received the fewest votes. The word "votes" appears in both the question and in the table and nowhere else in the text.

Level 1: Generic medicine (Item ID: C309A321)
Cognitive strategies: Integrate and interpret
Text format: Mixed
Medium: Print
Context: Personal (health and safety)
Difficulty score: 219

The stimulus is a short newspaper article entitled "Generic medicines: Not for the Swiss". It has two paragraphs and a table in the middle displaying the market share of generic medicines in 14 European countries and the United States. The test-taker is asked to determine the number of countries in which the generic drug market accounts for 10% or more of total drug sales. The test-taker has to count the number of countries with a market share greater than 10%. The percentages are sorted in descending order to facilitate the search. The phrase "drug sales", however, does not appear in the text; therefore, the test-taker needs to understand that "market share" is a synonym of "drug sales" in order to answer the question.

Level 2: Lakeside fun run (Item ID: C322P002)
Cognitive strategies: Evaluate and reflect
Text format: Mixed
Medium: Digital
Context: Personal (leisure and recreation)
Difficulty score: 240

The stimulus is a simulated website containing information about the annual fun run/walk organised by the Lakeside community club. The test-taker is first directed to a page with several links, including "Contact Us" and "FAQs". He or she is then asked to identify the link providing the phone number of the organisers of the event. In order to answer this item correctly, the test-taker needs to click on the link "Contact Us". This requires navigating through a digital text and some understanding of web conventions. While this task might be fairly simple for test-takers familiar with web-based texts, some respondents less familiar with web-based texts would need to make some inferences to identify the correct link.

Level 3: Library search (Item ID: C323P003)
Cognitive strategies: Access and identify
Text format: Multiple
Medium: Digital
Context: Education and training
Difficulty score: 289

The stimulus displays results from a bibliographic search from a simulated library website. The test-taker is asked to identify the name of the author of a book called *Ecomyth*. To complete the task, the test-taker has to scroll through a list of bibliographic entries and find the name of the author specified under the book title. In addition to scrolling, the test-taker must be able to access the second page where *Ecomyth* is located by either clicking the page number (2) or the word "next". There is considerable irrelevant information in each entry to this particular task, which adds to the complexity of the task.

...

Level 4: Library search (Item ID: C323P002)
Cognitive strategies: Integrate and interpret
Text format: Multiple
Medium: Digital
Context: Education and training
Difficulty score: 348

This task uses the same stimulus as the previous example. The test-taker is asked to identify a book suggesting that the claims made both for and against genetically modified foods are unreliable. He or she needs to read the title and the description of each book in each of the entries reporting the results of the bibliographic search in order to identify the correct book. Many pieces of distracting information are present. The information that the relevant book suggests that the claims for and against genetically modified foods are unreliable must be inferred from the statement that the author "describes how both sides in this hotly contested debate have manufactured propaganda, tried to dupe the public and...[text ends]".

Proficiency at Level 5 (scores equal to or higher than 376 points)

Level 5 is the highest proficiency level on the literacy scale. Adults reaching this level can perform tasks that involve searching for and integrating information across multiple, dense texts; constructing syntheses of similar and contrasting ideas or points of view, or evaluating evidence and arguments. They can apply and evaluate logical and conceptual models, and evaluate the reliability of evidentiary sources and select key information. They are aware of subtle, rhetorical cues and are able to make high-level inferences or use specialised background knowledge.

Less than 1% (0.7%) of adults perform at Level 5 in any participating country. Finland has the highest proportion of adults at this level (2.2%), followed by Australia and the Netherlands (both at 1.3%), Japan and Sweden (both at 1.2%).

Proficiency at Level 4 (scores from 326 points to less than 376 points)

At Level 4, adults can perform multiple-step operations to integrate, interpret, or synthesise information from complex or lengthy continuous, non-continuous, mixed, or multiple-type texts that involve conditional and/or competing information. They can make complex inferences and appropriately apply background knowledge as well as interpret or evaluate subtle truth claims or arguments.

On average, 11.1% of adults score at Level 4 and 11.8% score at Level 4 or higher. Japan (21.4%) and Finland (20.0%) have the largest proportion of adults scoring at this level and the largest proportion of adults scoring at this level or higher. At the other end of the scale, Italy (3.3%) and Spain (4.6%) have less than half the average proportion of adults performing at this level. They also have the smallest proportion of adults scoring at Level 4 or higher.

Proficiency at Level 3 (scores from 276 points to less than 326 points)

Adults performing at Level 3 can understand and respond appropriately to dense or lengthy texts, including continuous, non-continuous, mixed, or multiple pages. They understand text structures and rhetorical devices and can identify, interpret, or evaluate one or more pieces of information and make appropriate inferences. They can also perform multi-step operations and select relevant data from competing information in order to identify and formulate responses.

Across countries, 38.2 % of adults score at Level 3, on average. In most countries, more adults perform at this level than at any other level. This is true for all of the participating countries except France, Ireland, Italy, Poland and Spain, where larger proportions of adults score at Level 2. Japan (48.6%), the Slovak Republic (44.4%) and Korea (41.7%) have the largest proportions of adults at this level, while Italy has the smallest proportion of adults scoring at Level 3 (26.4%), followed by Spain (27.8%).

At the same time, half of adults score at Level 3 or higher, on average across countries. More than 60% of adults in Japan (71.1%) and Finland (62.9%) score at this level or higher while less than 40% of adults in Italy (29.7%) and Spain (32.6%) do.

Proficiency at Level 2 (scores from 226 points to less than 276 points)

At Level 2, adults can integrate two or more pieces of information based on criteria, compare and contrast or reason about information and make low-level inferences. They can navigate within digital texts to access and identify information from various parts of a document.

On average, one-third of adults (33.3%) perform at Level 2. Italy (42.0%) and Spain (39.1%) have the highest proportions of adults scoring at this level, and Ireland (37.6%), the Czech Republic (37.5%), Austria (37.2%) and Korea (37.0%) also have particularly large proportions of adults scoring at this level. By contrast, Japan (22.8%), the Netherlands (26.4%) and Finland (26.5%) have the smallest proportions of adults scoring at Level 2.

Across countries, 83.3% of adults reach at least Level 2. Countries with the largest proportion of adults reaching at least this level include Japan (93.9%), Finland (89.4%), the Slovak Republic (88.1%) and the Czech Republic (87.6%) while Italy (71.7%), Spain (71.7%) and the United States (78.3%) have the smallest proportions of adults reaching at least Level 2.

Proficiency at Level 1 (scores from 176 points to less than 226 points)

At Level 1, adults can read relatively short digital or print continuous, non-continuous, or mixed texts to locate a single piece of information, which is identical to or synonymous with the information given in the question or directive. These texts contain little competing information. Adults performing at this level can complete simple forms, understand basic vocabulary, determine the meaning of sentences, and read continuous texts with a degree of fluency.

Across countries, 12.2% of adults score at Level 1. Just over one in five adults in Italy (22.2%) and Spain (20.3%) score at this level. In contrast, just over one in 25 adults (4.3%) in Japan score at this level. Finland (8.0%), the Netherlands (9.1%), Norway (9.3%), Australia (9.4%), Sweden (9.6%) and the Slovak Republic (9.7%) also have small proportions of adults scoring at this level.

Countries with the largest proportions of adults scoring at or below Level 1 include Italy (27.7%), Spain (27.5%) and France (21.6%), while Japan (4.9%), Finland (10.6%), the Slovak Republic (11.6%) and the Netherlands (11.7%) have the smallest proportion of adults scoring at or below Level 1.

Proficiency below Level 1 (scores below 176 points)

Individuals at this level can read brief texts on familiar topics and locate a single piece of specific information identical in form to information in the question or directive. They are not required to understand the structure of sentences or paragraphs and only basic vocabulary knowledge is required. Tasks below Level 1 do not make use of any features specific to digital texts.

On average, 3.3% of adults perform below Level 1. Spain has the largest proportion of adults scoring below Level 1 (7.2%), followed by Italy (5.5%), France (5.3%), and Ireland (4.3%). Again, Japan has the smallest proportion of adults scoring at this level (0.6%), followed by the Czech Republic (1.5%), the Slovak Republic (1.9%) and Estonia (2.0%). More information about the skills of readers with very low proficiency was provided by the reading components assessment (see Box 2.5).

Box 2.5. Reading components

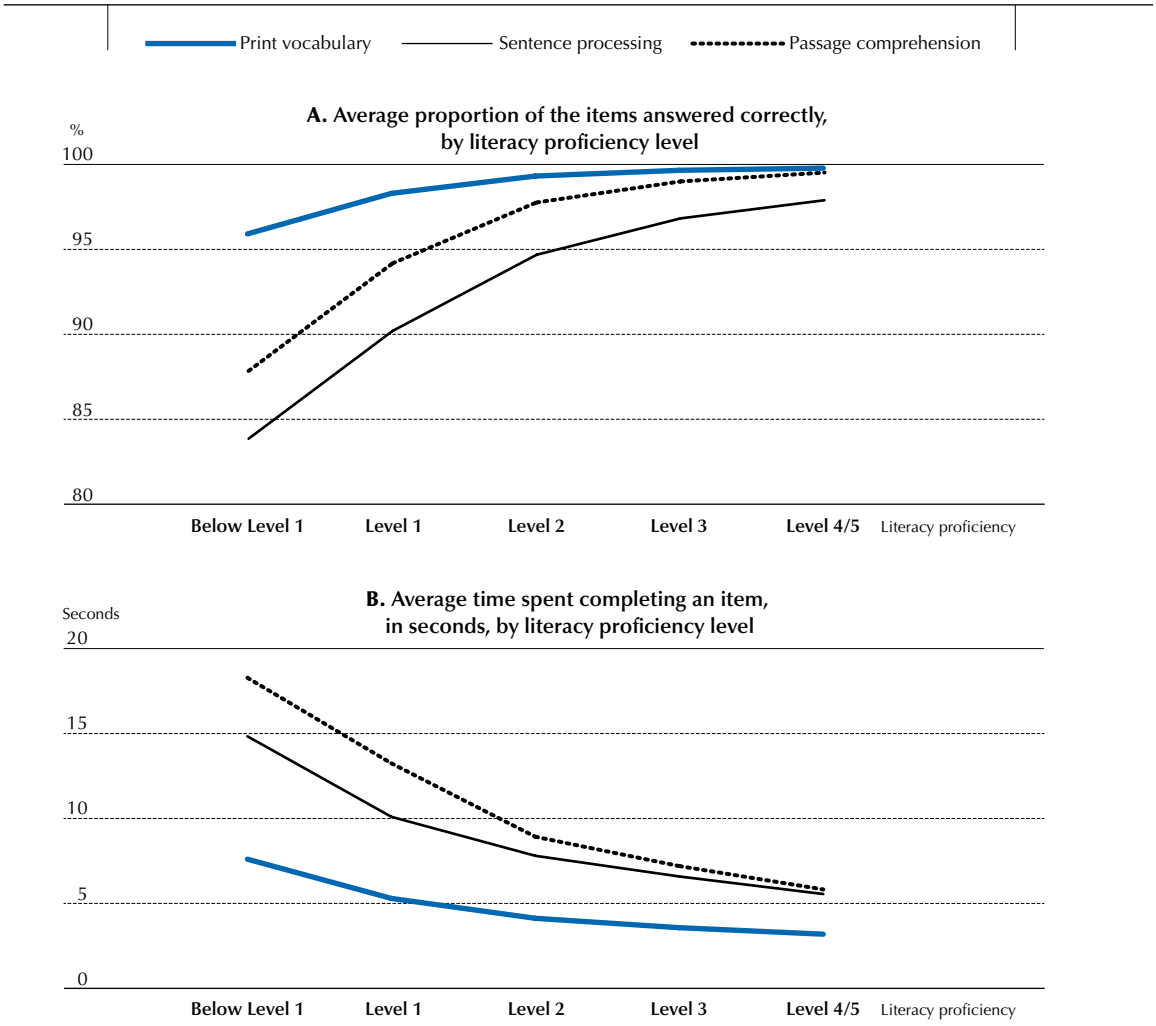
The Survey of Adult Skills included an assessment of *reading components* designed to provide information about adults with very low levels of proficiency in reading. This module was implemented in 21 of the 24 participating countries (Adults in Finland, France and Japan did not take part in this assessment). The skills tested by the reading components assessment are those that are essential for understanding the meaning of written texts: knowledge of vocabulary (word recognition), the ability to evaluate the logic of sentences, and fluency in reading passages of text. Skilled readers are able to undertake these types of operations automatically.

Three elements of reading proficiency were assessed in reading components: print vocabulary, sentence processing and passage comprehension. The print vocabulary tasks required test takers to select the word corresponding to a picture of an object from a selection of four alternative words. The sentence processing tasks required test takers to identify whether a sentence made logical sense in terms of the properties of the real world. The passage comprehension tasks entailed reading a prose text. At certain points in the text, test takers were given a choice of two words and required to select the word that made the most sense in the context of the passage. Chapter 1 in the *Reader's Companion* (OECD, 2013) to this report presents samples of the reading components tasks. The time taken by respondents to complete the tasks was recorded in each test.

...

■ Figure a ■

Relationship between literacy proficiency and performance in reading components



Notes: The results for each country can be found in the tables mentioned in the source below. Finland, France and Japan did not participate in the reading components assessment.
Source: Survey of Adult Skills (PIAAC) (2012), Tables B2.4a and B2.4b in Annex B.
StatLink http://dx.doi.org/10.1787/888932900783

The assessment of reading components was completed by respondents who failed the literacy and numeracy core assessment in the computer-based version of the assessment and by all respondents taking the paper version of the assessment in order to obtain comparative results (see Box 2.3 – Figure a).

Figure "a" shows the relationship between proficiency on the literacy scale and the performance in the three components of this assessment on average across the 21 countries that participated in the reading components assessment. In Figure "a", Panel A shows the relationship between literacy proficiency and the percentage of items answered correctly (accuracy) and Panel B shows the relationship between proficiency and the time taken (in seconds) to complete an item (speed). Both accuracy and speed increases with proficiency for all three of the components. There is little improvement in either accuracy or speed for individuals with proficiency at Level 3 or above in literacy.

The results from the reading components assessment will be explored in detail in a subsequent report examining the characteristics and skills of adults with very low levels of literacy proficiency.

Literacy-related non-response

In all of the participating countries, some adults were unable to complete the background questionnaire as they were unable to speak or read the language of the assessment, had difficulty reading or writing, or had learning or mental disabilities. In the case of the background questionnaire, there was no one present (either the interviewer or another person) to translate into the language of the respondent or answer on behalf of the respondent. In the case of these respondents, only their age, gender and, in some cases, educational attainment is known. In most countries, non-respondents represented less than 5% of the total population. This category is identified separately in Figure 2.1 as a black bar in each country (categorised as missing). While the proficiency of this group is likely to vary between countries, in most cases, these persons are likely to have low levels of proficiency (Level 1 or below) in the test language or languages of the country concerned.

HOW DISTRIBUTIONS OF PROFICIENCY SCORES COMPARE ACROSS COUNTRIES

Comparison of average proficiency scores in literacy

Mean literacy scores of participating countries in the Survey of Adult Skills are presented in Figure 2.2a. Countries with mean scores that are not statistically different from other countries are identified (see Box 2.6). For example, the mean score for Norway (278 points) is similar to that of Australia (280 points) and Sweden (279 points), but is lower than that of the Netherlands (284 points), Finland (288 points) and Japan (296 points) and higher than that of Estonia (276 points) and the countries whose mean scores are lower than that of Estonia. Countries whose scores are statistically similar to, above and below the average across countries are also identified.

Box 2.6. Comparing results among countries and population subgroups

The statistics in this report are estimates of national performance based on samples of adults, rather than values that could be calculated if every person in the target population in every country had answered every question. Consequently, it is important to measure the degree of uncertainty of the estimates. In the Survey of Adult Skills, each estimate has an associated degree of uncertainty, which is expressed through a standard error. The use of confidence intervals provides a way to make inferences about the population means and proportions in a manner that reflects the uncertainty associated with the sample estimates. From an observed sample statistic, and assuming a normal distribution, it can be inferred that the result for the corresponding population would lie within the confidence interval in 95 out of 100 replications of the measurement on different samples drawn from the same population.

In many cases, readers are primarily interested in whether a given value in a particular country is different from a second value in the same or another country, e.g. whether women in a country perform better than men in the same country. In the tables and figures used in this report, differences are labelled as statistically significant when there is less than a 5% chance of a reported difference between the populations of interest being erroneously attributed as real.

In addition to error associated with sampling, there are a range of other possible sources of error in sample surveys such as the Survey of Adult Skills including error associated with survey non-response (see Chapter 3 of the *Reader's Companion* (OECD, 2013) to this report for a discussion of response rates and non-response bias). While the likely level of bias associated with non-response is assessed as minimal to low for most countries participating in the study, the possibility of biases associated with non-response cannot be ruled out. Readers should, therefore, exercise caution in drawing conclusions from small score point differences between countries or population groups, even if the differences concerned are statistically significant.

Literacy-related non-respondents are not included in the calculation of the mean scores presented in Figure 2.2a[6] which, thus, present an upper bound of the estimated literacy proficiency of the population. Figure 2.2b presents a sensitivity analysis showing the impact on country mean scores if literacy-related non-respondents are taken into account and are all assumed to score 85 points on the literacy scale. This is believed to be a reasonable representation

of a lower bound for the proficiency of this group.[7] With the exception of the countries with high proportions of literacy-related non-respondents (missing), the effect on average scores and/or relative rankings of most countries are relatively small. The discussion that follows focuses on the data in Figure 2.2a.

■ Figure 2.2a ■

Comparison of average literacy proficiency among adults

Mean literacy proficiency scores of 16-65 year-olds

Significantly **above** the average
Not significantly different from the average
Significantly **below** the average

Mean	Comparison country	Countries whose mean score is NOT significantly different from the comparison country
296	**Japan**	
288	**Finland**	
284	**Netherlands**	
280	**Australia**	Norway, Sweden
279	**Sweden**	Australia, Norway
278	**Norway**	Australia, Sweden
276	**Estonia**	Czech Republic, Flanders (Belgium)
275	**Flanders (Belgium)**	Czech Republic, Estonia, Slovak Republic
274	**Czech Republic**	Canada, Estonia, Korea, Slovak Republic, Flanders (Belgium), England/N. Ireland (UK)
274	**Slovak Republic**	Canada, Czech Republic, Korea, Flanders (Belgium), England/N. Ireland (UK)
273	**Canada**	Czech Republic, Korea, Slovak Republic, England/N. Ireland (UK)
273	**Average**	**Canada, Czech Republic, Korea, Slovak Republic, England/N. Ireland (UK)**
273	**Korea**	Canada, Czech Republic, Slovak Republic, England/N. Ireland (UK)
272	**England/N. Ireland (UK)**	Canada, Czech Republic, Denmark, Germany, Korea, Slovak Republic, United States
271	**Denmark**	Austria, Germany, United States, England/N. Ireland (UK)
270	**Germany**	Austria, Denmark, United States, England/N. Ireland (UK), Cyprus[1]
270	**United States**	Austria, Denmark, Germany, England/N. Ireland (UK), Cyprus[1]
269	**Austria**	Denmark, Germany, United States, Cyprus[1]
269	**Cyprus[1]**	Austria, Germany, Ireland, United States
267	**Poland**	Ireland
267	**Ireland**	Poland, Cyprus[1]
262	**France**	
252	**Spain**	Italy
250	**Italy**	Spain

1. See notes at the end of this chapter.

Notes: Statistical significance is at the 5% level. Literacy-related non-response (missing) is excluded from the calculation of mean scores. Figure 2.2b, however, presents an estimate of lower-bound mean scores by attributing a very low score (85 points) to those adults who were not able to provide enough background information because of language difficulties, or learning or mental disabilities (literacy-related non-response).

Countries are ranked in descending order of the mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.2a.

StatLink http://dx.doi.org/10.1787/888932900384

The average literacy score for the OECD member countries participating in the assessment is 273 points. Japan (296 points) has the highest average level of proficiency in literacy followed by Finland (288 points). Italy (250 points) and Spain (252 points) record the lowest average scores. More concretely, the mean score for the Netherlands is 284 points, which corresponds to Level 3. Thus, an adult with a proficiency score equal to the mean score in the Netherlands can typically successfully complete assessment items at Level 3, such as the *Library search* item in Box 2.4. An adult with a proficiency score at the mean for Italy (250 points) is able to successfully complete tasks of Level 2 difficulty, such as *Lakeside fun run* in Box 2.4.

Overall, the variation in proficiency between the adult populations in the participating countries is relatively small. Some 46 score points separate the countries with the highest and lowest mean score. Most countries (19 out of 21) have mean scores within the range of 267 to 288 points (21 score points or less) and 14 countries have scores within the range of 267 to 276 points (9 score points). By way of comparison, the average score point gap between the highest and lowest performing 10% of adults is 116 score points in literacy across all countries.

■ Figure 2.2b ■

Comparison of average literacy proficiency among adults (adjusted)

Mean literacy proficiency scores of 16-65 year-olds, assuming a score of 85 points for literacy-related non-response

Significantly **above** the average
Not significantly different from the average
Significantly **below** the average

Adjusted mean	Comparison country	Countries whose mean score is NOT significantly different from the comparison country
294	**Japan**	
288	**Finland**	
280	**Netherlands**	Sweden
279	**Sweden**	Netherlands
277	**Australia**	Estonia
275	**Estonia**	Australia, Czech Republic, Norway, Slovak Republic
274	**Norway**	Czech Republic, Estonia, Slovak Republic
273	**Slovak Republic**	Canada, Czech Republic, Estonia, Korea, Norway
273	**Czech Republic**	Canada, Estonia, Korea, Norway, Slovak Republic
272	**Korea**	Canada, Czech Republic, Slovak Republic
272	**Canada**	Czech Republic, Korea, Slovak Republic, England/N. Ireland (UK)
270	**Average**	**Denmark, England/N. Ireland (UK)**
270	**Denmark**	England/N. Ireland (UK)
270	**England/N. Ireland (UK)**	Canada, Denmark
267	**Germany**	Austria, Ireland, Poland
267	**Poland**	Austria, Germany, Ireland
266	**Austria**	Germany, Ireland, Poland
266	**Ireland**	Austria, Germany, Poland
262	**United States**	France
261	**France**	United States
251	**Spain**	Italy
249	**Italy**	Spain
236	**Cyprus**[1]	

1. See notes at the end of this chapter.

Notes: Statistical significance is at the 5% level. The adjusted mean includes adults who were not able to provide enough background information because of language difficulties, or learning or mental disabilities (literacy-related non-response). They are attributed a very low score (85 points), which represents a lower bound for the mean score in each country. The results for Flanders (Belgium) are not shown at the country's request.

Countries are ranked in descending order of the adjusted mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.2b.

StatLink http://dx.doi.org/10.1787/888932900403

Comparison of average proficiency scores for 16-24 year-olds in literacy

The level of proficiency of the adult population as a whole represents the outcome of a range of influences both past and present. The proficiency of young adults reflects much more recent influences including current or recent participation in schooling and other forms of post school education and training. In addition, the proficiency of the younger cohorts leaving education is an important factor in shaping the proficiency of the adult population of the future in the participating countries. For these reasons, a focus has been placed on the proficiency of 16-24 year-olds in addition to that of the 16-65 year-old population. Chapters 3 and 5 provide more detailed discussions of the relationship between age and proficiency.[8]

Mean literacy scores of individuals aged 16-24 are presented in Figure 2.3a. The mean score for this age group is 280 score points, 7 points higher than that for all adults (273 score points). The difference in scores between the countries with the highest and lowest scores is 38 score points for the 16-24 year-olds as opposed to 46 score points for the 16-65 year-olds. The 16-24 population in Japan (299 points), Finland (297 points), the Netherlands (295 points) and Korea (293 points) have the highest mean scores, while those in Italy (261 points), Spain (264 points) and England/Northern Ireland (UK) (266 points) have the lowest mean scores.

Literacy-related non-respondents are excluded from the calculation of the mean scores presented in Figure 2.3a. These figures represent an upper bound for the estimated proficiency of the young adult population. The proportion of literacy-related non-respondents is lower among 16-24 year-olds than among the working age population. Figure 2.3b presents a sensitivity analysis showing the impact on country mean scores if literacy-related non-respondents are taken into account and are all assumed to have very low scores (85 points) on the literacy scale.[9] The discussion that follows focuses on the data in Figure 2.3a.

■ Figure 2.3a ■

Comparison of average literacy proficiency among young adults

Mean literacy proficiency scores of 16-24 year-olds

Significantly **above** the average
Not significantly different from the average
Significantly **below** the average

Mean	Comparison country	Countries whose mean score is NOT significantly different from the comparison country
299	**Japan**	Finland
297	**Finland**	Japan, Korea, Netherlands
295	**Netherlands**	Finland, Korea
293	**Korea**	Finland, Netherlands
287	**Estonia**	Australia, Flanders (Belgium)
285	**Flanders (Belgium)**	Australia, Czech Republic, Estonia, Poland, Sweden
284	**Australia**	Czech Republic, Estonia, Germany, Poland, Sweden, Flanders (Belgium)
283	**Sweden**	Australia, Czech Republic, Germany, Poland, Flanders (Belgium)
281	**Poland**	Australia, Czech Republic, Germany, Sweden, Flanders (Belgium)
281	**Czech Republic**	Australia, Austria, Canada, Denmark, Germany, Poland, Slovak Republic, Sweden, Flanders (Belgium)
280	**Average**	**Austria, Czech Republic, Germany, Poland, Sweden**
279	**Germany**	Australia, Austria, Canada, Czech Republic, Denmark, France, Norway, Poland, Slovak Republic, Sweden
278	**Austria**	Canada, Czech Republic, Denmark, France, Germany, Norway, Slovak Republic
276	**Denmark**	Austria, Canada, Czech Republic, France, Germany, Norway, Slovak Republic, United States
276	**Slovak Republic**	Austria, Canada, Czech Republic, Denmark, France, Germany, Norway, United States
276	**Canada**	Austria, Czech Republic, Denmark, France, Germany, Norway, Slovak Republic, United States
275	**Norway**	Austria, Canada, Denmark, France, Germany, Ireland, Slovak Republic, United States
275	**France**	Austria, Canada, Denmark, Germany, Norway, Slovak Republic, United States
272	**United States**	Canada, Denmark, France, Ireland, Norway, Slovak Republic, England/N. Ireland (UK), Cyprus[1]
271	**Ireland**	Norway, United States, England/N. Ireland (UK), Cyprus[1]
267	**Cyprus[1]**	Ireland, Spain, United States, England/N. Ireland (UK)
266	**England/N. Ireland (UK)**	Ireland, Italy, Spain, United States, Cyprus[1]
264	**Spain**	Italy, England/N. Ireland (UK), Cyprus[1]
261	**Italy**	Spain, England/N. Ireland (UK)

1. See notes at the end of this chapter.

Notes: Statistical significance is at the 5% level. Literacy-related non-response (missing) is excluded from the calculation of mean scores. Figure 2.3b, however, presents an estimate of lower-bound mean scores by attributing a very low score (85 points) to those adults who were not able to provide enough background information because of language difficulties, or learning or mental disabilities (literacy-related non-response).

Countries are ranked in descending order of the mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.2 (L).

StatLink http://dx.doi.org/10.1787/888932900422

In most countries, the mean score for 16-24 year-olds is higher than that of 16-65 year-olds. The advantage of the 16-24 age group is particularly significant in Korea (20 score points) and Poland (14 score points). In only three countries is the mean score for the 16-24 year-olds lower than that of the 16-65 year-old population: Cyprus[10] (-2 points), England/Northern Ireland (UK) (-6 points) and Norway (-3 score points).

There are some marked differences in the ranking of countries relative to the mean for the 16-24 year-olds and the 16-65 year-olds. The proficiency of the 16-24 year-old population in Korea is above average for 16-24 year-olds but not significantly different from the average for 16-65 year-olds. In Poland, the proficiency of 16-24 year-olds is close to the average and less than average for the adult population as a whole. In contrast, in England/Northern Ireland (UK) and Norway, the average proficiency of the 16-24 year-old population is far lower relative to the average than that of the 16-65 year-old population as a whole.

■ Figure 2.3b ■

Comparison of average literacy proficiency of young adults (adjusted)

Mean literacy proficiency scores of 16-24 year-olds, assuming a score of 85 points for literacy-related non-response

Significantly **above** the average
Not significantly different from the average
Significantly **below** the average

Adjusted mean	Comparison country	Countries whose mean score is NOT significantly different from the comparison country
297	**Finland**	Japan, Korea, Netherlands
296	**Japan**	Finland, Korea, Netherlands
293	**Korea**	Finland, Japan, Netherlands
292	**Netherlands**	Finland, Japan, Korea
286	**Estonia**	Australia, Sweden
283	**Australia**	Czech Republic, Estonia, Germany, Poland, Sweden
283	**Sweden**	Australia, Czech Republic, Estonia, Poland
281	**Poland**	Australia, Czech Republic, Germany, Sweden
280	**Czech Republic**	Australia, Austria, Germany, Poland, Slovak Republic, Sweden
278	**Average**	**Austria, Czech Republic, Denmark, Germany, Slovak Republic**
278	**Germany**	Australia, Austria, Canada, Czech Republic, Denmark, France, Norway, Poland, Slovak Republic
276	**Austria**	Canada, Czech Republic, Denmark, France, Germany, Norway, Slovak Republic
275	**Slovak Republic**	Austria, Canada, Czech Republic, Denmark, France, Germany, Norway
275	**Denmark**	Austria, Canada, France, Germany, Norway, Slovak Republic
275	**France**	Austria, Canada, Denmark, Germany, Ireland, Norway, Slovak Republic
274	**Canada**	Austria, Denmark, France, Germany, Ireland, Norway, Slovak Republic
273	**Norway**	Austria, Canada, Denmark, France, Germany, Ireland, Slovak Republic
270	**Ireland**	Canada, France, Norway
263	**Spain**	Italy, United States, England/N. Ireland (UK)
262	**England/N. Ireland (UK)**	Italy, Spain, United States
261	**United States**	Italy, Spain, England/N. Ireland (UK)
260	**Italy**	Spain, United States, England/N. Ireland (UK)
250	**Cyprus**[1]	

1. See notes at the end of this chapter.

Notes: Statistical significance is at the 5% level. The adjusted mean includes adults who were not able to provide enough background information because of language difficulties, or learning or mental disabilities (literacy-related non-response). They are attributed a very low score (85 points), which represents a lower bound for the mean score in each country. The results for Flanders (Belgium) are not shown at the country's request.

Countries are ranked in descending order of the adjusted mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.3.

StatLink http://dx.doi.org/10.1787/888932900441

Comparison of scores at the 5th, 25th, 75th and 95th percentiles

In addition to examining the distribution of proficiency in absolute terms against the international levels of proficiency, it is also useful to examine the distribution of proficiency relative to the national mean. This can be done by identifying the score points below which 5%, 25%, 75% and 95% of adults perform. In other words, this indicator measures the extent of inequality in the distribution of literacy proficiency in each participating country or sub-national region. Figure 2.4 presents the distribution of scores within countries in addition to the mean score. A longer gradient bar indicates greater variations in literacy proficiency within a country; a shorter bar indicates smaller variations.

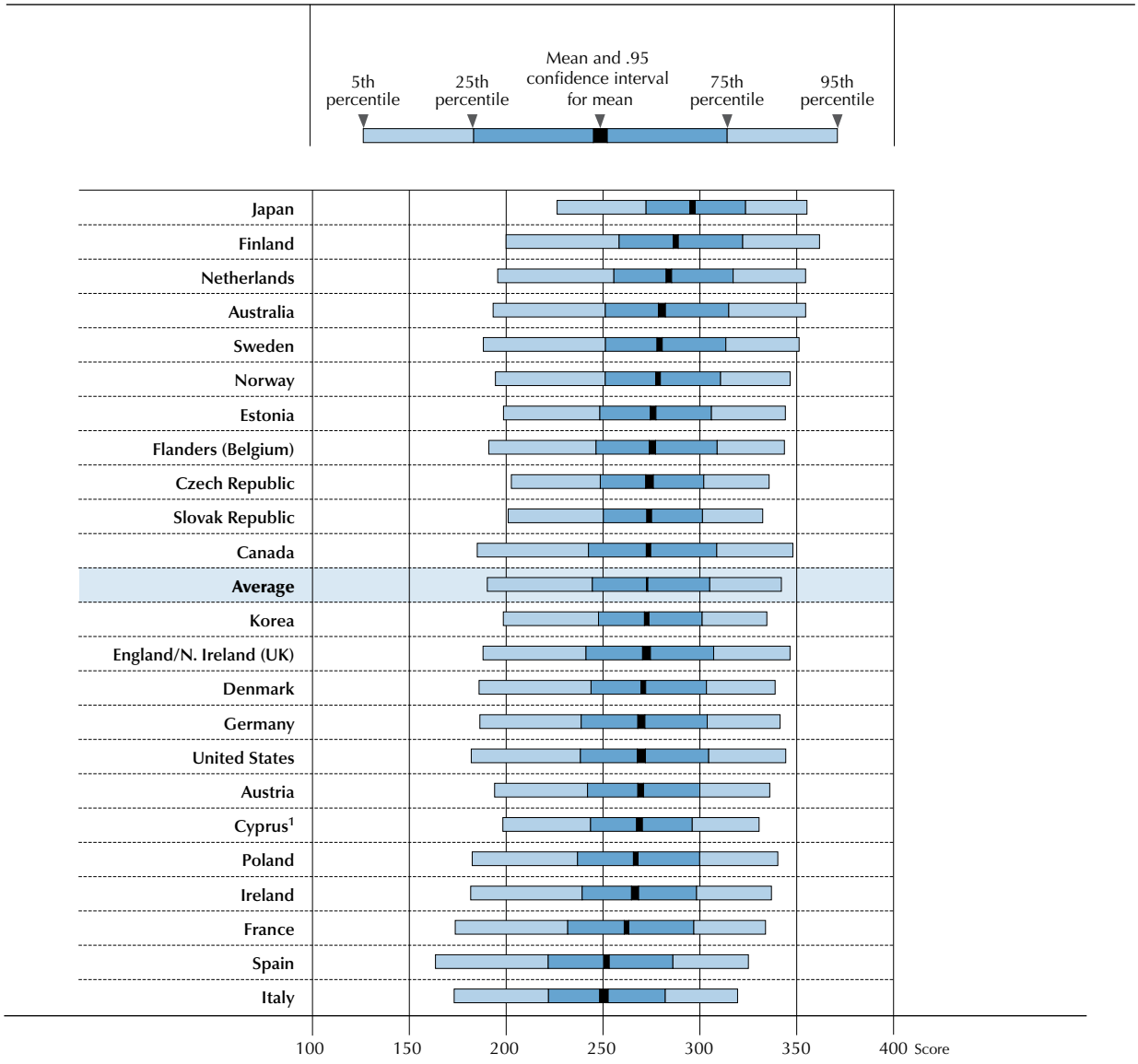
On average, 152 score points separate the highest and lowest 5% of performers in literacy. A number of countries have comparatively small variations in literacy proficiency among their adults. These include Japan (129 points), the Slovak Republic (131 points), the Czech Republic (133 points) and Korea (136 points). Countries with comparatively large variations in scores include Sweden (163 points), Canada (163 points), the United States (162 points), Finland (162 points), Spain (162 points) and Australia (161 points).

Adults in Finland (362 points) have the highest scores at the 95th percentile followed by adults in Australia, Japan and the Netherlands (all 355 points). At the other end of the scale, adults in the Czech Republic (203 points), Japan (226 points) and the Slovak Republic (201 points) have the highest scores at the 5th percentile. These three countries are also those with the least variation in scores.

■ Figure 2.4 ■

Distribution of literacy proficiency scores

Mean literacy proficiency and distribution of literacy scores, by percentile



1. See notes at the end of this chapter.

Notes: Mean scores are shown with a .95 confidence interval. Literacy-related non-response (missing) is excluded from the calculation of mean scores. Figure 2.2b, however, presents an estimate of lower-bound mean scores by attributing a very low score (85 points) to those adults who were not able to provide enough background information because of language difficulties, or learning or mental disabilities (literacy-related non-response).

Countries are ranked in descending order of the mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.4.

StatLink http://dx.doi.org/10.1787/888932900460

Interestingly, there is no clear relationship between overall level of proficiency in literacy and the variation in scores. Small variations in scores are found in countries in which adults have high (Japan), middle (Korea) and low (Austria) overall levels of proficiency in literacy, while large variations are found in countries with high (Australia), middle (Canada) and low (Spain) levels of literacy proficiency.

The reasons for the differences in performance variations are undoubtedly complex and likely to be affected by such factors as the historical patterns of participation in education, support for adult learning, and patterns of immigration.

PROFICIENCY IN NUMERACY

The Survey of Adult Skills defines numeracy as the ability to access, use, interpret and communicate mathematical information and ideas in order to engage in and manage the mathematical demands of a range of situations in adult life. A numerate adult is one who responds appropriately to mathematical content, information, and ideas represented in various ways in order to manage situations and solve problems in a real-life context. While performance on numeracy tasks is, in part, dependent on the ability to read and understand text, numeracy involves more than applying arithmetical skills to information embedded in text.

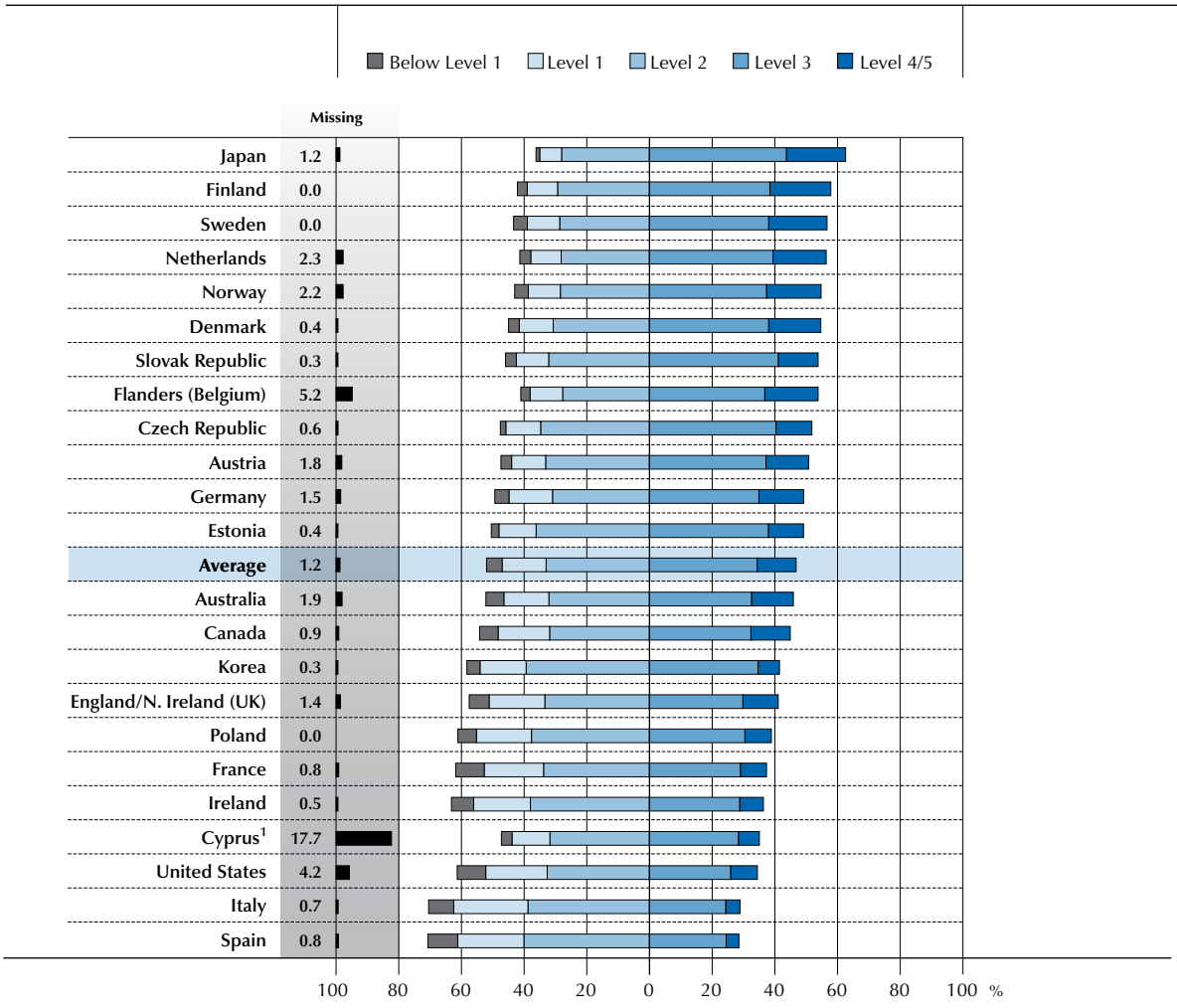
What adults can do at different levels of numeracy proficiency

Figure 2.5 presents the percentage of adults aged 16-65 who scored at each of the six levels of proficiency (Levels 1 through 5 plus below Level 1) on the numeracy scale in each participating country. The features of the tasks located in these levels are described in detail in Table 2.3 and some examples of numeracy items are described in Box 2.7.

■ Figure 2.5 ■

Numeracy proficiency among adults

Percentage of 16-65 year-olds scoring at each proficiency level in numeracy



1. See notes at the end of this chapter.

Notes: Adults in the missing category were not able to provide enough background information to impute proficiency scores because of language difficulties, or learning or mental disabilities (referred to as literacy-related non-response).

Countries are ranked in descending order of the combined percentage of adults scoring at Level 3 and Level 4/5.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.5.

StatLink http://dx.doi.org/10.1787/888932900479

Table 2.3
Description of proficiency levels in numeracy

Level	Score range	Percentage of adults scoring at each level (average)	The types of tasks completed successfully at each level of proficiency
Below Level 1	Below 176 points	5%	Tasks at this level require the respondents to carry out simple processes such as counting, sorting, performing basic arithmetic operations with whole numbers or money, or recognising common spatial representations in concrete, familiar contexts where the mathematical content is explicit with little or no text or distractors.
1	176 to less than 226 points	14.0%	Tasks at this level require the respondent to carry out basic mathematical processes in common, concrete contexts where the mathematical content is explicit with little text and minimal distractors. Tasks usually require one-step or simple processes involving counting, sorting, performing basic arithmetic operations, understanding simple percents such as 50%, and locating and identifying elements of simple or common graphical or spatial representations.
2	226 to less than 276 points	33.0%	Tasks at this level require the respondent to identify and act on mathematical information and ideas embedded in a range of common contexts where the mathematical content is fairly explicit or visual with relatively few distractors. Tasks tend to require the application of two or more steps or processes involving calculation with whole numbers and common decimals, percents and fractions; simple measurement and spatial representation; estimation; and interpretation of relatively simple data and statistics in texts, tables and graphs.
3	276 to less than 326 points	34.4%	Tasks at this level require the respondent to understand mathematical information that may be less explicit, embedded in contexts that are not always familiar and represented in more complex ways. Tasks require several steps and may involve the choice of problem-solving strategies and relevant processes. Tasks tend to require the application of number sense and spatial sense; recognising and working with mathematical relationships, patterns, and proportions expressed in verbal or numerical form; and interpretation and basic analysis of data and statistics in texts, tables and graphs.
4	326 to less than 376 points	11.4%	Tasks at this level require the respondent to understand a broad range of mathematical information that may be complex, abstract or embedded in unfamiliar contexts. These tasks involve undertaking multiple steps and choosing relevant problem-solving strategies and processes. Tasks tend to require analysis and more complex reasoning about quantities and data; statistics and chance; spatial relationships; and change, proportions and formulas. Tasks at this level may also require understanding arguments or communicating well-reasoned explanations for answers or choices.
5	Equal to or higher than 376 points	1.1%	Tasks at this level require the respondent to understand complex representations and abstract and formal mathematical and statistical ideas, possibly embedded in complex texts. Respondents may have to integrate multiple types of mathematical information where considerable translation or interpretation is required; draw inferences; develop or work with mathematical arguments or models; and justify, evaluate and critically reflect upon solutions or choices.

Note: The proportion of adults scoring at different levels of proficiency adds up to 100% when the 1.2% of numeracy-related non-respondents across countries are taken into account. Adults in the missing category were not able to provide enough background information to impute proficiency scores because of language difficulties, or learning or mental disabilities (see section on literacy-related non-response above).

Box 2.7. Examples of numeracy items

Items that exemplify the pertinent features of the proficiency levels in the domain of numeracy are described below (see Table 4.3 in the *Reader's Companion* to this report).

Below Level 1: Price tag (Item ID: C602A501)

Content: Quantity and number

Cognitive strategies: Act upon, use

Context: Personal

Difficulty score: 168

The stimulus for this item consists of four supermarket price tags. These identify the product, the price per kilogramme, the net weight, the date packed and the total price. The test-taker is asked to indicate the item that was packed first by simply comparing the dates on the price tags.

Level 1: Candles (Item ID: C615A602)

Content: Dimension and shape

Cognitive strategies: Interpret, evaluate

Context: Education and training

Difficulty score: 221

The stimulus for this item consists of a photo of a box containing tea light candles. The packaging identifies the product (tea light candles), the number of candles in the box (105 candles) and its weight. While the packaging partially covers the top layer of candles, it can be seen that the candles are packed in five rows of seven candles each. The instructions inform the test-taker that there are 105 candles in a box and asks him or her to calculate how many layers of tea candles are packed in the box.

Level 2: Logbook (Item ID: C613A520)

Content: Pattern, relationships, change

Cognitive strategies: Act upon, use

Context: Work-related

Difficulty score: 250

The stimulus for this item consists of a page from a motor vehicle logbook with columns for the date of the trip (start and finish), the purpose of the trip, the odometer reading (start and finish), the distance travelled, the date of entry and the driver's name and signature. For the first date of travel (5 June), the column for the distance travelled is completed. The instructions inform the test-taker that "a salesman drives his own car and must keep a record of the kilometres he travels in a Motor Vehicle Log. When he travels, his employer pays him €0.35 per kilometre plus €40.00 per day for various costs such as meals". The test taker is asked to calculate how much he will be paid for the trip on 5 June. (Note: both units of distance and currency are adapted to reflect the units applying in each participating country.)

Level 3: Package (Item ID: C657P001)

Content: Dimension and shape

Cognitive strategies: Interpret, evaluate

Context: Work-related

Difficulty score: 315

The stimulus for this item consists of an illustration of a box constructed from folded cardboard. The dimensions of the cardboard base are identified. The test-taker is asked to identify which plan best represents the assembled box out of four plans presented in the stimulus.

...

Level 4: Education level (Item ID: C632P001)
Content: Data and chance
Cognitive strategies: Interpret, evaluate
Context: Society and community
Difficulty score: 354

The stimulus for this item consists of two stacked-column bar graphs presenting the distribution of the Mexican population by years of schooling for men and women separately. The y axis of each of the graphs is labelled "percentage" with 6 grid lines labelled "0%", "20%", "40%", "60%", "80%" and "100%". The x axis is labelled "year" and data are presented for 1960, 1970, 1990, 2000 and 2005. A legend identifies three categories of schooling: "more than 6 years of schooling", "up to 6 years of schooling" and "no schooling". The test-taker is asked to approximate what percentage of men in Mexico had more than 6 years of schooling in 1970, choosing from a pull-down menu that has 10 response categories: "0-10%", "10-20%", and so on.

Proficiency at Level 5 (scores equal to or higher than 376 points)

Adults at Level 5 on the numeracy scale can understand complex representations, and abstract and formal mathematical and statistical ideas, sometimes embedded in complex texts. They can integrate several types of mathematical information where considerable translation or interpretation is required; draw inferences; develop or work with mathematical arguments or models; and justify, evaluate and critically reflect upon solutions or choices.

Only 1.1% of adults score at Level 5 on average. Finland has the highest proportion of adults at this level (2.2%), followed by Sweden (1.9%), Norway (1.7%), Denmark (1.7%) and Flanders (Belgium) (1.6%).

Proficiency at Level 4 (scores from 326 points to less than 376 points)

At this level, adults understand a broad range of mathematical information that may be complex, abstract or embedded in unfamiliar contexts. They can perform tasks involving multiple steps and select appropriate problem-solving strategies and processes. They can analyse and engage in more complex reasoning about quantities and data, statistics and chance, spatial relationships, change, proportions and formulae. They can also understand arguments and communicate well-reasoned explanations for answers or choices.

On average, 11.4% of adults score at Level 4. Japan (17.3%) and Finland (17.2%) have the largest proportion of adults scoring at this level and the largest proportion of adults scoring at this level or higher. In contrast, Spain (4.0%) and Italy (4.3%) have less than half of the average proportion of adults scoring at this level. They also have the smallest proportion of adults scoring at Level 4 or higher.

Proficiency at Level 3 (scores from 276 points to less than 326 points)

Adults at Level 3 can successfully complete tasks that require an understanding of mathematical information that may be less explicit, embedded in contexts that are not always familiar, and represented in more complex ways. They can perform tasks requiring several steps and that may involve a choice of problem-solving strategies and relevant processes. They have a good sense of number and space; can recognise and work with mathematical relationships, patterns, and proportions expressed in verbal or numerical form; and can interpret and perform basic analyses of data and statistics in texts, tables and graphs.

Some 34.4% of adults score at Level 3. Japan has the highest proportion of adults at this level (43.7%), followed by the Slovak Republic (41.1%), the Czech Republic (40.4%), and the Netherlands (39.4%). By contrast, Italy has the smallest proportion of adults scoring at Level 3 (24.4%), followed by Spain (24.5%) and the United States (25.9%).

On average, 46.8% of adults score at Level 3 or higher. More than 55% of adults in Japan (62.6%), Finland (57.9%), Sweden (56.6%) and the Netherlands (56.4%) score at this level or higher, while less than 35% of adults in Spain (28.5%), Italy (28.9%), and the United States (34.4%) do.

Proficiency at Level 2 (scores from 226 points to less than 276 points)

Adults at this level can successfully perform tasks that require identifying and acting upon mathematical information and ideas embedded in a range of common contexts where the mathematical content is fairly explicit or visual with relatively few distractors. The tasks may require applying two or more steps or processes involving, for example, calculations with whole numbers and common decimals, percents and fractions; simple measurement and spatial representations; estimation; or interpreting relatively simple data and statistics in texts, tables and graphs.

On average, one in three adults (33.0%) scores at Level 2. Spain has the largest proportion of adults scoring at this level (40.1%), followed by Korea (39.4%) and Italy (38.8%), while Flanders (Belgium) (27.7%), Japan (28.1%) and the Netherlands (28.2%) have the smallest proportions of adults scoring at this level.

Some 79.8% of adults reach at least Level 2. Countries with the largest proportion of adults reaching at least Level 2 include Japan (90.6%), Finland (87.2%), the Czech Republic (86.5%) and the Slovak Republic (86%). By contrast, the United States (67.0%), Italy (67.1%) and Spain (68.6%) have the smallest proportions of adults who reach at least Level 2.

Proficiency at Level 1 (scores from 176 points to less than 226 points)

Adults at Level 1 can complete tasks involving basic mathematical processes in common, concrete contexts where the mathematical content is explicit with little text and minimal distractors. They can perform one-step or simple processes involving counting, sorting, basic arithmetic operations, understanding simple percents, and locating and identifying elements of simple or common graphical or spatial representations.

Some 14% of adults score at Level 1. Japan has the smallest proportion of adults scoring at this level (7.0%) followed by the Netherlands (9.7%), Finland (9.7%), the Slovak Republic and Sweden (both 10.3%). By contrast, Italy has the largest proportion of adults scoring at Level 1 (23.7%), followed by Spain (21.1%) and the United States (19.6%).

Countries with the largest proportions of adults reaching Level 1 or below include Italy (31.7%), Spain (30.6%) and the United States (28.7%). By contrast, Japan (8.1%), Finland (12.8%), the Czech Republic (12.9%) and the Netherlands (13.2%) have the smallest proportions of adults reaching Level 1 or below.

Proficiency below Level 1 (scores below 176 points)

Adults at this level can only cope with very simple tasks set in concrete, familiar contexts where the mathematical content is explicit and that require only simple processes such as counting; sorting; performing basic arithmetic operations with whole numbers or money, or recognising common spatial representations. Adults who score less than 176 points are considered to be below Level 1.

On average, 5% of adults scored below Level 1. Spain (9.5%), France (9.1%), and the United States (9.1%) have the largest proportion of adults scoring below Level 1 – almost twice as large as the average share. Japan has the smallest proportion of adults scoring below Level 1 (1.2%), followed by the Czech Republic (1.7%), Estonia (2.4%), Flanders (Belgium) (3.0%) and Finland (3.1%).

Literacy-related non-response

In all countries, some adults were unable to complete the background questionnaire as they were unable to speak or read the language of the assessment, have difficulty reading or writing, or have learning or mental disability. This category is identified separately in Figure 2.5 as a black bar in each country (categorised as missing). While there will be variation between countries, it can be assumed that, in most cases, these persons will have low levels of proficiency (Level 1 or below) in numeracy when assessed in the test language or languages of the country concerned.

HOW DISTRIBUTIONS OF PROFICIENCY SCORES COMPARE ACROSS COUNTRIES

Comparison of average proficiency scores in numeracy

Mean scores on the numeracy scale for the countries participating in the Survey of Adult Skills are presented in Figure 2.6a. Countries with mean scores that are not statistically different from other countries are identified. For example, the mean score for Poland (260 points) is similar to that of England/Northern Ireland (UK) (262 points), but is significantly different from that of other countries at the 95% confidence level (see Box 2.6).

Literacy-related non-respondents are excluded from the calculation of the mean score presented in Figure 2.6a.[11] Figure 2.6b presents sensitivity analyses showing the impact on country mean scores if literacy-related non-respondents are taken into account and are all assumed to score 85 points on the numeracy scale.[12] With the exception of the countries with high proportions of literacy-related non-respondents (missing), the effect on average scores and/or relative rankings of most countries are relatively small. The discussion that follows focuses on the data in Figure 2.6a.

■ Figure 2.6a ■

Comparison of average numeracy proficiency among adults

Mean numeracy proficiency scores of 16-65 year-olds

Significantly **above** the average
Not significantly different from the average
Significantly **below** the average

Mean	Comparison country	Countries whose mean score is NOT significantly different from the comparison country
288	**Japan**	
282	**Finland**	Netherlands, Flanders (Belgium)
280	**Flanders (Belgium)**	Denmark, Finland, Netherlands, Norway, Sweden
280	**Netherlands**	Finland, Norway, Sweden, Flanders (Belgium)
279	**Sweden**	Denmark, Netherlands, Norway, Flanders (Belgium)
278	**Norway**	Denmark, Netherlands, Sweden, Flanders (Belgium)
278	**Denmark**	Norway, Sweden, Flanders (Belgium)
276	**Slovak Republic**	Austria, Czech Republic
276	**Czech Republic**	Austria, Slovak Republic
275	**Austria**	Czech Republic, Estonia, Slovak Republic
273	**Estonia**	Austria, Germany
272	**Germany**	Estonia
269	**Average**	**Australia**
268	**Australia**	Canada
265	**Canada**	Australia, Cyprus[1]
265	**Cyprus[1]**	Canada, Korea
263	**Korea**	England/N. Ireland (UK), Cyprus[1]
262	**England/N. Ireland (UK)**	Korea, Poland
260	**Poland**	England/N. Ireland (UK)
256	**Ireland**	France, United States
254	**France**	Ireland, United States
253	**United States**	France, Ireland
247	**Italy**	Spain
246	**Spain**	Italy

1. See notes at the end of this chapter.

Notes: Statistical significance is at the 5% level. Literacy-related non-response (missing) is excluded from the calculation of mean scores. Figure 2.6b, however, presents an estimate of lower-bound mean scores by attributing a very low score (85 points) to those adults who were not able to provide enough background information because of language difficulties, or learning or mental disabilities (literacy-related non-response).

Countries are ranked in descending order of the mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.6.

StatLink http://dx.doi.org/10.1787/888932900498

The average score among the OECD member countries participating in the assessment is 269 points. Japan has the highest average level of proficiency in numeracy (288 points), followed by Finland (282 points). Spain (246 points) and Italy (247 points) record the lowest average scores. An adult with a score equal to the national average in Ireland (256 points) or the United States (253 points), for example, can typically successfully complete assessment items at Level 2, such as the *Logbook* item in Box 2.7. Overall, the variation between countries is relatively small. Some 42 score points separates the means of the highest and lowest performing countries. The majority of countries (14 out of 22) have mean scores within the range of 263 to 282 points (19 score points). By way of comparison, the average score point gap between the highest and lowest performing 10% of adults across all countries is 127 score points in numeracy.

■ Figure 2.6b ■

Comparison of average numeracy proficiency among adults (adjusted)

Mean numeracy proficiency scores of 16-65 year-olds, assuming a score of 85 points for literacy-related non-response

Significantly **above** the average
Not significantly different from the average
Significantly **below** the average

Adjusted mean	Comparison country	Countries whose mean score is NOT significantly different from the comparison country
286	**Japan**	
282	**Finland**	
279	**Sweden**	Denmark
278	**Denmark**	Netherlands, Sweden
276	**Netherlands**	Czech Republic, Denmark, Norway, Slovak Republic
275	**Slovak Republic**	Czech Republic, Netherlands, Norway
275	**Czech Republic**	Estonia, Netherlands, Norway, Slovak Republic
274	**Norway**	Czech Republic, Estonia, Netherlands, Slovak Republic
272	**Estonia**	Austria, Czech Republic, Norway
272	**Austria**	Estonia, Germany
269	**Germany**	Austria
266	**Average**	
264	**Australia**	Canada, Korea
264	**Canada**	Australia, Korea
263	**Korea**	Australia, Canada
260	**Poland**	England/N. Ireland (UK)
259	**England/N. Ireland (UK)**	Poland
255	**Ireland**	France
253	**France**	Ireland
246	**Italy**	Spain, United States
246	**United States**	Italy, Spain
245	**Spain**	Italy, United States
233	**Cyprus**[1]	

1. See notes at the end of this chapter.

Notes: Statistical significance is at the 5% level. The adjusted mean shows the effect on mean scores if literacy-related non-respondents are included in the calculation and attributed a score of 85. This shows a lower bound for the mean score in each country assuming all literacy-related non-respondents have very low proficiency scores. The results for Flanders (Belgium) are not shown at the country's request.

Countries are ranked in descending order of the adjusted mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.6b.

StatLink http://dx.doi.org/10.1787/888932900517

While most countries' ranking in literacy and numeracy are similar, there are some notable exceptions. Australia, for example, is an average performer in numeracy, but an above-average performer in literacy. Austria, Germany and Denmark are above-average performers in numeracy, but below average in literacy. England/Northern Ireland (UK) and the United States are much poorer performers in numeracy than in literacy (see Figure 2.13).

Comparison of average proficiency scores for 16-24 year-olds in numeracy

As in the case of literacy, the mean numeracy proficiency of 16-24 year-olds is examined in addition to that of the 16-65 year-old population.[13]

Mean numeracy scores of individuals aged 16-24 are presented in Figure 2.7a. The mean score for this age group is 271 points, 2 score points higher than that for all adults (269 points). The advantage of the younger adults is smaller in numeracy than in literacy. The difference between the countries with the highest and lowest scores is 36 score points for the 16-24 year-olds as opposed to 42 score points for the 16-65 year-olds. The 16-24 year-old populations in the Netherlands (285 points), Finland (285 points), Japan (283 points), and Flanders (Belgium) (283 points) have the highest mean scores, while those in Italy (251 points), Spain (255 points) and England/Northern Ireland (UK) (257 points), and the United States (249 points) have the lowest mean scores.

■ Figure 2.7a ■

Comparison of average numeracy proficiency among young adults

Mean numeracy proficiency scores of 16-24 year-olds

Significantly **above** the average
Not significantly different from the average
Significantly **below** the average

Mean	Comparison country	Countries whose mean score is NOT significantly different from the comparison country
285	**Netherlands**	Finland, Japan, Korea, Flanders (Belgium)
285	**Finland**	Japan, Korea, Netherlands, Flanders (Belgium)
283	**Japan**	Austria, Czech Republic, Estonia, Finland, Korea, Netherlands, Slovak Republic, Sweden, Flanders (Belgium)
283	**Flanders (Belgium)**	Austria, Finland, Japan, Korea, Netherlands, Slovak Republic, Sweden
281	**Korea**	Austria, Czech Republic, Estonia, Finland, Japan, Netherlands, Slovak Republic, Sweden, Flanders (Belgium)
279	**Austria**	Czech Republic, Estonia, Germany, Japan, Korea, Slovak Republic, Sweden, Flanders (Belgium)
279	**Estonia**	Austria, Czech Republic, Germany, Japan, Korea, Slovak Republic, Sweden
278	**Sweden**	Austria, Czech Republic, Estonia, Germany, Japan, Korea, Slovak Republic, Flanders (Belgium)
278	**Czech Republic**	Austria, Estonia, Germany, Japan, Korea, Slovak Republic, Sweden
278	**Slovak Republic**	Austria, Czech Republic, Estonia, Germany, Japan, Korea, Sweden, Flanders (Belgium)
275	**Germany**	Australia, Austria, Czech Republic, Denmark, Estonia, Norway, Slovak Republic, Sweden
273	**Denmark**	Australia, Germany, Norway
271	**Average**	**Australia, Canada, Denmark, Norway, Poland**
271	**Norway**	Australia, Canada, Denmark, Germany, Poland
270	**Australia**	Canada, Denmark, Germany, Norway, Poland, Cyprus[1]
269	**Poland**	Australia, Canada, Norway, Cyprus[1]
268	**Canada**	Australia, Norway, Poland, Cyprus[1]
264	**Cyprus[1]**	Australia, Canada, France, Poland
263	**France**	Cyprus[1]
258	**Ireland**	Italy, Spain, England/N. Ireland (UK)
257	**England/N. Ireland (UK)**	Ireland, Italy, Spain
255	**Spain**	Ireland, Italy, England/N. Ireland (UK)
251	**Italy**	Ireland, Spain, United States, England/N. Ireland (UK)
249	**United States**	Italy

1. See notes at the end of this chapter.

Notes: Statistical significance is at the 5% level. Literacy-related non-response (missing) is excluded from the calculation of mean scores. Figure 2.7b, however, presents an estimate of lower-bound mean scores by attributing a very low score (85 points) to those adults who were not able to provide enough background information because of language difficulties, or learning or mental disabilities (literacy-related non-response).

Countries are ranked in descending order of the mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.2 (N).

StatLink http://dx.doi.org/10.1787/888932900536

Literacy-related non-respondents are excluded from the calculation of the mean scores presented in Figure 2.7a. Figure 2.7b presents a sensitivity analysis showing the impact on country mean scores if literacy-related non-respondents are taken into account and are all assumed to score 85 points on the numeracy scale.[14] The discussion that follows focuses on the data in Figure 2.7b.

The mean score for 16-24 year-olds is higher than that of 16-65 year-olds in 16 out of 23 countries. The advantage of the 16-24 age group is particularly large in Korea (18 score points), Spain (9 score points) and Poland (9 score points). Among countries where 16-24 year-olds score lower on average than the 16-65 year-old population, the disadvantage of the young is greatest in Norway (-5 score points), Denmark (-6 score points), England/Northern Ireland (UK) (-6 score points), Japan (-5 score points) and the United States (-6 score points).

As in the case of literacy, there are some marked differences in the ranking of countries relative to the average across countries for 16-24 year-olds and for 16-65 year-olds. The mean score for 16-24 year-olds in Korea is significantly above the average. This is in contrast to that of the 16-65 year-old population, which is significantly below the average. In Norway, where the 16-65 year-old population had an average level of proficiency above the average across countries, the proficiency of 16-24 year-olds is around the average across countries. The mean proficiency of 16-24 year-olds in the United States is the lowest of all countries; that of 16-65 year-olds was the third lowest.

■ Figure 2.7b ■

Comparison of average numeracy proficiency among young adults (adjusted)

Mean numeracy proficiency scores of 16-24 year-olds, assuming a score of 85 points for literacy-related non-response

Significantly **above** the average
Not significantly different from the average
Significantly **below** the average

Adjusted mean	Comparison country	Countries whose mean score is NOT significantly different from the comparison country
285	**Finland**	Japan, Korea, Netherlands
283	**Netherlands**	Finland, Japan, Korea, Sweden
281	**Korea**	Austria, Czech Republic, Estonia, Finland, Japan, Netherlands, Slovak Republic, Sweden
281	**Japan**	Austria, Czech Republic, Estonia, Finland, Korea, Netherlands, Slovak Republic, Sweden
278	**Sweden**	Austria, Czech Republic, Estonia, Germany, Japan, Korea, Netherlands, Slovak Republic
278	**Czech Republic**	Austria, Estonia, Germany, Japan, Korea, Slovak Republic, Sweden
278	**Estonia**	Austria, Czech Republic, Germany, Japan, Korea, Slovak Republic, Sweden
277	**Austria**	Czech Republic, Estonia, Germany, Japan, Korea, Slovak Republic, Sweden
277	**Slovak Republic**	Austria, Czech Republic, Estonia, Germany, Japan, Korea, Sweden
274	**Germany**	Australia, Austria, Czech Republic, Denmark, Estonia, Norway, Slovak Republic, Sweden
272	**Denmark**	Australia, Germany, Norway
270	**Average**	**Australia, Canada, Denmark, Norway, Poland**
269	**Norway**	Australia, Canada, Denmark, Germany, Poland
269	**Australia**	Canada, Denmark, France, Germany, Norway, Poland
269	**Poland**	Australia, Canada, Norway
267	**Canada**	Australia, France, Norway, Poland
263	**France**	Australia, Canada, Ireland
258	**Ireland**	France, Italy, Spain, England/N. Ireland (UK)
254	**Spain**	Ireland, Italy, England/N. Ireland (UK)
253	**England/N. Ireland (UK)**	Ireland, Italy, Spain, Cyprus[1]
251	**Italy**	Ireland, Spain, England/N. Ireland (UK), Cyprus[1]
247	**Cyprus[1]**	Italy, United States, England/N. Ireland (UK)
240	**United States**	Cyprus[1]

1. See notes at the end of this chapter.

Notes: Statistical significance is at the 5% level. The adjusted mean shows the effect on mean scores if literacy-related non-respondents are included in the calculation and attributed a score of 85. This shows a lower bound for the mean score in each country assuming all literacy-related non-respondents have very low proficiency scores. The results for Flanders (Belgium) are not shown at the country's request.

Countries are ranked in descending order of the adjusted mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.7.

StatLink http://dx.doi.org/10.1787/888932900555

Comparison of scores at the 5th, 25th, 75th and 95th percentiles

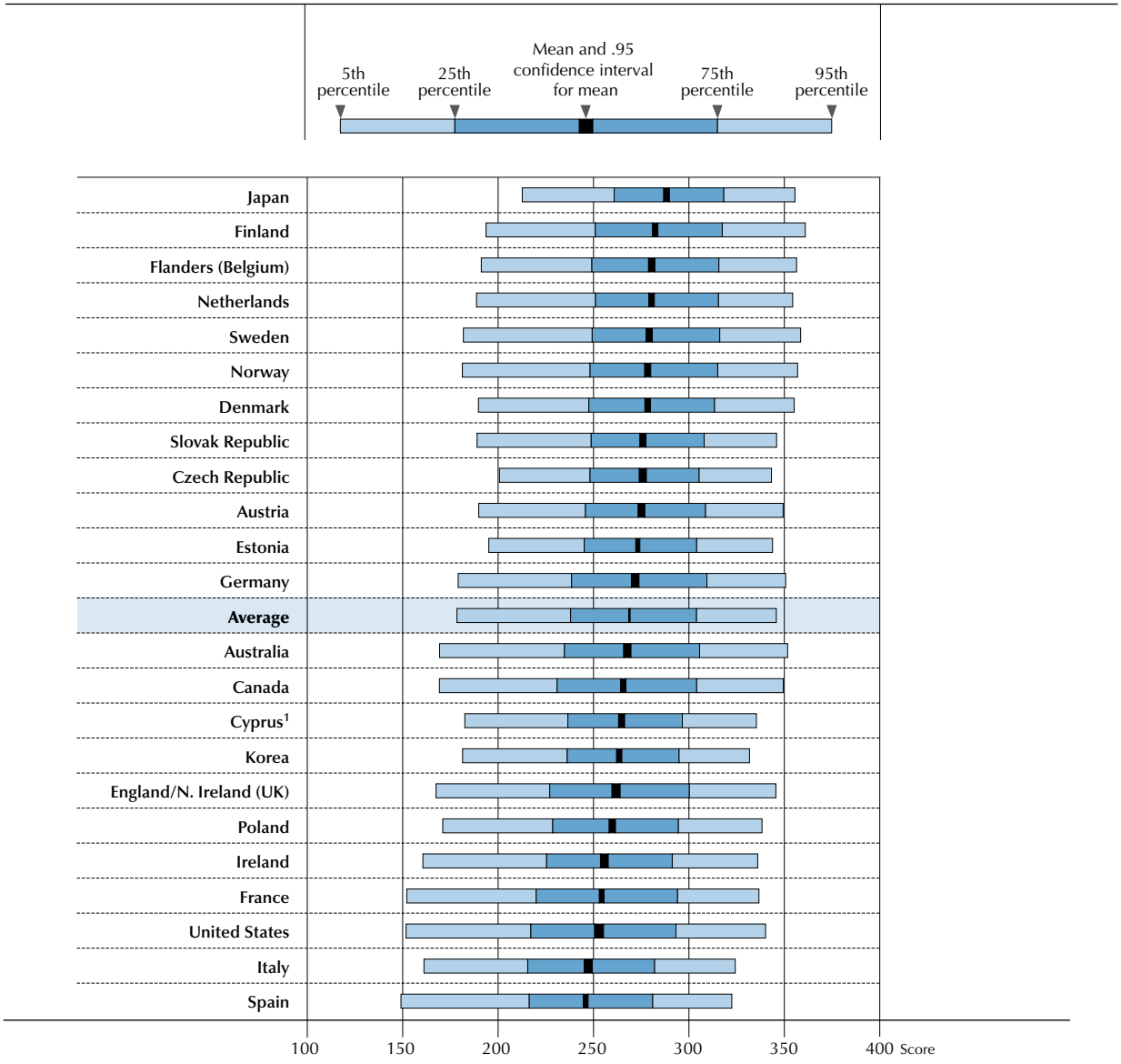
Examining the variation in performance within a country, by identifying the score points below which 5%, 25%, 75%, and 95% of adults perform, shows the gap in proficiency between high and low performers.[15] In other words, this indicator measures the extent of inequality in the distribution of numeracy proficiency in each participating country or sub-national region. Figure 2.8 presents the distribution of scores within countries in addition to the mean score. A longer gradient bar indicates greater variations in numeracy proficiency within a country; a shorter bar indicates smaller variations.

On average, 167 score points separate the highest and lowest performers in numeracy. The Czech Republic has the narrowest distribution of scores (143-point difference) on the numeracy scale. The United States has the widest gap between the lowest and the highest performers (188 points).

■ Figure 2.8 ■

Distribution of numeracy proficiency scores

Mean numeracy proficiency and distribution of numeracy scores, by percentile



1. See notes at the end of this chapter.

Notes: Mean scores are shown with a .95 confidence interval. Literacy-related non-response (missing) is excluded from the calculation of mean scores. Figure 2.6b, however, presents an estimate of lower-bound mean scores by attributing a very low score (85 points) to those adults who were not able to provide enough background information because of language difficulties, or learning or mental disabilities (literacy-related non-response).

Countries are ranked in descending order of the mean score.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.8.

StatLink http://dx.doi.org/10.1787/888932900574

France (184-point difference), Australia (182-point difference), Canada (180-point difference), England/Northern Ireland (UK) (178-point difference), and Sweden (177-point difference) also have wide distributions of scores, signalling a large gap between the lowest and highest performers.

Adults in Finland (361 points) have the highest scores at the 95th percentile, followed by Sweden (358 points) and Norway (357 points). The countries in which adults have the highest scores at the 5th percentile are Japan (213 points), the Czech Republic (201 points) and Estonia (195 points).

Correlations between proficiency in literacy and numeracy

Individuals' proficiency in literacy and numeracy is closely related. The correlation between proficiency in literacy and numeracy at the individual level for the entire sample is 0.87 (see Figure 2.9). The correlation is highest in Norway (0.90), the United States (0.89), Australia (0.89) and the Netherlands (0.89) and lowest in the Czech Republic (0.80), Italy (0.82) and Estonia (0.83). The level of correlation is in line with expectations. For example, similar levels of correlation are found in PISA between reading literacy and mathematical literacy (OECD, 2012a, p. 194) and in the Adult Literacy and Life Skills Survey (ALL) between prose and document literacy and numeracy.

Literacy and numeracy, nevertheless, constitute distinct skills, each defined by their respective frameworks. At the individual level, the strength of the relationship with other outcomes, such as employment and wages, varies between literacy and numeracy. Numeracy, for example, has a stronger relationship to wages than does literacy (see Chapter 6).

■ Figure 2.9 ■

Correlation among key information-processing skills

Correlation between literacy and numeracy proficiency scores of 16-65 year-olds

	Correlation coefficient
Norway	0.901
United States	0.890
Sweden	0.890
Australia	0.889
Spain	0.887
Netherlands	0.886
Korea	0.883
Denmark	0.881
Germany	0.876
Ireland	0.873
England/N. Ireland (UK)	0.873
Flanders (Belgium)	0.872
Canada	0.868
Average	0.867
France	0.867
Finland	0.864
Austria	0.863
Poland	0.858
Slovak Republic	0.855
Japan	0.846
Estonia	0.829
Italy	0.823
Cyprus[1]	0.805
Czech Republic	0.803

1. See notes at the end of this chapter.

Countries are ranked in descending order of the Pearson correlation coefficient.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.9.

StatLink http://dx.doi.org/10.1787/888932900593

PROFICIENCY IN PROBLEM SOLVING IN TECHNOLOGY-RICH ENVIRONMENTS

The Survey of Adult Skills defines problem solving in technology-rich environments as "using digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks". It focuses on "the abilities to solve problems for personal, work and civic purposes by setting up appropriate goals and plans, and accessing and making use of information through computers and computer networks" (OECD, 2012b).

Problem solving in technology-rich environments represents the intersection of what are sometimes described as "computer literacy" skills (i.e. the capacity to use ICT tools and applications) and the cognitive skills required to solve problems. Some basic knowledge regarding the use of ICT input devices, such as a keyboard and mouse and display screen, file-management tools, applications (Internet browsers, spreadsheets, e-mail), and graphic interfaces is essential for performing assessment tasks (see Box 2.8). However, the objective is not to test proficiency in the use of ICT tools and applications in isolation, but rather to assess the capacity of adults to use these tools to access, process, evaluate and analyse information effectively in a goal-oriented way. The difficultly of the problem-solving tasks is related to both the cognitive demands and complexity of the tasks, and the range and nature of the tools and applications that the test-taker is required to use to arrive at a solution. For example, the more difficult problem solving tasks tended to involve transferring information from one application to another, and then transforming that information in addition to requiring the test-taker to follow a relatively complex sequence of actions involving multiple steps and negotiating impasses in order to arrive at a solution.

A prerequisite for displaying proficiency in problem solving in technology-rich environments is having some rudimentary skills in using computer tools and applications. Given the very different levels of familiarity with computer applications in the countries participating in the Survey of Adult Skills, the proportions of the population to which the estimates of proficiency in this domain refer vary widely among countries.[16]

The survey provides two different, albeit related, pieces of information regarding the capacity of adults to manage information in technology-rich environments. The first is the proportion of adults who have sufficient familiarity with computers to use them to perform information-processing tasks. The second is the proficiency of adults with at least some ICT skills in solving the types of problems commonly encountered in their roles as workers, citizens and consumers in a technology-rich world.

Box 2.8. Problem solving in technology-rich environments: Beyond using ICT tools to manage information

The assessment of problem solving in technology-rich environments is designed to evaluate the ability of adults to solve problems in which the information they use is accessed through ICT applications and the solution either requires the use of, or is made easier by the use of, ICT tools. In some cases, the problem itself is partly generated by the very existence of these tools.

The assessment was developed to provide information not only about access to and familiarity with ICTs, but also to understand the extent to which adults can use these tools efficiently and effectively to solve the types of problems that arise in their everyday lives as workers, consumers and citizens. The assessment involved a series of problem scenarios. Respondents had to find a solution to a problem using the information and tools that were accessible in simulated computer environments that contained applications, such as an Internet browser and web pages, or a computer-based room-reservation system and other common applications, such as e-mail, word processing and spreadsheet tools. In addition, the scenarios involved different levels of cognitive complexity. The solution path could entail a few or many steps, with or without built-in impasses. The problem statement could be more or less explicit; and arriving at a solution could demand greater or lesser levels of self-monitoring, inferential reasoning, and evaluation of the relevance and credibility of information.

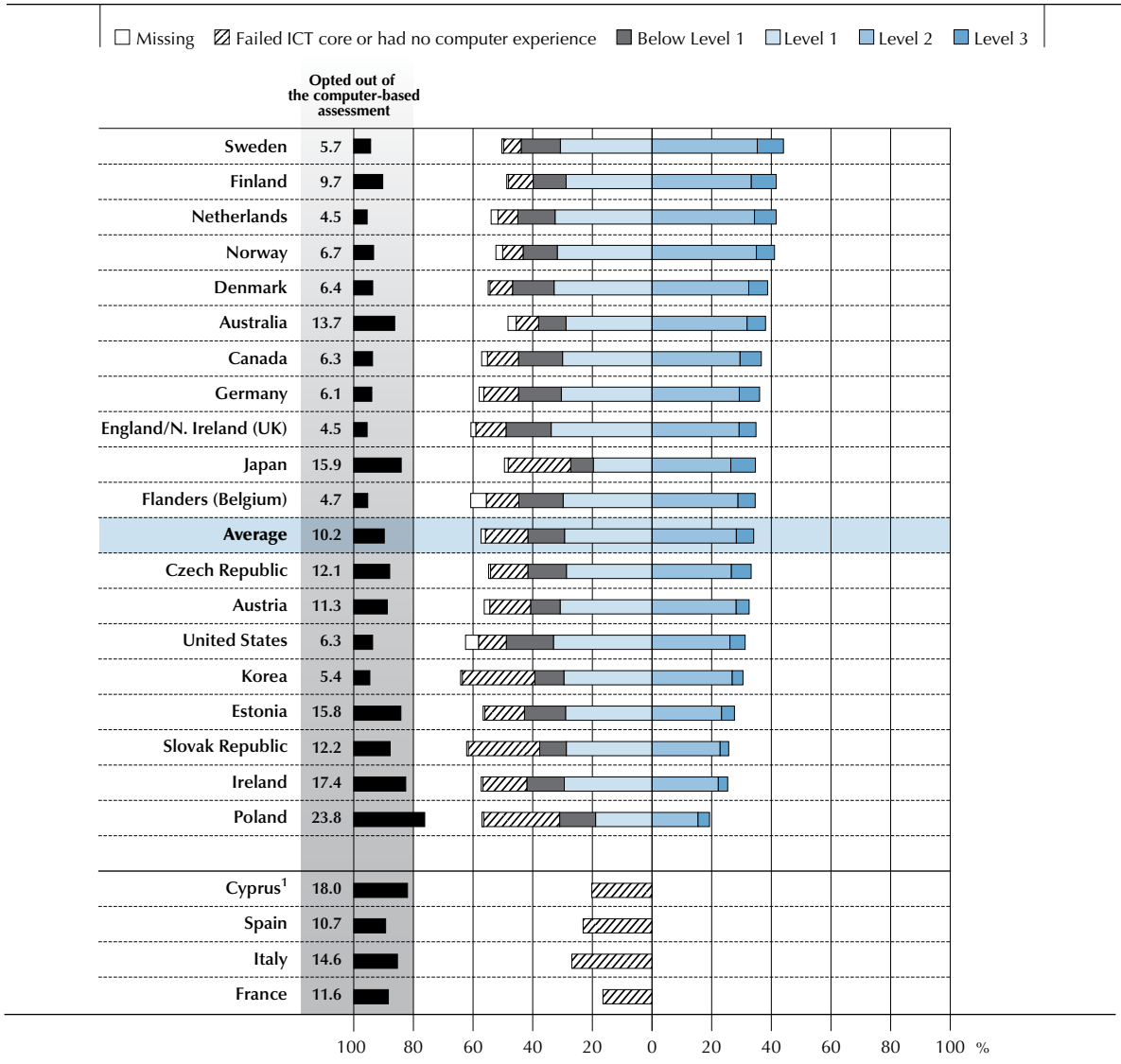
WHAT ADULTS CAN DO AT DIFFERENT LEVELS OF PROFICIENCY IN PROBLEM SOLVING IN TECHNOLOGY-RICH ENVIRONMENTS

Figure 2.10a presents the proportion of all adults aged 16-65, across all participating countries, at the four levels of proficiency (Level 1 through 3 plus below Level 1) on the problem solving in technology-rich environments scale. The features of the tasks at these levels are described in detail in Table 2.4 and some examples of problem-solving items are described in Box 2.9. The range in the proportion of adults who completed the assessment in this domain (from a high of 87.9% in Sweden to a low of 50.2% in Poland) means that comparisons of mean scores across countries are not particularly meaningful for comparing proficiency.

■ Figure 2.10a ■

Proficiency in problem solving in technology-rich environments among adults

Percentage of 16-65 year-olds scoring at each proficiency level



1. See notes at the end of this chapter.

Notes: Adults included in the missing category were not able to provide enough background information to impute proficiency scores because of language difficulties, or learning or mental disabilities (referred to as literacy-related non-response). The missing category also includes adults who could not complete the assessment of problem solving in technology-rich environments because of technical problems with the computer used for the survey. Cyprus,[1] France, Italy and Spain did not participate in the problem solving in technology-rich environments assessment.

Countries are ranked in descending order of the combined percentage of adults scoring at Levels 2 and 3.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.10a.

StatLink http://dx.doi.org/10.1787/888932900612

Table 2.4
Description of proficiency levels in problem solving in technology-rich environments

Level	Score range	Percentage of adults able to perform tasks at each level (average)	The types of tasks completed successfully at each level of proficiency
No computer experience	Not applicable	9.3%	Adults in this category reported having no prior computer experience; therefore, they did not take part in the computer-based assessment but took the paper-based version of the assessment, which did not include the problem solving in technology-rich environment domain.
Failed ICT core	Not applicable	4.9%	Adults in this category had prior computer experience but failed the ICT core test, which assesses the basic ICT skills, such as the capacity to use a mouse or scroll through a web page, needed to take the computer-based assessment. Therefore, they did not take part in the computer-based assessment, but took the paper-based version of the assessment, which did not include the problem solving in technology-rich environment domain.
"Opted out" of taking computer-based assessment	Not applicable	10.2%	Adults in this category opted to take the paper-based assessment without first taking the ICT core assessment, even if they reported some prior experience with computers. They also did not take part in the computer-based assessment, but took the paper-based version of the assessment, which did not include the problem solving in technology-rich environment domain.
Below Level 1	Below 241 points	12.3%	Tasks are based on well-defined problems involving the use of only one function within a generic interface to meet one explicit criterion without any categorical or inferential reasoning, or transforming of information. Few steps are required and no sub-goal has to be generated.
1	241 to less than 291 points	29.4%	At this level, tasks typically require the use of widely available and familiar technology applications, such as e-mail software or a web browser. There is little or no navigation required to access the information or commands required to solve the problem. The problem may be solved regardless of the respondent's awareness and use of specific tools and functions (e.g. a sort function). The tasks involve few steps and a minimal number of operators. At the cognitive level, the respondent can readily infer the goal from the task statement; problem resolution requires the respondent to apply explicit criteria; and there are few monitoring demands (e.g. the respondent does not have to check whether he or she has used the appropriate procedure or made progress towards the solution). Identifying content and operators can be done through simple match. Only simple forms of reasoning, such as assigning items to categories, are required; there is no need to contrast or integrate information.
2	291 to less than 341 points	28.2%	At this level, tasks typically require the use of both generic and more specific technology applications. For instance, the respondent may have to make use of a novel online form. Some navigation across pages and applications is required to solve the problem. The use of tools (e.g. a sort function) can facilitate the resolution of the problem. The task may involve multiple steps and operators. The goal of the problem may have to be defined by the respondent, though the criteria to be met are explicit. There are higher monitoring demands. Some unexpected outcomes or impasses may appear. The task may require evaluating the relevance of a set of items to discard distractors. Some integration and inferential reasoning may be needed.
3	Equal to or higher than 341 points	5.8%	At this level, tasks typically require the use of both generic and more specific technology applications. Some navigation across pages and applications is required to solve the problem. The use of tools (e.g. a sort function) is required to make progress towards the solution. The task may involve multiple steps and operators. The goal of the problem may have to be defined by the respondent, and the criteria to be met may or may not be explicit. There are typically high monitoring demands. Unexpected outcomes and impasses are likely to occur. The task may require evaluating the relevance and reliability of information in order to discard distractors. Integration and inferential reasoning may be needed to a large extent.

Box 2.9. Examples of problem solving in technology-rich environments

Items that exemplify the pertinent features of the proficiency levels in the domain of problem solving in technology-rich environments are described below (see Table 4.4 in the *Reader's Companion* to this report [OECD, 2013]).

Level 1: Party invitations (Item ID: U01A)
Cognitive strategies: Plan and use information
Technology: E-mail
Context: Personal
Difficulty score: 286

This task involves sorting e-mails into pre-existing folders. An e-mail interface is presented with five e-mails in an Inbox. These e-mails are responses to a party invitation. The test-taker is asked to place the response e-mails into a pre-existing folder to keep track of who can and cannot attend a party. The item requires the test-taker to "Categorise a small number of messages in an e-mail application in existing folders according to a single criterion." The task is performed in a single and familiar environment and the goal is explicitly stated in operational terms. Solving the problem requires a relatively small number of steps and the use of a restricted range of operators and does not demand a significant amount of monitoring across a large number of actions.

Level 2: Club membership (Item ID: U19b)
Cognitive strategies: Set goals and monitor progress, plan, acquire and evaluate information and use information
Technology: Spreadsheet, E-mail
Context: Society and community
Difficulty score: 296

This task involves responding to a request for information by locating information in a spreadsheet and e-mailing the requested information to the person who asked for it. The test-taker is presented with a word-processor page containing a request to identify members of a bike club who meet two conditions, and a spreadsheet containing 200 entries in which the relevant information can be found. The required information has to be extracted by using a sort function. The item requires the test-taker to "Organise large amounts of information in a multiple-column spreadsheet using multiple explicit criteria and locate and mark relevant entries." The task requires switching between two different applications and involves multiple steps and operators. It also requires some amount of monitoring. Making use of the available tools greatly facilitates identifying the relevant entries.

Level 3: Meeting rooms (Item ID: U02)
Cognitive strategies: Set goals and monitor progress, plan, acquire and evaluate information and use information
Technology: E-mail, Internet
Context: Work-related
Difficulty score: 346

This task involves managing requests to reserve a meeting room on a particular date using a reservation system. Upon discovering that one of the reservation requests cannot be accommodated, the test-taker has to send an e-mail message declining the request. Successfully completing the task involves taking into account multiple constraints (e.g. the number of rooms available and existing reservations). Impasses exist, as the initial constraints generate a conflict (one of the demands for a room reservation cannot be satisfied). The impasse has to be resolved by initiating a new sub-goal, i.e. issuing a standard message to decline one of the requests. Two applications are present in the environment: an e-mail interface with a number of e-mails stored in an inbox containing the room reservation requests, and a web-based reservation tool that allows the user to assign rooms to meetings at certain times. The item requires the test-taker to "Use information from a novel web application and several e-mail messages, establish and apply criteria to solve a scheduling problem where an impasse must be resolved, and communicate the outcome." The task involves multiple applications, a large number of steps, a built-in impasse, and the discovery and use of ad hoc commands in a novel environment. The test-taker has to establish a plan and monitor its implementation in order to minimise the number of conflicts. In addition, the test-taker has to transfer information from one application (e-mail) to another (the room-reservation tool).

Proficiency at Level 3 (scores equal to or higher than 341 points)

Adults at Level 3 can complete tasks involving multiple applications, a large number of steps, impasses, and the discovery and use of ad hoc commands in a novel environment. They can establish a plan to arrive at a solution and monitor its implementation as they deal with unexpected outcomes and impasses.

Some 5.8% of adults score at Level 3. Sweden (8.8%), Finland (8.4%) and Japan (8.3%) have the largest proportions of adults scoring at this level, followed by the Netherlands (7.3%), Canada (7.1%) and Germany (6.8%).

Proficiency at Level 2 (scores from 291 points to less than 341 points)

At Level 2, adults can complete problems that have explicit criteria for success, a small number of applications, and several steps and operators. They can monitor progress towards a solution and handle unexpected outcomes or impasses.

On average, 28.2% of adults score at Level 2. More than 30% of adults in Sweden (35.2%), Norway (34.9%), the Netherlands (34.3%), Finland (33.2%), Denmark (32.3%) and Australia (31.8%) achieve this level while less than 25% of adults in Poland (15.4%), Ireland (22.1%), the Slovak Republic (22.8%) and Estonia (23.2%) do. On average, 34.0% of adults are proficient at Level 2 or higher. In other words, just over one in three adults, on average, can successfully complete assessment items such as the *Club membership* item described in Box 2.9. More than 40% of adults in Sweden (44%), Finland (41.6%), the Netherlands (41.5%) and Norway (41%) score at this level or higher. Poland has the smallest proportion of adults scoring at Level 2 or higher (19.2%), followed by Ireland (25.3%) and the Slovak Republic (25.6%).

Proficiency at Level 1 (scores from 241 points to less than 291 points)

At Level 1, adults can complete tasks in which the goal is explicitly stated and for which the necessary operations are performed in a single and familiar environment. They can solve problems in the context of technology-rich environments whose solutions involve a relatively small number of steps, the use of a restricted range of operators, and a limited amount of monitoring across a large number of actions.

Some 29.4% of adults score at Level 1. England/Northern Ireland (UK) (33.9%), the United States (33.1%) and Denmark (32.9%) have the largest proportions of adults scoring at this level.

Proficiency below Level 1 (scores below 241 points)

Below Level 1, adults can complete tasks in which the goal is explicitly stated and for which the necessary operations are performed in a single and familiar environment. They can solve problems whose solutions involve a relatively small number of steps, the use of a restricted range of operators, and a limited amount of monitoring across a large number of actions.

Some 12.3% of adults score below Level 1. The United States (15.8%), England/Northern Ireland (UK) (15.1%), Flanders (Belgium) (14.8%) and Canada (14.8%) have the largest proportions of adults scoring below Level 1.

The proportion of adults with basic ICT skills

In each participating country, some adults were unable to display proficiency in problem solving in technology-rich environments. This group includes adults who had no prior computer experience and adults with some computer experience who did not have the basic computer skills – the ability to use a mouse, scroll through text, highlight text, and use drag and drop functionality – necessary to take the assessment component of the Survey of Adult Skills in its computer-based version. In addition, some respondents opted to take the paper-based version of the assessment without first taking the test of basic ICT skills, even though they reported that they had experience with computers.

Overall, the results suggest that in all countries participating in the survey, there is a reasonably large proportion of adults who have either no experience in the use of computers or at most a very low level of familiarity with computer devices and applications. On average, 9.3% of adults reported having no prior computer experience. This ranged from around 2% in Sweden (1.6%), Norway (1.6%) and Denmark (2.4%) to over 20% in Italy (24.4%) and the Slovak Republic (22.0%). A further 4.9% of adults did not possess the basic ICT skills, such as the capacity to use a mouse or scroll through a web page, needed to take the assessment in its computer-based form (see Figure 2.10a) that were assessed by the ICT core test. This was true of 3% or less of adults in the Czech Republic (2.2%), the Slovak Republic (2.2%) and Italy (2.5%). Japan (10.7%)[17] Korea (9.1%), Poland (6.5%) and Spain (6.2%) had high proportions of adults who did not pass the core test.

Some adults preferred not to use a computer in an assessment situation, even if they reported some prior experience with computers. In all participating countries, a proportion of adults opted to take the paper-based version of the assessment without first taking the ICT core test (see Box 2.10). Some 10.2% of adults opted to take the paper-based assessment without first taking the ICT core test (illustrated as a black bar in each country in Figure 2.10a). Poland (23.8%), Ireland (17.4%), Japan (15.9%), Estonia (15.8%), Italy (14.6%) and Australia (13.7%) had particularly large proportions of adults who "opted out" of the computer-based assessment, whereas England/Northern Ireland (UK), the Netherlands (both at 4.5%) and Flanders (Belgium) (4.7%) had relatively small proportions of adults who did so.

Box 2.10. Adults who "opted out" of taking the computer-based assessment

Respondents took the assessment component of the Survey of Adult Skills either in a computer-based format on a laptop computer or in a paper-based format. Respondents who indicated in the background questionnaire that they had no prior experience using computers took the assessment in the paper-based format. Respondents who had computer experience first took a simple test of their ability to use the functionality required to undertake the assessment in computer-based form (the ICT core). Those who "failed" the ICT core test were also directed to the paper version of the assessment. Some respondents who had computer experience opted to take the paper version without first completing the ICT core. In total across participating countries, except partner countries, 9.3% of respondents had no prior computer experience, 4.9% of adults failed the ICT core, and 10.2% of adults opted to take the paper-based assessment without first taking the ICT core. Figure "a" in this box summarises the characteristics of adults in each of the four groups: respondents who had no computer experience, those who failed the ICT core, those who "opted out" of taking the computer-based assessment, and those who passed ICT core and took the computer-based assessment.

■ Figure a ■

Adults' range of experience with computers and the computer-based assessment, by socio-demographic profile

	Adults with no computer experience	Adults failed ICT core	Adults who "opted out" of taking the computer-based assessmen	Adults who took the computer-based assessment
Age group (%)	100%	100%	100%	100%
16-24 year-olds	1.4	11.9	5.9	20.7
25-34 year-olds	4.3	18.1	11.8	23.5
35-44 year-olds	10.0	20.3	18.9	23.0
45-54 year-olds	26.8	24.6	27.0	19.1
55-65 year-olds	57.5	25.2	36.5	13.7
Educational attainment (%)	100%	100%	100%	100%
Less than upper secondary	60.2	33.0	34.0	18.3
Upper secondary, post-secondary non-tertiary	35.6	46.7	48.9	45.4
Tertiary	4.2	20.0	17.1	36.2
Occupation level (%)	100%	100%	100%	100%
Elementary occupation	25.6	15.9	14.8	7.2
Semi-skilled blue-collar occupation	46.1	30.3	31.8	17.8
Semi-skilled white-collar occupation	21.4	29.4	30.6	30.1
Skilled occupation	6.9	24.4	22.9	44.9
ICT use in everyday life (%)	a	100%	100%	100%
No engagement in ICT-related practices	a	3.3	4.3	0.5
Almost never	a	38.7	46.1	17.6
Rarely	a	20.4	21.2	20.1
Sometimes	a	13.8	12.4	20.4
Frequently	a	12.8	8.9	20.6
Almost everyday	a	11.0	7.1	20.7
Mean scores (points)				
Literacy mean scores	224	243	262	281
Numeracy mean scores	212	228	248	280

Note: The figures presented in this table are based on the average and the results for each country can be found in the tables mentioned in the source below.

Source: Survey of Adult Skills (PIAAC) (2012). Tables B2.5a, B2.5b, B2.5c, B2.5d, B2.5e and B2.5f in Annex B. The proportion of adults in the total population can be found in Tables B3.3, B3.5, B3.6, B3.11 and B3.14 in Annex B.

StatLink http://dx.doi.org/10.1787/888932900802

...

Respondents who opted out of the computer-based assessment were more similar in age, level of educational attainment and occupation to the respondents who failed the ICT core test than to those who passed and took the assessment in its computer-based format. Overall, respondents who opted out of taking the computer-based assessment were older than both those who failed and those who passed the ICT core. They had similar levels of education and occupational status as respondents who failed the ICT core, and lower levels of education and lower probabilities of being employed in skilled occupations than those who passed the core test. The opt-out group reported less frequent use of ICTs in everyday life and at work compared to those who failed and those who passed the ICT core test. Among adults who opted out of taking the computer-based assessment, 50.4% reported no or almost no ICT use in everyday life compared to 42.0% of adults who failed the ICT core test and 18.1% of adults who took the computer-based assessment. Adults who opted out had higher mean literacy (262 points) and numeracy (248 points) scores than those who failed the ICT core test (243 points in literacy and 228 points in numeracy), but they had lower scores than adults who passed the ICT core test (281 points in literacy and 280 points in numeracy).

The reasons for which these individuals opted to take the pencil and paper based assessment are unknown.[18] However, information regarding the characteristics of the members of this group and their patterns of ICT usage are available and can be used to infer something about their likely level of ICT skills and/or comfort with using a computer in a test situation. In summary, the evidence suggests that many in the "opt out" group are likely to have relatively low levels of computer skills (see Box 2.10).

WHAT YOUNG ADULTS CAN DO AT DIFFERENT LEVELS OF PROFICIENCY IN PROBLEM SOLVING IN TECHNOLOGY-RICH ENVIRONMENTS

Figure 2.10b presents the proportion of young adults aged 16-24, at the four levels of proficiency (Level 1 through 3 plus below Level 1) on the problem solving in technology-rich environments scale as in the case for the overall population. In all countries, 16-24 year-olds have higher average levels of proficiency in this domain than does the 16-65 year-old population as a whole. They also have lower chances of having no prior computer experience, or failing the ICT core test, or opting to take the paper-based rather than computer-based version of the assessment.

Proficiency at Level 3 (scores equal to or higher than 341 points)

Some 9% of 16-24 year-olds score at Level 3, 3 percentage points more than that for adults aged 16-65. Sweden (11.7%), the Czech Republic (11.7%), Finland (11.5%), the Netherlands (11.4%) and Flanders (Belgium) (11.1%) have 11% or more young adults at this level. In all of the participating countries, the proportion of 16-24 year-olds at Level 3 is larger than that of 16-65 year-olds. The advantage of 16-24 year-olds is particularly marked in Korea (6 percentage points), Flanders (Belgium) (5 percentage points) and the Czech Republic (5 percentage points).

Proficiency at Level 2 (scores from 291 points to less than 341 points)

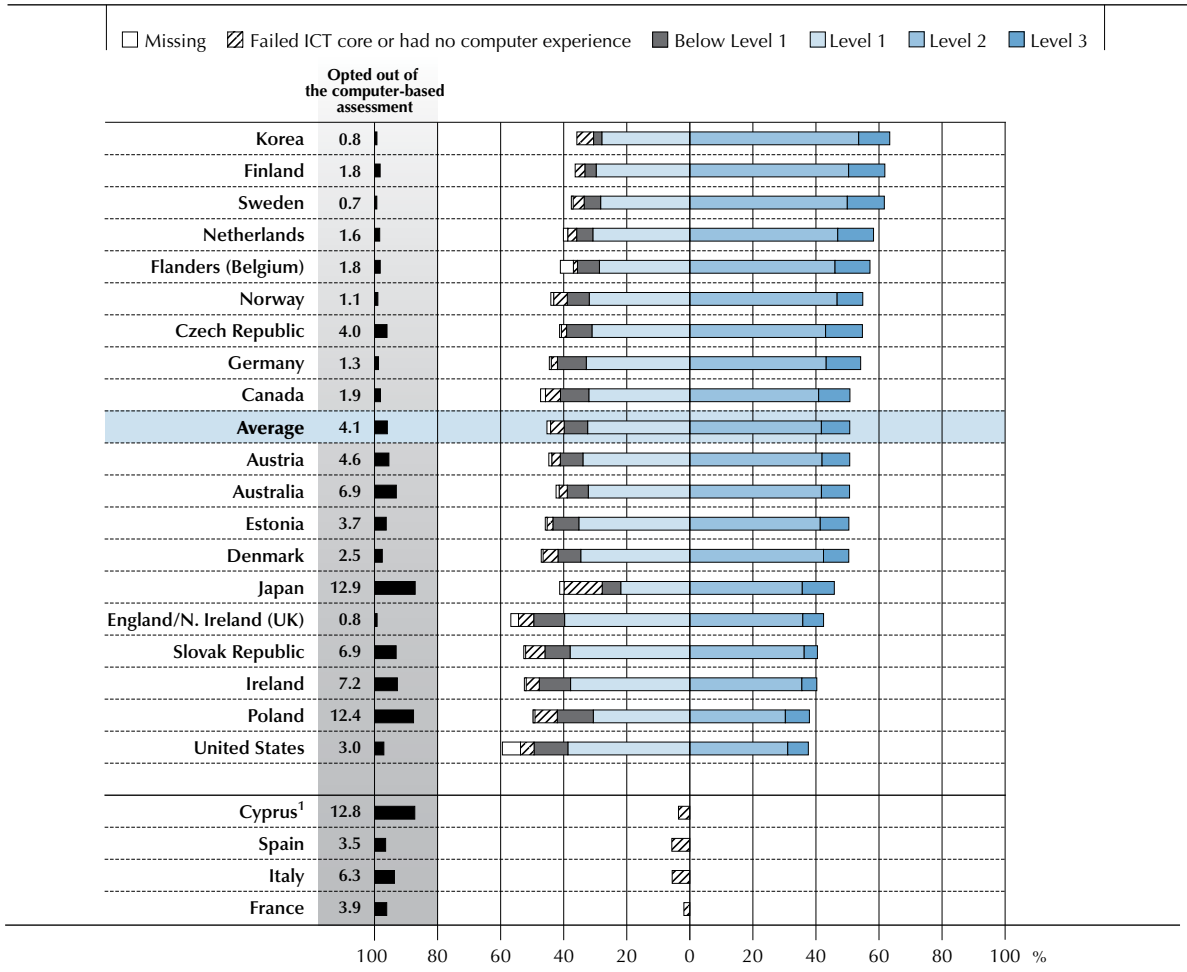
On average, 41.7% of young adults score at Level 2, a proportion that is 14 percentage points larger than that of adults aged 16-65. Korea has the highest proportion of young adults at this level (53.6%), followed by Finland (50.4%) and Sweden (49.9%). By contrast, less than 35% of young adults in Poland (30.3%) and the United States (31.1%) score at this level. In all of the participating countries, the proportion of 16-24 year-olds scoring at Level 2 is greater than that of 16-65 year-olds. The difference in the proportion of young adults who score at this level compared with the overall adult population is widest in Korea (27 percentage points), followed by Estonia (18 percentage points) and Flanders (Belgium) (17 percentage points).

Some 50.7% of young adults are proficient at Level 2 or higher, on average. In other words, just over one in two young adults can successfully complete assessment items such as the *Club membership* item described in Box 2.9. More than 55% of young adults in Korea (63.4%), Finland (61.9%), Sweden (61.7%), the Netherlands (58.3%) and Flanders (Belgium) (57.1%) score at Level 2 or higher. The United States has the smallest proportion of 16-24 year-olds who score at this level or higher (37.6%), followed by Poland (37.9%).

■ Figure 2.10b ■

Proficiency in problem solving in technology-rich environments among young adults

Percentage of 16-24 year-olds scoring at each proficiency level



1. See notes at the end of this chapter.

Notes: Young adults in the missing category were not able to provide enough background information to impute proficiency scores because of language difficulties, or learning or mental disabilities (referred to as literacy-related non-response). The missing category also includes adults who could not complete the assessment of problem solving in technology-rich environments because of technical problems with the computer used for the survey. Cyprus,[1] France, Italy and Spain did not participate in the problem solving in technology-rich environments assessment.

Countries are ranked in descending order of the combined percentage of adults scoring at Levels 2 and 3.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.10b.

StatLink http://dx.doi.org/10.1787/888932900631

Proficiency at Level 1 (scores from 241 points to less than 291 points)

Some 32.4% of 16-24 year-olds score at Level 1, a proportion that is 3 percentage points larger than that of 16-65 year-olds who score at this level. England/Northern Ireland (UK) (39.7%), the United States (38.7%) and the Slovak Republic (38.0%) have the largest proportions of young adults scoring at this level. Poland (12 percentage points) and the Slovak Republic (9 percentage points) have the largest differences in the proportion of young adults who score at this level compared with the overall population.

Proficiency below Level 1 (scores below 241 points)

Some 7.5% of young adults score below Level 1, a share that is 5 percentage points smaller than that of 16-65 year-olds who score at this level. Korea (2.6%) and Finland (3.6%) have the smallest proportions of young adults scoring at this level, while Poland (11.4%) and the United States (10.7%) have the largest proportion of 16-24 year-olds who do. In all of the participating countries, the proportion of young adults scoring at this level is smaller than that of 16-65 year-olds.

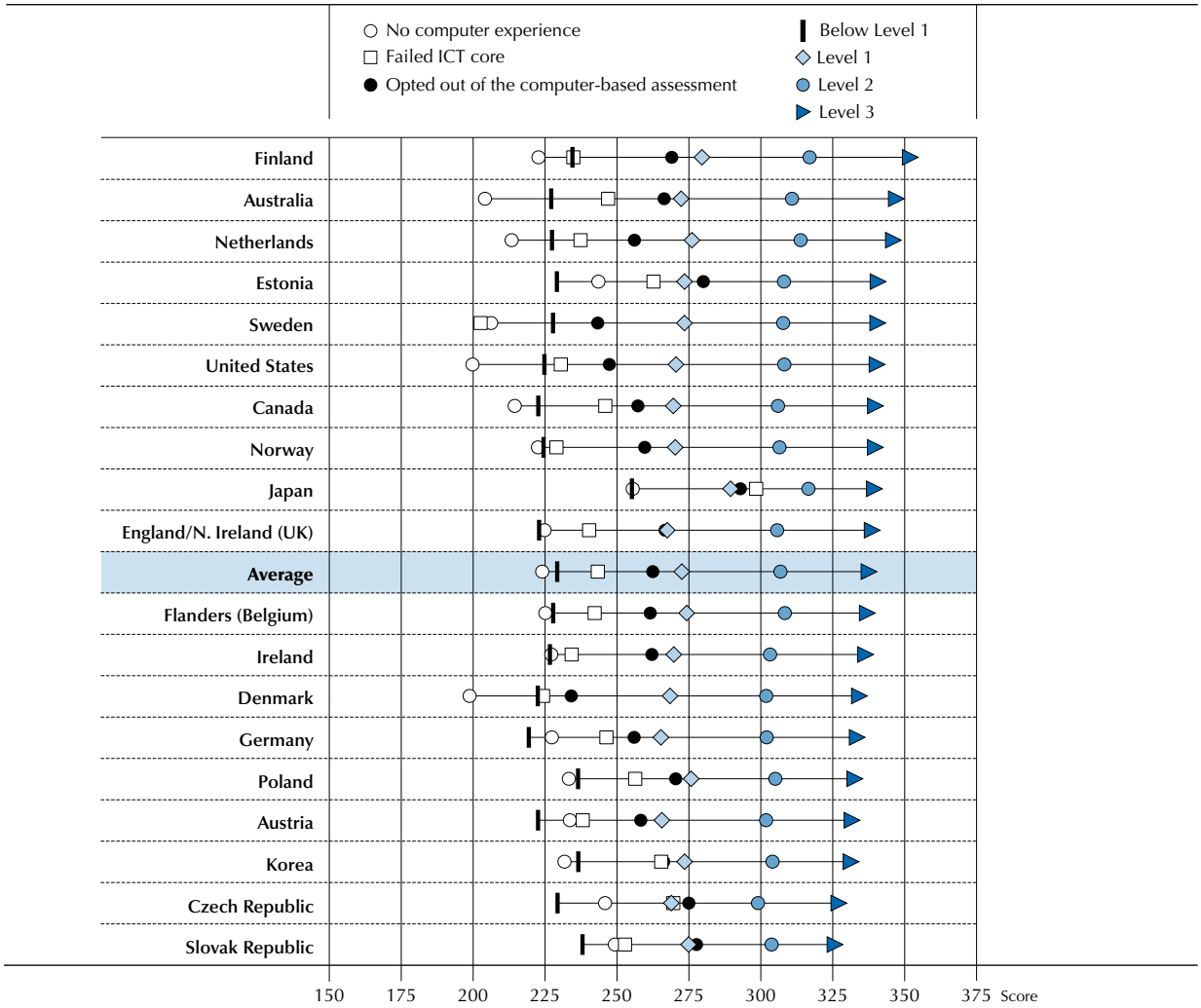
THE RELATIONSHIP BETWEEN PROFICIENCY IN LITERACY/NUMERACY AND PROBLEM SOLVING IN TECHNOLOGY-RICH ENVIRONMENTS

In order to look more closely at the relationship between literacy and problem solving in technology-rich environments, and numeracy and problem solving in technology-rich environments, Figures 2.11 and 2.12 present the mean scores on the literacy and numeracy scales of individuals at the various proficiency levels on the problem solving in technology-rich environments scale, those individuals without computer experience, those who failed the ICT core and those who opted not to take the computer-based assessment. On average, individuals scoring at Level 3 on the problem solving in technology-rich environments scale score at Level 4 on the literacy and the numeracy scales. Those who score at Level 2 on the problem solving in technology-rich environments scale score at Level 3 on the literacy and numeracy scales; and those who score at or below Level 1 on the problem solving in technology-rich environments scale score at the top of Level 2 or at the lower end of Level 2 on the literacy and numeracy scales, on average. The exception is Japan, where those who score at or below Level 1 on the problem solving in technology-rich environments scale score considerably higher in literacy and numeracy than adults in other participating countries who have a similar level of proficiency on problem solving in technology-rich environments scale.

■ Figure 2.11 ■

Relationship between literacy and problem solving in technology-rich environments

Mean literacy proficiency, by proficiency level in problem solving in technology-rich environments



Countries are ranked in descending order of the mean literacy score of adults scoring at Level 3 on the problem solving in technology-rich environments scale.

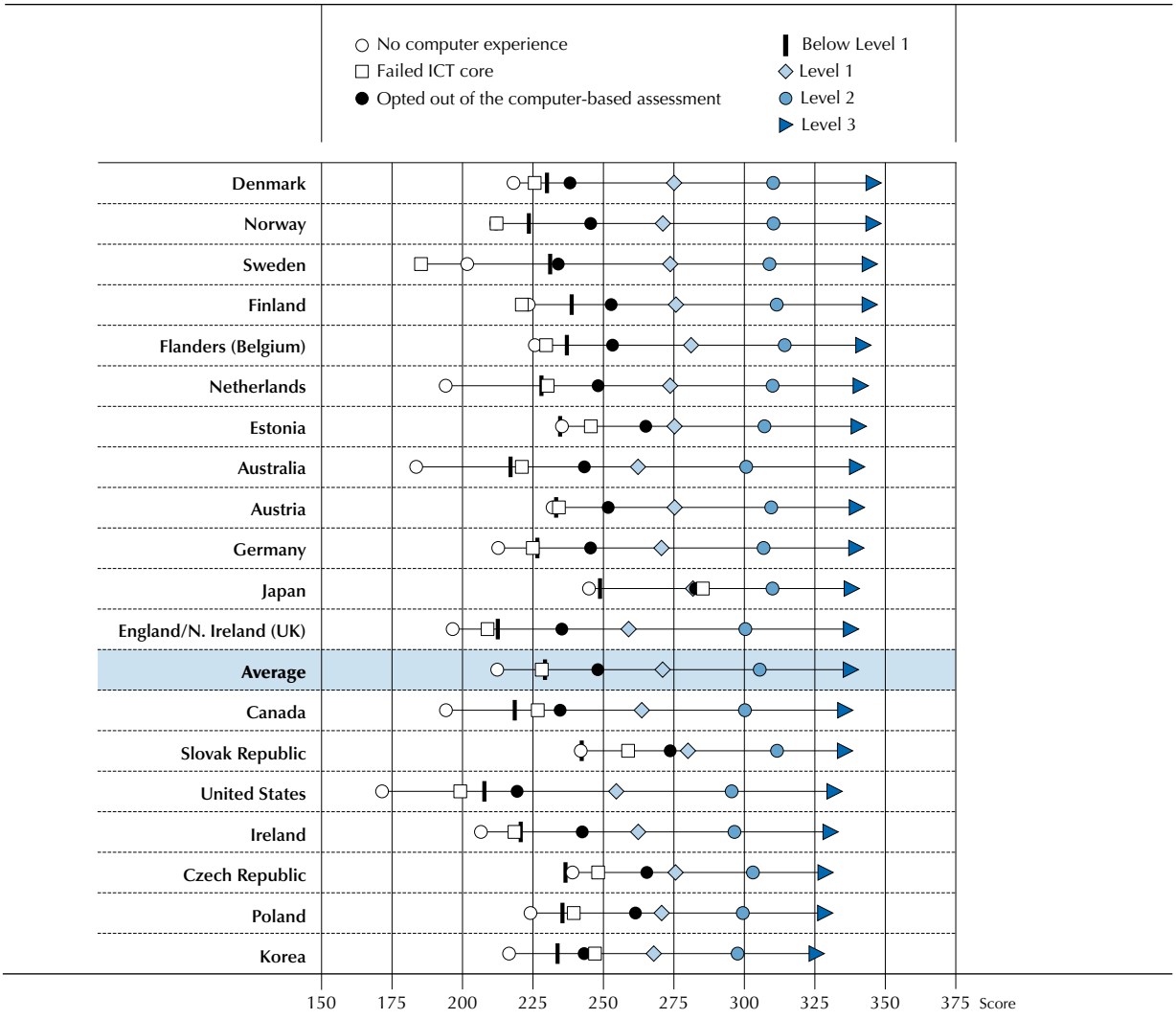
Source: Survey of Adult Skills (PIAAC) (2012), Table A2.11.

StatLink http://dx.doi.org/10.1787/888932900650

■ Figure 2.12 ■

Relationship between numeracy and problem solving in technology-rich environments

Mean numeracy proficiency, by proficiency level in problem solving in technology-rich environments



Countries are ranked in descending order of the mean numeracy score of adults scoring at Level 3 on the problem-solving in technology-rich environments scale.

Source: Survey of Adult Skills (PIAAC) (2012), Table A2.12.

StatLink http://dx.doi.org/10.1787/888932900669

The literacy and numeracy proficiency among individuals who opted out of the computer-based assessment is higher than that among individuals who have no computer experience or who failed the ICT core on average. Almost without exception, the proficiency in literacy and numeracy among individuals without computer experience is lower than that among individuals who failed the ICT core. In absolute terms, the literacy and numeracy proficiency of this group is very low, ranging from 200 score points (the mid-point of Level 1) to 256 points (the mid-point of Level 2) in literacy and 171 points (the bottom of Level 1) and 245 points (the mid-point of Level 2) in numeracy. The average literacy and numeracy scores among individuals who failed the ICT core vary more, ranging from around 200 points to 270 points (the top of Level 2) in literacy and to 259 points (the mid-point of Level 2) in numeracy. Japan is, again, the exception: the average literacy score among individuals who failed the ICT core is around 300 points. It is also striking that the individuals without computer experience, who failed ICT core or "opted out" of the computer-based assessment score particularly poorly in numeracy.

The link between proficiency in literacy and numeracy and proficiency in managing information in digital environments raises some interesting issues. High levels of proficiency in literacy and numeracy go hand in hand with high levels of proficiency in problem solving in digital environments. On the other hand, low levels of proficiency in literacy and particularly in numeracy may be significant barriers to using ICT applications effectively to manage information. The fact that adults who fail the ICT core have generally low proficiency in literacy and numeracy suggests that low literacy may hinder the acquisition of basic ICT skills. In addition, even if adults have some computer skills, it is difficult for those with low levels of proficiency in literacy and numeracy to handle many of the information management and information processing tasks that they are likely to encounter in a society where the use of online applications – for shopping, interaction with public authorities and service providers, and accessing information – is common, if not the norm. Given that text-based information occupies a considerable portion of the online world, access to that world should be seen in terms of proficiency in literacy as well as in technology. The digital divide may also thus reflect a literacy divide.

COMPARISON OF THE RESULTS FROM THE SURVEY OF ADULT SKILLS (PIAAC) WITH THOSE OF PREVIOUS SKILLS SURVEYS

The Survey of Adult Skills was designed to provide reliable comparisons with the results of the International Adult Literacy Survey (IALS), which was administered in 21 countries between 1994 and 1998, and the Adult Literacy and Life Skills Survey (ALL), which was administered in 13 countries between 2003 and 2007. In total, 15 countries participating in the Survey of Adult Skills participated in IALS and 6 participated in both IALS and ALL. An overview of the relationship between the Survey of Adult Skills and IALS and ALL is provided in Chapter 5 of the *Reader's Companion* to this report (OECD, 2013).

A comparison of the results in IALS and ALL with those of the Survey of Adult Skills will be published separately. However, some data from previous surveys are examined in Chapter 5 of this report in an analysis of the relationship between proficiency and ageing.

Readers should note that the results from the Survey of Adult Skills cannot be directly compared with the results from IALS and ALL surveys (see OECD/Statistics Canada, 2000 and 2011, OECD/Statistics Canada, 2005). First, for literacy, the Survey of Adult Skills reports results for a single domain, that of *literacy*, which covers the reading of both *prose* and *document* texts as well as digital texts, while IALS and ALL report literacy as two separate domains: *prose literacy* and *document literacy*. Second, even though the concept of *numeracy* has remained largely unchanged between ALL (in which the concept was introduced) and the Survey of Adult Skills, there is significantly more information available from the Survey of Adult Skills for constructing the numeracy scale.

To allow for comparisons of change over time, the results for *prose* and *document literacy* in IALS and ALL have been combined and re-estimated so that that they can be presented on a common scale with those from the Survey of Adult Skills. The results for *numeracy* in ALL have also been re-estimated for the countries that participated in both of the surveys. Comparisons between the results of the Survey of Adult Skills and previous surveys should, therefore, be made only on the basis of the revised data from IALS and ALL.

SUMMARISING PERFORMANCE ACROSS COUNTRIES

Figure 2.13 summarises the proficiency of the adult populations in participating countries in each of the three domains assessed, or in literacy and numeracy only for those countries that did not assess problem solving in technology-rich environments. It provides an overview of the average proficiency in each participating country relative to the average in each domain. In considering literacy and numeracy, it indicates whether the mean score for the population is greater than, equal to, or less than the average across countries. In considering problem solving in technology-rich environments, it shows whether the proportion of the total population performing at Level 2 or 3 on the problem solving in technology-rich environments scale is greater than, equal to, or less than the average.

The adult populations in Finland, the Netherlands, Norway and Sweden have above-average levels of proficiency in all three domains. Of these countries, Finland has the highest average score in literacy and numeracy, while Sweden has the largest proportion of adults scoring at Level 2 or 3 in problem solving in technology-rich environments. Estonia, Flanders (Belgium) and Japan have above-average mean scores in both literacy and numeracy and both Flanders (Belgium) and Japan have around the average proportion of adults scoring at Level 2 or 3 in problem solving in technology-rich

environments. Australia has a mean score statistically significantly above the average in literacy, while Denmark has above-average mean scores in numeracy and they also have statistically significantly larger-than-average proportions of adults scoring at Level 2 or 3 on the problem solving in technology-rich environments scale. Austria, the Czech Republic, Germany and the Slovak Republic have statistically significantly above-average mean scores only in numeracy. Canada has a statistically significantly larger-than-average proportion of adults scoring at Level 2 or 3 in problem solving in technology-rich environments.

■ Figure 2.13 ■

Summary of proficiency in key information-processing skills

Mean proficiency scores of 16-65 year-olds in literacy and numeracy, and the percentage of 16-65 year-olds scoring at Level 2 or 3 in problem solving in technology-rich environments

Significantly **above** the average
Not significantly different from the average
Significantly **below** the average

OECD	Literacy Mean score	Numeracy Mean score	Problem solving in technology-rich environments % at Level 2 or 3
National entities			
Australia	280	268	38
Austria	269	275	32
Canada	273	265	37
Czech Republic	274	276	33
Denmark	271	278	39
Estonia	276	273	28
Finland	288	282	42
France	262	254	m
Germany	270	272	36
Ireland	267	256	25
Italy	250	247	m
Japan	296	288	35
Korea	273	263	30
Netherlands	284	280	42
Norway	278	278	41
Poland	267	260	19
Slovak Republic	274	276	26
Spain	252	246	m
Sweden	279	279	44
United States	270	253	31
Sub-national entities			
Flanders (Belgium)	275	280	35
England/N. Ireland (UK)	272	262	35
Average	**273**	**269**	**34**
Partners			
Cyprus[1]	269	265	m

1. See notes at the end of this chapter.

Notes: Cyprus,[1] France, Italy and Spain did not field the problem solving in technology-rich environments assessment.
Countries are ranked in alphabetical order.
Source: Survey of Adult Skills (PIAAC) (2012), Tables A2.4, A2.8 and A2.10a.
StatLink http://dx.doi.org/10.1787/888932900688

Fourteen of twenty-two countries have mean scores statistically significantly below average in at least one of the domains. Ireland, Poland and the United States have below-average mean scores in all of the domains. Italy and Spain have statistically significantly below-average mean scores in both literacy and numeracy (neither of these countries participated in the problem solving in technology-rich environments assessment). Austria has a below-average mean score in literacy, Canada has a below-average mean score in numeracy, and Korea has a below-average mean score in numeracy and in problem solving in technology-rich environments.

SUMMARY

Being able to read, understand and respond appropriately to numerical and mathematical information are skills that are essential for full social and economic participation. In modern societies, much information and knowledge is stored and transmitted in written form, and many interactions and transactions with others, whether of a personal or official nature, involve texts of some sort, such as letters, memos and forms. Increasingly, accessing, analysing and communicating information takes place through the use of digital devices and applications, such as personal computers, smart phones and the Internet. The capacity to use these devices intelligently to manage information is thus of growing importance in many aspects of modern life.

One striking feature of the results is the extent of convergence between participating countries in terms of the proficiency of adults in literacy, numeracy and problem solving in technology-rich environments despite differences in the composition of the respective populations, the history of educational participation and the starting point and rate of economic growth over the last half-century. Fourteen countries had mean literacy scores within the range of 267 to 276 points, a difference of 9 score points; 16 countries had mean numeracy scores that differed by 20 score points or less.

At the same time, in all participating countries there are significant proportions of the adult population who have relatively poor skills. In all but one country, at least 10% of adults aged 16-65 are proficient at or below Level 1 in the domains of literacy or numeracy. This is a level at which individuals can regularly complete simple reading and numeracy tasks, such as locating information in a short text or performing simple one-step arithmetic operations, but have trouble with extracting information from longer and more complex texts or performing numerical tasks involving several steps and mathematical information represented in different ways.

In addition, there are adults with no or extremely limited ICT skills in all of the participating countries. From around 7% to 27% of the adult population reported having no experience in the use of computers or lacked the most elementary computer skills, such as the ability to use a mouse. In addition, there are also adults who appear to lack confidence in their ability to use computers, primarily because they use them infrequently. Of the adults undertaking the assessment, most were proficient at Level 1, which involves the use of familiar applications to solve problems that involved few steps and explicit criteria, such as sorting e-mails into pre-existing folders. As would be expected, young adults are less likely than their older compatriots to lack computer skills or to have low proficiency in problem solving in technology-rich environments. At the same time, there are several countries in which the proportion of young adults who can effectively solve more complex problems in computer environments is surprisingly low.

Both the existence of a reasonable proportion of adults with no or very limited ICT skills and the fact that, in most countries, a large proportion has low skills in managing information in digital environments suggests that governments may need to rethink the way they conceive and implement some aspects of policies relating to the digital economy, particularly concerning e-government and online access to public services.

Connectivity alone is insufficient to provide real access to online information and services. Access to the digital world is conditional, to some extent, on proficiency in literacy and numeracy. Low levels of proficiency in literacy and numeracy can be significant barriers to using ICT applications effectively to manage information. First, poor literacy may hinder the acquisition of basic ICT skills. Second, even if they have some computer skills, it is difficult for adults with low levels of proficiency in literacy and numeracy to handle many of the information management and information processing tasks encountered in online environments.

In most countries, younger adults have higher proficiency than their older peers in all three of the skills assessed. In several countries, however, the proficiency in literacy and/or numeracy of the youngest cohort is at the same level, or lower, than that of the overall population. Given the typical patterns of the evolution of proficiency over a lifetime (see Chapter 5), the implication for these countries is that the proficiency of their adult population is likely to decline over the next decades unless action is taken to improve the proficiency of the cohorts of young people who will enter adulthood in the next decades. This includes improvements in the teaching of literacy and numeracy in schools and providing older adults with opportunities to develop and maintain their skills as they age.

As is shown in subsequent chapters, low proficiency does not necessarily lead to poor outcomes. Most adults with low proficiency in literacy are employed, for example. However, such adults are at far greater risk than adults with high proficiency of being unemployed or inactive and of earning low wages if they are employed (see Chapter 6). They also report poorer health, lower levels of trust in others, and a sense that they have little impact on the political process (see Chapter 6).

In the context of an ongoing shift towards service industries, particularly involving the analysis and communication of information, and the pervasiveness of ICTs in all aspects of life, individuals with poor levels of proficiency in information-processing skills are likely to find themselves at even greater risk. Low proficiency in these skills will increasingly limit adults' access to many basic services, to better-paying and more-rewarding jobs, and to the possibility of participating in further education and training, which is crucial for developing and maintaining skills (see Chapter 5). At the national level, if large proportions of the adult population have low proficiency in information-processing skills, the introduction and adoption of productivity-improving technologies and work organisation may be hampered; and that, in turn, could stall improvements in living standards.

In addition to highlighting areas of concern for governments, the results of the assessment also identify areas in which countries can learn from each other. There are countries that have been more successful than others in ensuring higher levels of proficiency in literacy and numeracy and in minimising the performance gap between low and high performers. In the area of problem solving in technology-rich environments, for example, the Nordic countries and the Netherlands have been far more successful than other countries in creating an environment in which only small proportions of adults lack experience with computers or have only the most basic computer skills.

Notes

1. Writing skills were not directly assessed in the Survey of Adult Skills, which is mainly due to the difficulty of assessing writing in a reliable and valid way in an international comparative assessment.

2. Four proficiency levels have been defined for the domain of problem solving in technology rich-environments rather than six in the case of literacy and numeracy. This reflects the far smaller number of items that are used in the assessment of problem solving (16 items) and, thus, available to describe the scale, than used in the assessment of literacy (58 items) and numeracy (56 items).

3. The common denomination of the levels (e.g. Level 1, 2 or 3) does not imply any underlying similarity of the factors affecting the difficulty of tasks at any given level in each of the domains. The descriptors for each of the levels in each of the domains reflect the features of the relevant framework and the specific factors determining difficulty in each domain.

4. The division between Level 2 and below and Level 3 and above in literacy and numeracy and Level 2 and above and Level 1 and below in problem solving in technology-rich environments in the figures showing the distribution of the population by proficiency level has been made for ease of presentation. It does not reflect a judgement that Level 3 in literacy and in numeracy or Level 2 in problem solving represents a performance benchmark in any sense.

5. The average difference in scores between a person with n completed years of education and one with n+1 years should not be seen as an estimate of the 'learning gain' associated with an additional year of education. The relationship between proficiency and education is complex. Proficiency in literacy, for example, is not developed only through education. The direction of causality between education and proficiency is also two way. This is discussed in more detail in Chapters 3 and 5.

6. This effectively treats literacy-related non-respondents as having proficiency scores in literacy at the average for the country as a whole.

7. The proficiency in literacy of this group is *unknown*, even if there are reasons to believe that in most cases it will be low. It may also vary considerably between countries. The purpose of the analysis is to show what the effect on country mean scores would be if all members of this group had a score of 85 on the literacy scale when tested in *the test language(s) of their country of residence*. The score of 85 is chosen to illustrate what the impact on country means would be if the literacy-related non-respondents all had *very low* scores. Some 98.7% of total respondents have scores higher than 85 points in literacy.

8. The mean literacy scores of 16-24, 25-34, 35-44, 45-54 and 55-65 year-olds are reported in Figure 3.1 (L).

9. See previous note.

10. See notes regarding Cyprus below.

11. This effectively treats literacy related non-respondents as having proficiency scores in numeracy identical to the average for the country as a whole.

12. The proficiency in numeracy of this group is *unknown*, even if there are reasons to believe that in most cases it will be low, especially when these individuals are assessed in the language(s) of their country of residence. It may also vary considerably between countries. The purpose of the analysis is to show what the effect on country mean scores would be if all members of this group had a score of 85 on the numeracy scale when tested in *the test language(s) of their country of residence*. The score of 85 is chosen to illustrate the impact on country means if the literacy-related non-respondents all had *very low* scores. Some 98.5% of total respondents have scores higher than 85 points in numeracy.

13. Chapters 3 and 5 provide more detailed discussions of the relationship between age and proficiency.

14. See previous note.

15. Standard deviations can also be found in Table A2.3 in Annex A.

16. For this reason, the presentation of results focuses on the proportions of the population by proficiency level rather than the comparison of mean proficiency scores.

17. This may represent an over-estimate of the proportion of the Japanese adult population with very low levels of ICT skills. In particular, the proficiency in literacy and numeracy of these respondents in Japan was far higher compared to that of adults reporting no prior computer use in other countries. At the same time, the majority of those failing the core in Japan reported limited use of ICTs in everyday life.

18. Presumably they regarded themselves as having a low level of ICT skills, or felt more comfortable with or believed that they would perform better on the paper-based version of the assessment than on the computer-based assessment.

Notes regarding Cyprus

Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

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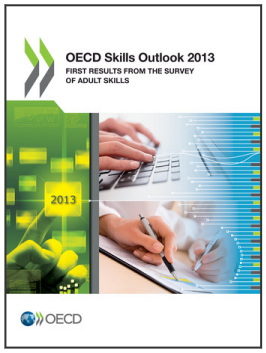

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