Department for Business Innovation & Skills

RESEARCH

BIS RESEARCH PAPER NUMBER 183

The impact of low skills on labour market engagement in the International Survey of Adult Skills 2012

DECEMBER 2014

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Research paper number 183

August 2014

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Authors and acknowledgements

NFER was the lead partner in a consortium with NatCen, TNS-BMRB and Northern Ireland Statistics and Research Agency (NISRA) and was responsible for administering the OECD Survey of Adult Skills in England and Northern Ireland on behalf of the Department of Business, Innovation and Skills in England and the Department of Education and Learning in Northern Ireland. This additional analysis of England's results and reporting were carried by the project team at NFER.

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We are grateful for the support and guidance we have received from colleagues at DfE and BIS in producing this report, in particular Kris Chapman, Anthony Clarke and Emily Knowles.

Acronyms

IALS	International Adult Literacy Survey
IRT	Item Response Theory
OECD	Organisation for Economic Co-operation and Development
PIAAC	Programme for the International Assessment of Adult Competencies
PISA	Programme for International Student Assessment

Executive Summary

The OECD's Survey of Adult Skills (part of the Programme for the Initial Assessment of Adult Competencies, PIAAC) found that although England's performance was similar to the average of other participating OECD countries for literacy and below the OECD average for numeracy, the UK (England and Northern Ireland) was more efficient at using these skills than many other countries. A greater proportion of highly skilled adults were in employment in England and Northern Ireland compared with the OECD average and fewer highly skilled people were out of the labour market. Workers in England and Northern Ireland also used skills such as reading and numeracy in work more frequently than the OECD average and had relatively high productivity. This report focuses on how low skills are related to labour market engagement and productivity to explore the relationship between low skills, employment status and use of skills in work in England. Adults with low skills are defined as those with literacy or numeracy at level 1 or below in the Survey of Adult Skills, or below level 1 in problem solving in technology-rich environments.

A greater proportion of adults in England who were unemployed or fulfilling domestic tasks had low skills in numeracy compared with the average of participating OECD countries. This supports the finding from the regression analysis in Chapter 5 of the national report (Wheater *et al.*, 2013b); in England, adults who were unemployed and looking for work were more likely to have low proficiency in literacy and numeracy than average. People in employment were less likely than average to be low skilled. Compared to the participating OECD countries in general, retired adults and part-time workers were less likely to have low literacy and numeracy. However, unemployed adults and disabled adults were more likely than across participating OECD countries to have low skills. Likewise, students in England did not perform very differently to the general adult population in literacy and numeracy, while they were better than average across OECD participating countries. The significance differences by levels was not tested in the National Report so interpretation of these findings needs to be done with caution. Although some industry sectors and occupations are likely to have a greater proportion of adults with low skills, industries and occupations that had high proportions of adults with low skills were not identified by regression analysis in the national report as factors that contributed to low skills. This suggests that although these adults have low skills, these low skills can be explained by other factors.

Industry sectors and occupations with few adults with low literacy, numeracy and problem solving proficiency include the financial and insurance, information and communication, and professional, scientific and technical industries. Low level skills is therefore a significant barrier to employment in these sectors.

In England, and the OECD on average, more frequent use of skills in the workplace, such as reading, numeracy and ICT, was associated with higher average scores in literacy, numeracy and problem solving compared with adults using these skills infrequently. However, the distribution of the frequency of use of skills amongst workers with different levels of proficiency, overlap substantially so that, for instance, adults with low levels of proficiency in literacy and numeracy are likely to use skills at work with a similar level of frequency to many adults with high proficiency in literacy and numeracy. Additionally, there is no clear relationship between countries whose workforce makes the most frequent use

of skills, and overall performance of countries (OECD, 2013a). For example, numeracy skills at work are used most frequently in Canada and the United States, yet these countries were not the top performers in numeracy, ranking 14th and 22nd respectively. Therefore, although increased use of skills is associated with higher performance in literacy and numeracy, the relationship between countries shows that ensuring the workforce makes more use of these skills will not necessarily lead to improvements in performance relative to other countries. This implies that factors other than just skills use determine average skill level in each country.

The use of reading and ICT skills at work was correlated with productivity for adults with low skills (where salary is used as a proxy for productivity). Increased proficiency in numeracy strongly predicts employment. However, use of numeracy skills at work is less strongly associated with productivity, with a greater split between higher-paid jobs which use numeracy rarely or frequently than for reading and ICT. There was little relationship between learning at work and productivity, except for the highest earners, indicating that most adults had similar frequencies of opportunities to learn at work.

1. Introduction

In 2012, England participated in OECD's Survey of Adult Skills (PIAAC[1]). The international report (OECD, 2013a) and national report for England (Wheater *et al.*, 2013b) were published on 8 October 2013. This report is supplementary to the national report, and was commissioned by the Department for Business, Innovation and Skills, to investigate **what the results of the OECD's Survey of Adult Skills tell us about the impact of low skills on labour market engagement in England**.

Working age adults in England performed, on average, in line with their peers in the other participating OECD countries for literacy in the Survey of Adult Skills and below average in numeracy. In every participating country, some adults performed at the lowest end of the competence distribution. In literacy, the prevalence of low skilled[2] adults ranged from just over one-in-four in Italy and Spain to just under one-in-twenty in Japan. In England, just less than one-in-six adults (16%) had low literacy skills, and just less than one-quarter (24%) had low numeracy skills. See Appendix A, table A1 for more details.

One key finding was that the labour market in England is more efficient at using these skills than in many other countries (OECD, 2013b, p.2). For instance, a greater proportion of highly skilled adults are in employment in England compared with the average, and fewer highly skilled people are out of the labour market. In addition, workers in England use their skills in work more frequently than the OECD average and have relatively high productivity.

This report focuses particularly on how low skills are related to labour market engagement and productivity to explore the relationship between low skills, employment status and use of skills in work in England. In particular:

- firstly, it compares the prevalence of adults with low proficiency in each of the three skills domains in England with the average across participating OECD countries;
- comparisons are then made between the skill levels of adults working in different occupational sectors in England with the average across these occupations in participating OECD countries; and
- findings from the international (OECD, 2013a) and national (Wheater *et al.*, 2013b) reports on skills use at work are synthesised and explored further; skill level, skill level use and productivity of low skilled adults are also explored, synthesised and interpreted.

[1] Programme for the International Assessment of Adult Competencies.

[2] For the purpose of analysis, adults with low skills are defined those with PIAAC level 1 or below in literacy and numeracy and below level 1 in problem solving. This is the same definition used in Chapter 5 of the national report for the regression analysis of low skills (Wheater *et al.*, 2013, pp.127–144).

2. The impact of low skills on employment

2.1 The employment status of adults with low skills in England

Appendix tables A2 to A4 show the proportion of adults with low skills in literacy, numeracy and problem solving in each participating country who are employed, unemployed or out of the labour force. In England, 55.3 per cent of adults with literacy level 1 or below were *employed*, similar to the average across participating OECD countries (56.6 per cent). A greater proportion of adults with low literacy skills (literacy level 1 or below) in England were *unemployed* than the average (10.5 per cent compared with 7.2 per cent – only in Spain, Ireland and the Slovak Republic is the percentage higher). A relatively small proportion of adults with low literacy skills were *out of the work force* in England compared with other countries.

A very similar picture is found for adults with low numeracy skills (Appendix table A3). However, adults with low problem solving skills in England were less likely than their peers across other participating countries, on average, to be *employed* (61.3 per cent in England compared with 64.4 per cent on average across other countries) and more likely to be *unemployed* or *out of the workforce*.

In order to unpick the skill levels of adults out of the workforce in more detail, table 2.1 shows the percentages, odds and odds ratios of adults in more fine-grained employment categories with low skills in literacy, numeracy and problem solving and compares them with the average across the whole population and across participating OECD countries. Key points illustrated by table 2.1 are that:

- Adults with low literacy and numeracy skills were less prevalent amongst those who were retired in England than in other countries.
- Adults with low numeracy and literacy skills were more prevalent amongst the unemployed, and adults out of work due to studying, or having a permanent disability in England than on average across other participating countries.
- Adults with low numeracy skills were also more prevalent amongst those out of work due to fulfilling domestic tasks in England than on average across participating countries.

Table 2.1 Percentage of adults with each employment status who have low skills in literacy, numeracy and problem solving

	Percentage of adults with low skills			Odds			Odds ratios – compared with whole population		
	Literacy	Numeracy	Problem solving	Literacy	Numeracy	Problem solving	Literacy	Numeracy	Problem solving
Overall in England	17	24	18	0.20	0.32	0.22	1	1	1
Overall on average across all participating OECD countries	16	19	16	0.19	0.24	0.20	1	1	1
Full-time employed (self-employed, employee) (England)	13	18	15	0.14	0.22	0.18	0.72	0.68	0.81
OECD participating country average	12	14	15	0.14	0.16	0.18	0.76	0.69	0.90
Part-time employed (self-employed, employee) (England)	14	22	18	0.17	0.29	0.22	0.83	0.89	1.00
OECD participating country average	15	20	19	0.18	0.25	0.23	0.98	1.05	1.17
Unemployed (England)	30	43	26	0.42	0.74	0.35	2.12	2.30	1.61
OECD participating country average	25	31	23	0.33	0.45	0.29	1.75	1.88	1.50
Pupil, student (England)	18	23	8	0.22	0.30	0.09	1.08	0.92	0.41
OECD participating country average	8	12	6	0.08	0.14	0.06	0.45	0.60	0.31
Apprentice, internship (England)	‡	‡	‡						
OECD participating country average	18	25	12	0.23	0.33	0.14	1.22	1.37	0.72
In retirement or early retirement (England)	14	23	31	0.16	0.29	0.44	0.80	0.90	2.01
OECD participating country average	25	28	37	0.34	0.38	0.58	1.83	1.61	2.96
Permanently disabled (England)	49	61	52	0.95	1.59	1.08	4.77	4.92	4.93
OECD participating country average	42	48	45	0.72	0.94	0.81	3.89	3.95	4.12
In compulsory military or community service (England)	‡	‡	‡						
OECD participating country average	18	24	18	0.22	0.32	0.22	1.20	1.33	1.14
Fulfilling domestic tasks or looking after children/family (England)	25	42	29	0.33	0.71	0.41	1.68	2.20	1.89
OECD participating country average	25	32	22	0.33	0.48	0.29	1.76	2.02	1.46
Other (England)	26	39	23	0.35	0.64	0.29	1.75	1.97	1.33
OECD participating country average	21	27	22	0.27	0.36	0.28	1.45	1.52	1.43
Don't know	‡	‡	‡						
average	—	—	—						

Source: adapted from Wheater *et al.*, 2013b: tables 2.14, 2.15 and 2.16.

‡ Sample size fewer than 60 — Not available

2.2 Sectoral analysis of industries employing low-skilled adults in England

This section explores the industries in which the low-skilled adults in England work. The national report found that adults who worked in information and communication professions had the highest average scores in literacy, numeracy and problem solving. Conversely, adults working in transportation and storage had the lowest scores in literacy, numeracy and problem solving (Wheater *et al.*, 2013b, p. 94). Compared with the average across participating OECD countries, respondents working in transportation and storage in England (six per cent of working adults), and those working in the wholesale and retail trade and in the repair of motor vehicles and motorcycles sector (13 per cent of working adults) scored significantly lower in literacy, numeracy and problem solving (see Wheater *et al.*, 2013: table 3.1).

The national report provides the percentage of adults at each literacy, numeracy and problem solving skill level and the mean score of adults in England, by occupation, and the mean proficiency score of adults in England, by general industry sector (Wheater *et al.*, 2013b: tables 3.1, 3.2, 3.3 and 3.4). Tables A5 to A7 show the distribution of skill level of adults in England in literacy, numeracy and problem solving by a more detailed breakdown of 20 industry sectors.

Working adults with low literacy skills are most prevalent in transportation and storage (26%). In contrast, the following sectors appear to employ very few adults with such a low level of literacy in England: financial and insurance (2%); information and communication (2%); electricity, professional, scientific and technical (6%).

Transportation and storage employs the highest proportions of adults with low numeracy proficiency in England (33%). In addition, one-quarter or more of adults in the following industries have low numeracy skills: accommodation and food service activities (29%); administration and support service activities (28%); other service activities (26%) and wholesale and retail trade: repair of motor vehicles and motorcycles (25%). The same three industry sectors as listed in the previous paragraph were the only sectors in which fewer than one-in-ten adults had low numeracy skills.

The distribution of problem solving proficiency amongst industry sectors is slightly different from literacy and numeracy. At least one-in-five adults employed in the following industries had low proficiency (below level 1) in the problem solving assessment: transportation and storage (29%); human health and social work activities (21%); wholesale and retail trade: repair of motor vehicles and motorcycles (20%). As well as those industries outlined above as employing very few adults with low literacy and numeracy skills, the following sectors also include fewer than one-in-ten adults with the lowest problem solving skills: arts, entertainment and recreation (8%); public administration and defence; compulsory social security (9%).

These simple analyses indicate the skills levels of adults by different industry sectors. The regression to analyse the characteristics of adults with low skills in literacy, numeracy and problem solving (contained in Chapter 5 of the national report, Wheater *et al*., 2013: pp.127–144) found that the characteristics most likely to be associated with low skills were

having a low level of education, belonging to particular ethnic groups, having poorer general health, having parents who have low levels of education, not having computer experience in everyday life, and working in particular occupations (i.e. services and shop and market sales). The analysis did not find that the industry sectors above with high proportions of low skilled adults were related to low skills once these other factors were taken into account.

2.3 Summary

This chapter provides further background analysis to that contained in the national report on the employment prospects of adults with low skills. The national report also includes analysis by occupation and a regression to explore the characteristics of adults with low skills in literacy, numeracy and problem solving.

The comparison of adults with low skills in literacy, numeracy and problem solving in section 2.1 found that adults who were unemployed and looking for work were more likely to have low proficiency in literacy and numeracy than average. Compared against OECD participating countries in general, retired adults and part-time workers were less likely to have low literacy and numeracy. However, unemployed adults and disabled adults were more likely than across participating OECD countries to have low skills. Likewise, students in England did not perform very differently to the general adult population in literacy and numeracy, while they were better than average across OECD participating countries. The industries identified in section 2.2 with high proportions of adults with low skills were not identified by the regression in the national report as factors that contributed to low skills. This suggests that although adults working in these industries have particularly low skills, this can be explained by the profile of adults, such as personal characteristics, education outcomes or type of occupation which these industries offer, rather than something specifically relating to the industry itself.

In England, transportation and storage employs the highest proportions of low-skilled adults across each of the skills domains. In addition, low numeracy skills are particularly prominent among adults working in service industries, and low problem solving skills are particularly prominent among adults working in human health and social work.

In contrast, low literacy, numeracy and problem solving proficiency appears to be a significant barrier to employment in the financial and insurance; information and communication; and professional, scientific and technical industries. Fewer than 10 per cent have basic skills in each domain in these industries. Additionally, low problem solving skills pose barriers to employment in public administration and the arts.

3. Skill level and use of skills at work

Indices to describe the use of skills at work were created for the OECD's Survey of Adult Skills from multiple questions included in the background questionnaire. Each skill index provides a measure of how often the tasks making up the index were carried out by a participant. Respondents who answered 'Never' to all questions in the index appear in an 'All zero response' category. The remaining respondents' answers to the questions were analysed using Item Response Theory (IRT) to produce the index. Internationally, these participants were grouped into quintiles, which give an indication of how often they perform these tasks. For instance, participants who fall in the lowest 20 per cent on the index internationally will tend to perform some or all of the tasks infrequently, whereas participants who fall in the 'more than 80 per cent' group will frequently perform many of the tasks. Further details about how the indices are created are described in Chapter 4 of the international report (OECD, 2013a), the reader companion (OECD, 2013c) and Chapter 20 of the technical report (OECD, 2013d).

Analysis in the national report found that more frequent use of skills in the work place (such as influencing; cooperating; planning and organising; problem solving; ICT; literacy and numeracy; and learning at work) was associated with higher average scores in literacy, numeracy and problem solving compared with adults using these skills infrequently, which matched the pattern observed, on average, across participating OECD countries (Wheater *et al.*, 2013b, section 3.5, pp.101–109). This may provide evidence on the importance of developing and assisting workers who use these skills infrequently to build and utilise their skills in the workplace. An alternative explanation, however, could be that those who are required to use the skills more in the work place then develop their skills further and perform better in the assessments. However, although higher levels of proficiency in literacy and numeracy are associated with greater use of literacy and numeracy skills at work, the distribution of skills use amongst workers with different levels of proficiency overlaps substantially.

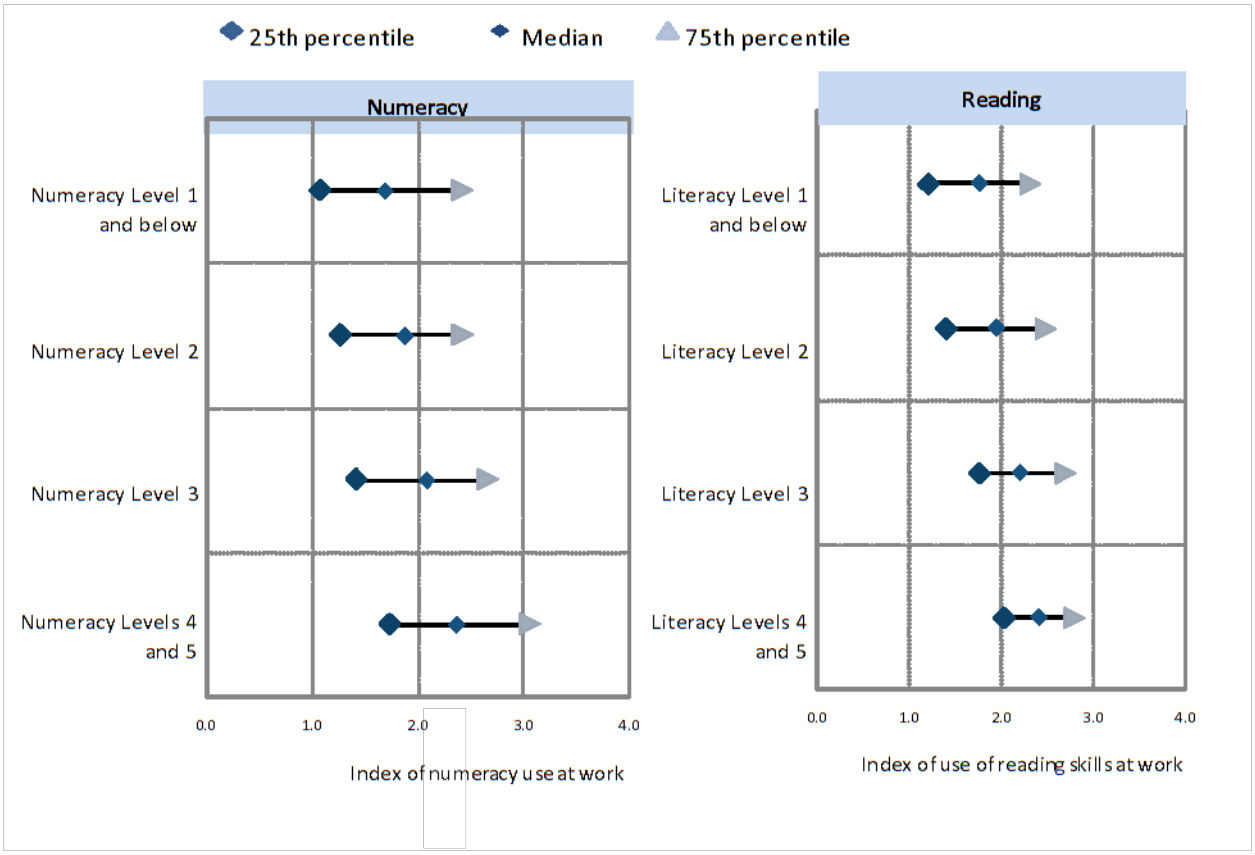
Figure 3.1 below replicates Figure 4.23 in the international report (OECD, 2013a, p.167) for England only and shows the skills use at work of working adults by proficiency level in literacy and numeracy. Skills use variables were derived from background questions on the frequency and intensity with which various tasks were performed. The results were transformed to have a common mean and variance across the whole sample of participating countries.

As per the results observed across all participating countries, there is a lot of overlap in skills use at work for adults in England with each level of literacy and numeracy. Adults with low levels of proficiency in literacy and numeracy are likely to report using skills at work with a similar level of frequency to many adults with high proficiency in literacy and numeracy. Additionally, there is no clear relationship between countries whose workforce reports making the most frequent use of skills and overall performance of countries (OECD, 2013a, figure 4.1, p.144). For instance, reading skills at work are reported to be used most frequently in Australia and Norway and numeracy skills at work are reported to

be used most frequently in Canada and the United States, however, these countries ranked 4th and 6th in literacy and 14th and 22nd and numeracy respectively. Therefore, although increased use of skills is associated with higher performance in literacy and numeracy within countries, the relationship between countries shows adults' reports of skills use are not consistent with their performance across countries. This suggests that other factors than skills use also determine average skills levels across countries.

Tables comparing the distributions for England with the average for participating OECD countries are included in Appendix tables A8 and A9.

Figure 3.1 Skills use at work in England by proficiency level: median, 25th and 75th percentiles of the distribution of skills use, by level of proficiency



Source: Survey of Adult Skills (PIAAC) (2012), England-only replication of figure 4.23 in OECD 2013a.
Notes: Employees only.

These variables have been transformed so that they have a mean of 2 and a standard deviation of 1 across the pooled sample of all participating countries, thus allowing meaningful comparisons across countries.

4. The impact of low skills on productivity – use of skills and wages

The following analysis uses adults' wages as a measure of their productivity and compares this with adults' self-reported use of key skills, presented as indices. It focuses on adults identified as having low proficiency in literacy, which is highly correlated with low proficiency in numeracy and problem solving.

The OECD country note for the Survey of Adult Skills (OECD, 2013b) discusses the productivity of England and Northern Ireland (UK), noting that workers in England and Northern Ireland read, write, work with mathematics, solve problems and use ICT applications in their jobs more frequently, and show higher labour productivity (output per hour worked) than on average across participating OECD countries.

For the purpose of the analysis, productivity is measured by hourly earnings including bonuses for wage and salary earners, in deciles. Wage is the only individual measure of productivity that can be made from the data to enable comparison of different groups within a country. The disadvantage of this measure is that people who are not in the workforce (e.g. those who are looking after children full time) do not have a measure of productivity and so cannot be included in the analysis, even though these adults do contribute to the productivity of a country. In addition, it is not necessarily the case that someone who earns more is more productive. The tables showing the results of the analysis in this Chapter can be found in A10 to A15 in the Appendix.

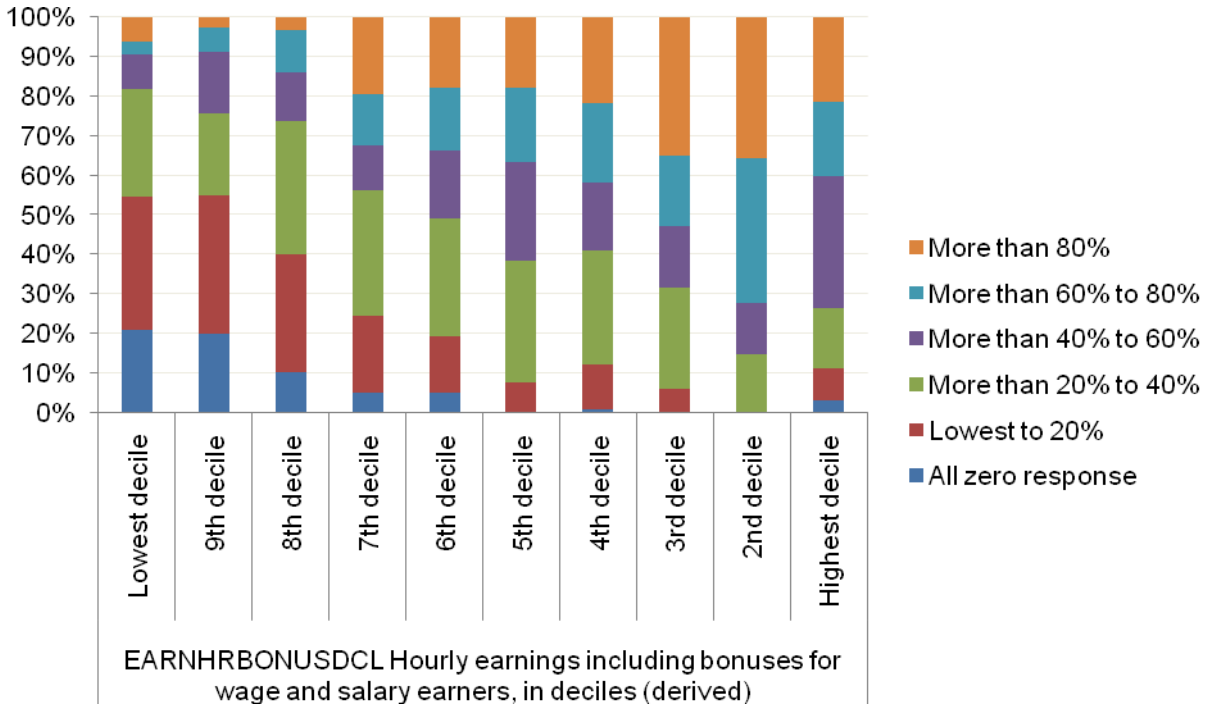
In order to create indices of skill use at work, multiple responses from participants on questions about how often they carried out elements of each skill at work were combined. Each skill index provides a measure of how often the tasks making up the index were carried out by a participant. Respondents who answered 'Never' to all questions in the index appear in an 'All zero response' category. The remaining respondents' answers to the questions were analysed using Item Response Theory (IRT) to produce the index. Internationally, these participants were grouped into quintiles which give an indication of how often they perform these tasks. For instance, participants who fall in the lowest 20 per cent on the index internationally will tend to perform some or all of the tasks infrequently, whereas participants who fall in the 'more than 80 per cent' group will frequently perform many of the tasks. Further details about how the indices are created are described in the Survey of Adult Skills Reader Companion (OECD, 2013c, pp. 40–45) and Technical Report of the Survey of Adult Skills (OECD, 2013d, pp. 8–21).

Analysis in the national report found a particularly strong relationship between wages and skills in each proficiency domain in England, except for those adults earning the very lowest salaries.

For adults identified as having low skills in the Survey of Adult Skills, the use of reading and ICT skills at work are correlated with this measure of productivity. Although increased proficiency in numeracy most strongly predicts employment, use of numeracy skills at work

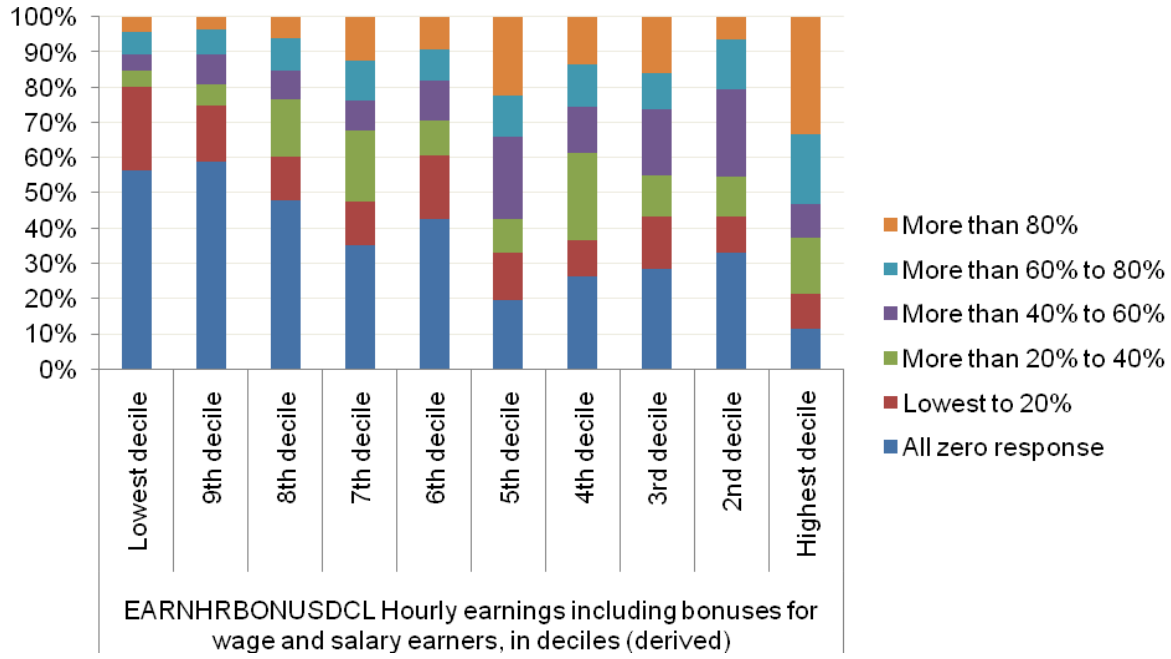
is less strongly associated with productivity than use of reading or ICT skills at work. Figure 4.1 below shows the relationship between use of reading skills at work with productivity, figure 4.2 shows the relationship for numeracy skills, and figure 4.3 shows the relationship for ICT skills.

Figure 4.1 Use of reading skills at work and productivity in England



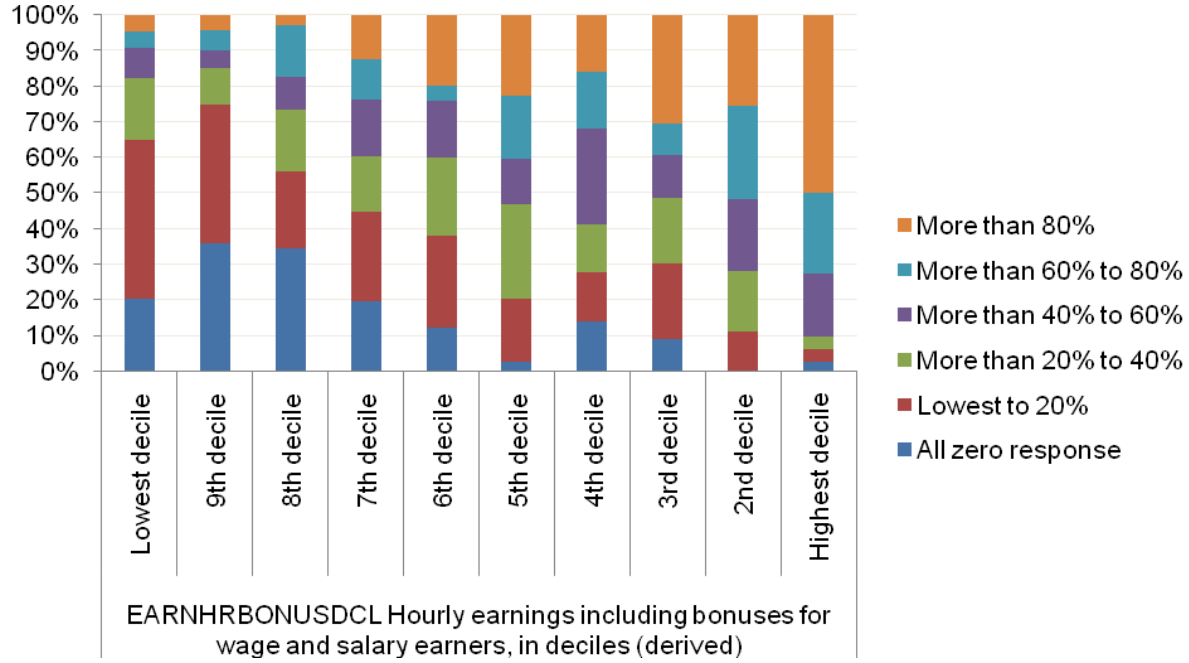
Source: Survey of Adult Skills (PIAAC) (2012), see Appendix tables A10 for underlying data.

Figure 4.2 Use of numeracy skills at work and productivity in England



Source: Survey of Adult Skills (PIAAC) (2012), see Appendix tables A11 for underlying data.

Figure 4.3 Use of ICT skills at work and productivity in England

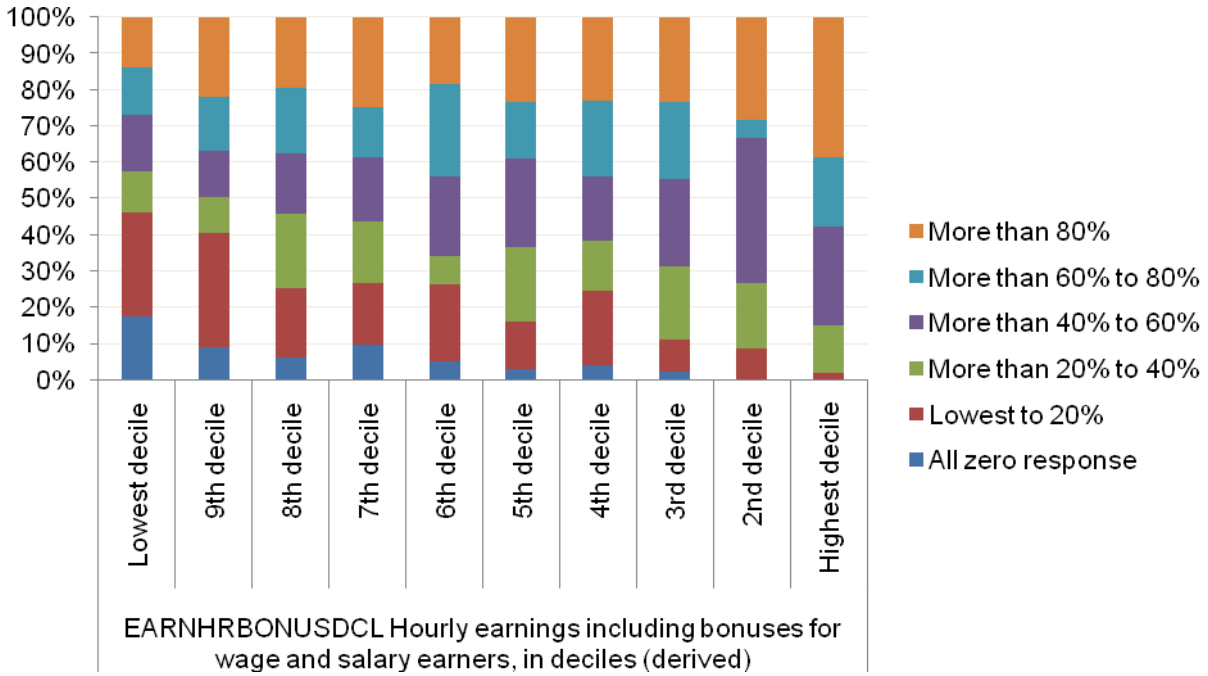


Source: Survey of Adult Skills (PIAAC) (2012), see Appendix table A12 for underlying data.

The association between earnings and reported use of reading and ICT skills at work is stronger than that with the use of numeracy skills at work. It can therefore be inferred that the highest paid jobs are likely to be jobs that require the use of literacy and ICT skills but not necessarily numeracy skills, although strong numeracy skills are the best predictor of having the job in the first place. There appears to be a split in the highest decile of hourly earnings between jobs that use numeracy frequently and those that use it rarely.

Compared with the use of reading and ICT skills at work, more frequent learning at work was less strongly associated with higher productivity, as measured by wage distribution. Figure 4.4 below shows the reported frequency of learning at work by hourly earnings in deciles.

Figure 4.4 Learning at work and productivity in England



Source: Survey of Adult Skills (PIAAC) (2012), see Appendix table A13 for underlying data.

Figure 4.4 shows that adults reported similar opportunities to learn at work except for those in the very highest salary bands (3rd decile and higher).

Although increased use of skills at home is associated with higher proficiency scores (see Wheater *et al.*, 2013, chapter 4), when productivity is compared with reported use of skills at home, there is no strong association. Perhaps this is not surprising as productivity is related to the work place, rather than activities carried out at home. Figures 4.5 and 4.6 show the relationship between use of reading skills at home and the use of numeracy skills at home with productivity.

Figure 4.5 Use of reading skills at home and productivity in England

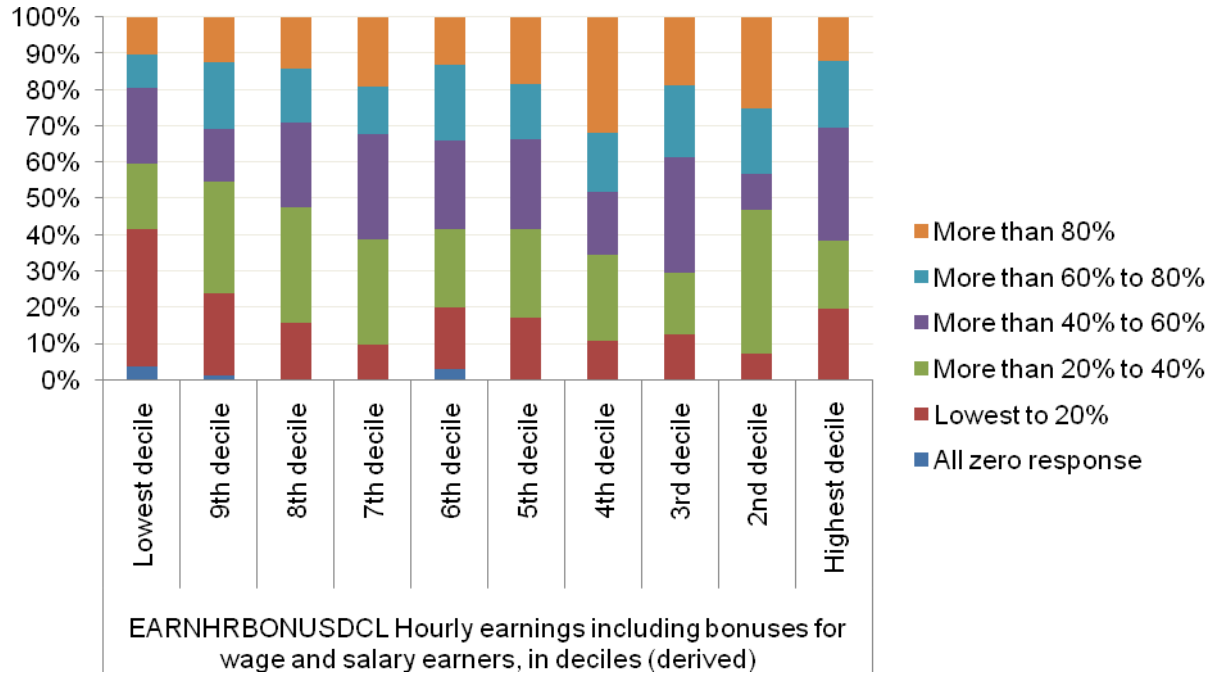
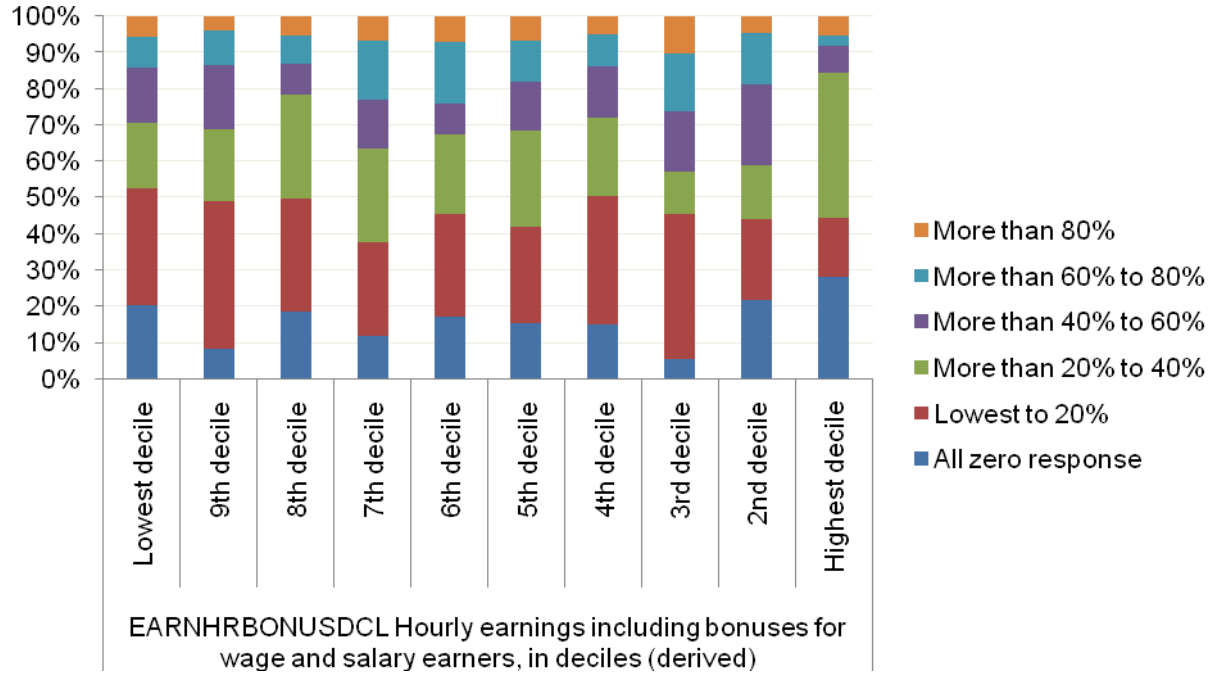


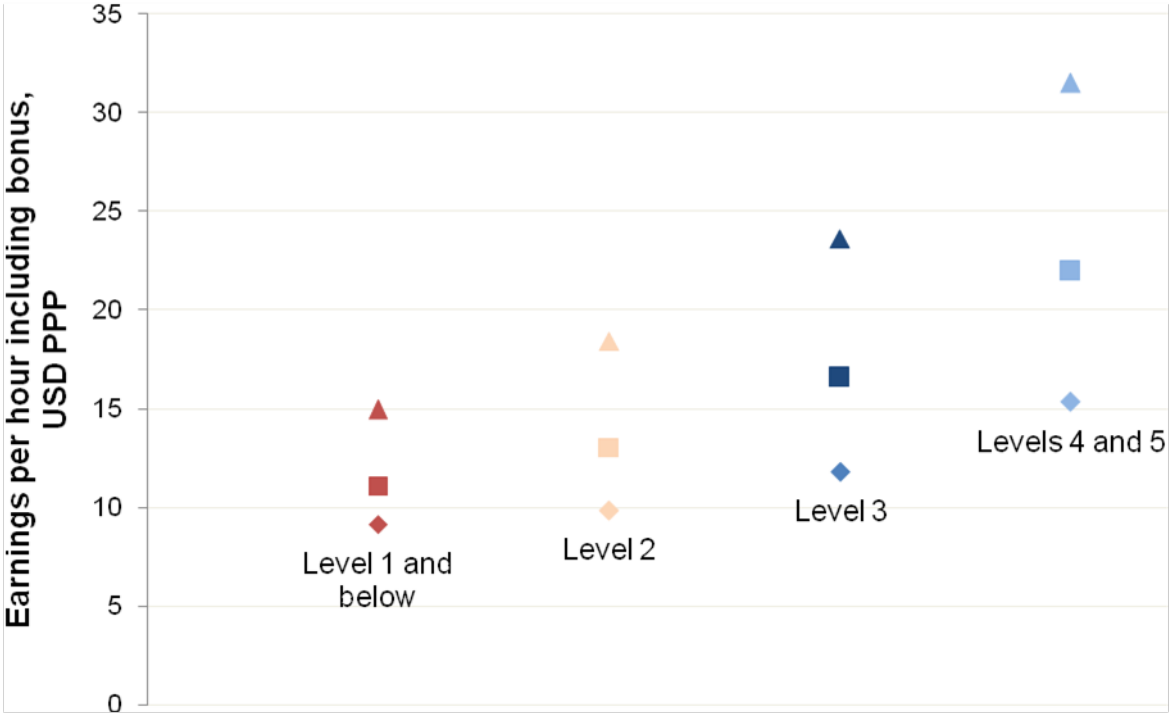
Figure 4.6 Use of numeracy skills at home and productivity in England



Source: Survey of Adult Skills (PIAAC) (2012), see Appendix tables A 14 and A15 for underlying data.

The analysis above splits earnings in England into deciles. In order to compare actual earnings with other countries and the average across participating OECD countries, earnings can be converted into US dollars. Figure 4.6 below replicates the analysis in Figure 6.4 (L) of the OECD international report (OECD, 2013, p. 229) for England only.

Figure 4.7 Distribution of wages by literacy proficiency level in England



Source: Survey of Adult Skills (PIAAC) (2012)
Note: diamond indicates 25th percentile, square 50th percentile, triangle 75th percentile.

The wages for each proficiency level are shown at the 25th (diamond), 50th (square) and 75th (triangle) percentile. On average across all participating OECD countries, the wage distribution is narrower for adults with low levels of literacy proficiency than it is for those with higher levels of proficiency. The earnings at the 75th percentile for an adult with literacy level 1 or below are similar to an adult at the 50th percentile with literacy level 3 or the 25th percentile with literacy level 4 or 5.

Compared with the average distribution of participating OECD countries, the median earnings of adults in England were lower than the average for those at literacy level 2 or below, but higher than the average for those at level 4 and 5. The range of earnings between the 25th and 75th percentile was larger for adults in England than on average, except for those at level 1 and below.

To summarise, for adults with low levels of literacy, increased use of literacy and ICT skills at work is correlated with higher productivity. The relationship between increased use of numeracy at work and productivity is weak. As found in other OECD countries, on average, the wage distribution of adults with low skills is narrower than the distribution of

adults with higher levels of proficiency. In England, the distribution between the 25th and 75th percentile is lower than the average.

5. Conclusions

England has similar proportions of adults with literacy level 1 and below and problem solving below level 1 compared with the average across participating OECD countries. However, a significantly higher proportion of adults performed at level 1 or below in the numeracy assessment, compared with the average across participating OECD countries.

Adults in England who were unemployed and looking for work were more likely to have low proficiency in literacy and numeracy than average. Retired people in England were less likely to have low skills than across the OECD participating countries. But, students in England were just as likely to have low proficiency skills in literacy and numeracy as the general adult population, while the likelihood was lower for their counterparts in OECD participating countries.

The industries identified in section 2.2 with high proportions of adults with low skills were not identified by the regression in the national report as factors that contributed to low skills. This suggests that although adults working in these industries have particularly low skills, this can be explained by the profile of adults' personal characteristics, education outcomes or type of occupation which these industries offer, rather than something specifically relating to the industry itself. Adults employed in transportation and storage had the highest proportions of low-skilled adults across each of the skills domains. In addition, low numeracy skills are particularly prominent among adults working in service industries and low problem solving skills are particularly prominent among adults working in human health and social work.

In contrast, low literacy, numeracy and problem solving proficiency appears to be a significant barrier to employment in the financial and insurance, information and communication, and professional, scientific and technical industries – as fewer than 10% have basic skills in each domain in these industries. Additionally, low problem solving skills pose barriers to employment in public administration and the arts.

In England and across all participating OECD countries, on average, more frequent use of skills in the work place is associated with higher average scores in literacy, numeracy and problem solving compared with adults using these skills infrequently. However, the distribution of skills amongst workers with different levels of proficiency overlaps substantially so that adults with low levels of proficiency in literacy and numeracy are likely to use skills at work with a similar level of frequency to many adults with high proficiency in literacy and numeracy.

When adults with low skills in the Survey of Adult Skills are considered, the use of reading and ICT skills at work is correlated with productivity, as measured by salary. As salary is used as a measure of productivity, only adults in employment are considered in the analysis. Although increased proficiency in numeracy most strongly predicts employment, use of numeracy skills at work is less strongly associated with productivity than use of reading or ICT skills at work, with a greater split between higher-paid jobs which use numeracy rarely or frequently than for reading and ICT. There was little relationship between learning at work and productivity, except for opportunities for those earning the highest salaries, indicating that adults had similar frequencies of opportunities to learn at

work. There was no strong relationship between activities at home and productivity, despite a strong relationship between use of skills at home and proficiency level.

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Appendix A

A1 Skill levels of workers

PIAAC Proficiency Level	England		Average across participating OECD countries	
	Per cent	S.E.	Per cent	S.E.
Literacy				
Level 1 or below	16.6	(0.8)	15.6	(0.2)
Above level 1	83.4	(0.8)	84.4	(0.2)
Numeracy				
Level 1 or below	24.5 *	(0.9)	19.3	(0.2)
Above level 1	75.5 *	(0.9)	80.7	(0.2)
Problem solving				
Below level 1	18.0	(1.0)	16.8	(0.2)
Level 1 or above	82.0	(1.0)	83.2	(0.2)

Source: Survey of Adult Skills (PIAAC) (2012)
* Statistically significant at the 5 per cent level
S.E. Standard Error

A2 Percentage of adults in each labour market status with literacy level 1 or below

	Literacy Level 1 and below					
	Employed		Unemployed		Out of the labour force	
	%	S.E.	%	S.E.	%	S.E.
OECD						
National entities						
Australia	56.8	(1.9)	5.5	(1.2)	37.7	(2.0)
Austria	61.7	(2.0)	4.8	(0.9)	33.5	(1.9)
Canada	63.5	(1.2)	5.3	(0.6)	31.2	(1.3)
Czech Republic	56.9	(3.8)	5.9	(1.6)	37.2	(4.0)
Denmark	56.4	(1.6)	6.1	(0.8)	37.5	(1.6)
Estonia	62.8	(2.0)	8.4	(1.1)	28.8	(1.9)
Finland	47.4	(2.5)	4.6	(1.1)	48.0	(2.6)
Germany	62.7	(1.9)	6.5	(1.0)	30.8	(1.8)
Ireland	46.4	(2.2)	11.1	(1.3)	42.5	(2.3)
Italy	51.9	(1.9)	10.3	(1.2)	37.8	(1.8)
Japan	67.4	(4.1)	1.2	(0.9)	31.4	(4.0)
Korea	67.0	(2.1)	1.8	(0.6)	31.3	(2.2)
Netherlands	57.5	(2.5)	5.4	(1.4)	37.1	(2.5)
Norway	62.5	(2.5)	5.0	(1.3)	32.5	(2.4)
Poland	52.5	(2.1)	7.6	(1.1)	39.9	(2.0)
Slovak Republic	41.3	(2.7)	12.7	(1.4)	46.0	(2.6)
Spain	46.9	(1.4)	17.1	(1.1)	36.1	(1.3)
Sweden	51.7	(2.2)	9.2	(1.4)	39.1	(2.2)
United States	64.4	(2.3)	9.8	(1.1)	25.8	(2.1)
Sub-national entities						
Flanders (Belgium)	55.0	(2.0)	2.2	(0.6)	42.8	(2.0)
England (UK)	55.3	(2.2)	10.5	(1.2)	34.3	(2.1)
Northern Ireland (UK)	50.6	(2.5)	7.2	(1.3)	42.2	(2.2)
England/N. Ireland (UK)	55.1	(2.1)	10.4	(1.2)	34.5	(2.1)
Average	56.6	(0.5)	7.2	(0.2)	36.3	(0.5)
Partners						
Cyprus[1 2]	53.6	(2.4)	9.2	(1.6)	37.2	(2.3)

1. 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”.
2. 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.
Source : OECD, 2013a, table A6.3 (L) Part 1/4

A3 Percentage of adults in each labour market status with numeracy level 1 or below

	Numeracy Level 1 and below					
	Employed		Unemployed		Out of the labour force	
	%	S.E.	%	S.E.	%	S.E.
OECD						
National entities						
Australia	57.5	(1.5)	5.3	(0.8)	37.2	(1.4)
Austria	61.3	(2.2)	4.7	(0.9)	34.0	(2.0)
Canada	62.9	(1.1)	6.3	(0.6)	30.8	(1.0)
Czech Republic	50.8	(3.6)	7.9	(1.6)	41.3	(3.5)
Denmark	54.1	(1.9)	7.0	(1.0)	39.0	(2.0)
Estonia	58.5	(1.8)	9.4	(1.0)	32.1	(1.7)
Finland	48.9	(2.3)	6.3	(1.2)	44.8	(2.4)
Germany	59.1	(1.8)	7.5	(1.0)	33.5	(1.7)
Ireland	47.4	(1.9)	11.3	(1.2)	41.3	(1.7)
Italy	46.8	(1.6)	11.0	(1.3)	42.1	(1.7)
Japan	65.6	(2.7)	1.5	(0.8)	32.9	(2.6)
Korea	65.2	(1.7)	2.9	(0.6)	31.9	(1.6)
Netherlands	56.6	(2.3)	5.8	(1.2)	37.6	(2.5)
Norway	60.6	(2.2)	5.6	(1.1)	33.8	(2.1)
Poland	50.1	(1.5)	8.4	(1.0)	41.5	(1.5)
Slovak Republic	35.3	(2.2)	13.9	(1.5)	50.7	(2.4)
Spain	45.2	(1.3)	17.2	(1.0)	37.6	(1.2)
Sweden	54.4	(2.3)	9.2	(1.5)	36.4	(2.1)
United States	62.3	(1.7)	11.0	(1.0)	26.8	(1.5)
Sub-national entities						
Flanders (Belgium)	52.7	(1.9)	2.0	(0.6)	45.2	(1.9)
England (UK)	56.3	(1.7)	10.6	(0.8)	33.1	(1.6)
Northern Ireland (UK)	50.5	(2.0)	7.0	(1.0)	42.6	(1.9)
England/N. Ireland (UK)	56.1	(1.6)	10.5	(0.8)	33.4	(1.6)
Average	54.8	(0.4)	7.8	(0.2)	37.3	(0.4)
Partners						
Cyprus[1 2]	49.5	(2.2)	9.8	(1.4)	40.8	(2.0)

1. Note by Turkey:
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Source : OECD, 2013a, table A6.3 (N) Part 1/4

A4 Percentage of adults in each labour market status with problem solving below level 1

	Problem-solving in technology-rich environments below Level 1					
	Employed		Unemployed		Out of the labour force	
	%		%		%	
OECD						
National entities						
Australia	66.2		6.9		26.9	
Austria	m		m		m	
Canada	66.0		6.3		27.7	
Czech Republic	70.5		4.1		25.3	
Denmark	58.2		6.7		35.1	
Estonia	73.0		6.7		20.3	
Finland	62.4		8.0		29.6	
Germany	67.7		6.8		25.5	
Ireland	54.1		16.7		29.3	
Italy	m		m		m	
Japan	70.3		6.5		23.3	
Korea	72.9		2.4		24.7	
Netherlands	57.3		7.7		35.1	
Norway	65.3		3.7		30.9	
Poland	63.2		9.2		27.6	
Slovak Republic	64.5		13.2		22.3	
Spain	m		m		m	
Sweden	65.8		6.3		27.9	
United States	63.1		12.9		24.0	
Sub-national entities						
Flanders (Belgium)	64.8		5.3		29.9	
England (UK)	61.3		9.8		28.9	
Northern Ireland (UK)	56.7		12.8		30.4	
Average	64.4		8.0		27.6	
Partners						
Cyprus[1 2]	m		m		m	

1. 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”.
2. 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.

Note: Cyprus[1], Italy and Spain did not participate in the problem solving in technology-rich environments assessment.

m. Data are not available. The data are not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

Source : Survey of Adult Skills (PIAAC) (2012), replication of table A6.3 (L and N) Part ¼ for Problem Solving

A5 Distribution of literacy proficiency levels by industry sector (per cent)

		Low proficiency	Below L1	L1	L2	L3	L4	L5
	No paid work for past 5 years	**31.5**	8.9	22.7	36.1	26.6	5.6	0.2
A	Agriculture, forestry and fishing	‡	‡	‡	‡	‡	‡	‡
B	Mining and quarrying	‡	‡	‡	‡	‡	‡	‡
C	Manufacturing	**15.6**	3.2	12.4	33.7	36.3	13.6	0.8
D	Electricity, gas, steam and air conditioning supply	‡	‡	‡	‡	‡	‡	‡
E	Water supply; sewerage, waste management and remediation activities	‡	‡	‡	‡	‡	‡	‡
F	Construction	**13.8**	1.7	12.1	39.0	36.5	10.2	0.5
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	**14.6**	1.8	12.8	41.9	34.9	8.0	0.6
H	Transportation and storage	**26.4**	7.0	19.3	34.7	29.7	9.0	0.1
I	Accommodation and food service activities	**17.5**	1.5	16.0	41.7	33.0	7.6	0.2
J	Information and communication	**2.4**	0.0	2.4	19.2	43.5	30.7	4.2
K	Financial and insurance activities	**1.5**	0.0	1.5	24.1	48.8	23.7	1.9
L	Real estate activities	‡	‡	‡	‡	‡	‡	‡
M	Professional, scientific and technical activities	**6.3**	0.2	6.1	20.4	46.4	25.7	1.2
N	Administrative and support service activities	**18.4**	7.5	10.9	32.9	38.0	10.5	0.2
O	Public administration and defence; compulsory social security	**6.4**	0.9	5.5	24.2	48.2	20.0	1.2
P	Education	**6.7**	0.5	6.2	23.2	47.6	21.4	1.1
Q	Human health and social work activities	**15.4**	2.2	13.1	32.9	37.5	12.8	1.3
R	Arts, entertainment and recreation	**7.8**	0.7	7.1	38.2	41.9	11.5	0.6
S	Other service activities	**17.3**	6.6	10.7	29.5	40.1	12.7	0.3
T	Activities of households as employers; undifferentiated goods- and services-producing activ. of households for own use	‡	‡	‡	‡	‡	‡	‡

Source: Survey of Adult Skills (PIAAC) (2012)
‡ Fewer than 60 cases in this industry sector

A6 Distribution of numeracy proficiency levels by industry sector (per cent)

		Low proficiency	Below L1	L1	L2	L3	L4	L5
	No paid work for past 5 years	**43.9**	16.9	27.0	32.4	19.2	4.4	0.2
A	Agriculture, forestry and fishing	**‡**	‡	‡	‡	‡	‡	‡
B	Mining and quarrying	**‡**	‡	‡	‡	‡	‡	‡
C	Manufacturing	**21.2**	5.8	15.4	31.2	34.3	11.6	1.7
D	Electricity, gas, steam and air conditioning supply	**‡**	‡	‡	‡	‡	‡	‡
E	Water supply; sewerage, waste management and remediation activities	**‡**	‡	‡	‡	‡	‡	‡
F	Construction	**17.4**	1.9	15.5	40.3	29.9	10.8	1.6
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	**24.7**	4.1	20.6	41.0	26.8	7.2	0.2
H	Transportation and storage	**33.2**	8.3	24.9	32.4	26.4	7.9	0.2
I	Accommodation and food service activities	**28.6**	5.6	22.9	41.4	25.4	4.7	0.0
J	Information and communication	**4.4**	0.1	4.3	22.8	41.7	25.4	5.6
K	Financial and insurance activities	**4.6**	0.3	4.3	29.3	42.5	19.9	3.7
L	Real estate activities	**‡**	‡	‡	‡	‡	‡	‡
M	Professional, scientific and technical activities	**8.1**	1.2	6.9	22.5	43.3	25.1	1.1
N	Administrative and support service activities	**27.7**	10.1	17.6	30.8	31.6	9.5	0.3
O	Public administration and defence; compulsory social security	**12.2**	2.6	9.6	30.7	40.4	15.3	1.4
P	Education	**13.2**	1.4	11.7	27.4	41.5	16.6	1.3
Q	Human health and social work activities	**22.9**	3.6	19.3	36.3	31.4	8.4	1.0
R	Arts, entertainment and recreation	**16.4**	2.4	14.1	35.8	38.0	8.9	0.9
S	Other service activities	**25.6**	7.8	17.7	36.0	28.5	9.5	0.5
T	Activities of households as employers; undifferentiated goods-and services-producing activ. of households for own use	**‡**	‡	‡	‡	‡	‡	‡

Source: Survey of Adult Skills (PIAAC) (2012)
‡ Fewer than 60 cases in this industry sector

A7 Distribution of problem solving proficiency levels by industry sector (per cent)

		Low proficiency	Below L1	L1	L2	L3
	No paid work for past 5 years	**29.2**	29.2	45.0	23.7	2.1
A	Agriculture, forestry and fishing	‡	‡	‡	‡	‡
B	Mining and quarrying	‡	‡	‡	‡	‡
C	Manufacturing	**16.5**	16.5	38.3	38.0	7.2
D	Electricity, gas, steam and air conditioning supply	‡	‡	‡	‡	‡
E	Water supply; sewerage, waste management and remediation activities	‡	‡	‡	‡	‡
F	Construction	**17.0**	17.0	45.3	30.1	7.5
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	**20.3**	20.3	44.8	29.5	5.3
H	Transportation and storage	**28.7**	28.7	46.6	21.0	3.6
I	Accommodation and food service activities	**16.1**	16.1	44.8	35.4	3.6
J	Information and communication	**3.9**	3.9	19.2	56.8	20.1
K	Financial and insurance activities	**2.9**	2.9	25.8	52.4	19.0
L	Real estate activities	‡	‡	‡	‡	‡
M	Professional, scientific and technical activities	**8.0**	8.0	27.6	50.7	13.7
N	Administrative and support service activities	**16.9**	16.9	38.5	39.2	5.4
O	Public administration and defence; compulsory social security	**9.4**	9.4	33.8	46.6	10.2
P	Education	**11.7**	11.7	33.9	46.6	7.8
Q	Human health and social work activities	**21.1**	21.1	46.4	28.3	4.2
R	Arts, entertainment and recreation	**7.9**	7.9	44.5	36.7	10.9
S	Other service activities	**15.8**	15.8	44.5	32.0	7.7
T	Activities of households as employers; undifferentiated goods- and services-producing activ. of households for own use	‡	‡	‡	‡	‡

Source: Survey of Adult Skills (PIAAC) (2012)
‡ Fewer than 60 cases in this industry sector

A8 Use of reading skills at work by proficiency level (index)

	England			OECD average		
Skill Level	25th percentile	Median	75th percentile	25th percentile	Median	75th percentile
Literacy Level 1 and below	1.2	1.8	2.3	0.9	1.7	2.3
Literacy Level 2	1.4	2.0	2.5	1.4	2.1	2.5
Literacy Level 3	1.8	2.2	2.7	1.8	2.3	2.6
Literacy Levels 4 and 5	2.0	2.4	2.8	2.1	2.4	2.7

Source: Survey of Adult Skills (PIAAC) (2012)

A9 Use of numeracy skills at work by proficiency level (index)

	England			OECD average		
Skill Level	25th percentile	Median	75th percentile	25th percentile	Median	75th percentile
Numeracy Level 1 and below	1.1	1.7	2.4	1.0	1.6	2.2
Numeracy Level 2	1.3	1.9	2.4	1.3	1.9	2.4
Numeracy Level 3	1.4	2.1	2.7	1.5	2.1	2.6
Numeracy Levels 4 and 5	1.7	2.4	3.0	1.9	2.4	2.9

Source: Survey of Adult Skills (PIAAC) (2012)

A10 Use of reading skills at work and productivity in England

Hourly earnings including bonuses for wage and salary earners, in deciles	Index of use of reading skills at work (prose and document texts)					
	All zero response	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Lowest decile	20.8%	33.9%	27.1%	9.0%	3.1%	6.2%
9th decile	19.7%	35.2%	20.8%	15.6%	6.1%	2.6%
8th decile	9.9%	30.0%	33.8%	12.4%	10.6%	3.3%
7th decile	5.0%	19.3%	31.8%	11.5%	12.8%	19.6%
6th decile	5.0%	14.1%	29.9%	17.2%	15.9%	17.9%
5th decile	-	7.5%	30.9%	25.0%	18.9%	17.8%
4th decile	0.5%	11.5%	28.9%	17.1%	20.2%	21.7%
3rd decile	-	5.9%	25.5%	15.5%	17.9%	35.1%
2nd decile	-	-	14.5%	13.0%	36.9%	35.6%
Highest decile	3.0%	7.8%	15.4%	33.3%	18.9%	21.4%

Source: Survey of Adult Skills (PIAAC) (2012)

A11 Use of numeracy skills at work and productivity in England

Hourly earnings including bonuses for wage and salary earners, in deciles	Index of use of numeracy skills at work (basic and advanced)					
	All zero response	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Lowest decile	56.3%	24.0%	4.5%	4.5%	6.4%	4.3%
9th decile	58.9%	15.9%	6.3%	8.2%	7.3%	3.5%
8th decile	47.7%	12.7%	16.1%	8.3%	9.3%	5.9%
7th decile	35.1%	12.6%	20.2%	8.3%	11.5%	12.3%
6th decile	42.4%	18.4%	9.8%	11.3%	8.9%	9.1%
5th decile	19.4%	13.6%	9.6%	23.5%	11.5%	22.5%
4th decile	26.1%	10.5%	24.9%	13.0%	12.1%	13.4%
3rd decile	28.5%	14.6%	11.9%	18.6%	10.4%	16.0%
2nd decile	32.9%	10.3%	11.4%	25.0%	14.0%	6.4%
Highest decile	11.2%	9.9%	15.9%	9.6%	20.1%	33.3%

Source: Survey of Adult Skills (PIAAC) (2012)

A12 Use of ICT skills at work and productivity in England

Hourly earnings including bonuses for wage and salary earners, in deciles	Index of use of ICT skills at work					
	All zero response	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Lowest decile	20.2%	44.9%	17.1%	8.5%	4.8%	4.5%
9th decile	36.0%	39.0%	10.2%	5.0%	5.5%	4.3%
8th decile	34.5%	21.4%	17.3%	9.4%	14.6%	2.7%
7th decile	19.4%	25.3%	15.6%	15.9%	11.4%	12.4%
6th decile	12.1%	25.7%	22.0%	16.2%	4.2%	19.8%
5th decile	2.6%	17.7%	26.6%	12.6%	17.7%	22.8%
4th decile	13.7%	14.0%	13.4%	27.1%	15.7%	16.1%
3rd decile	8.8%	21.2%	18.6%	12.0%	8.9%	30.4%
2nd decile	-	11.1%	16.9%	20.2%	26.5%	25.4%
Highest decile	2.3%	3.7%	3.7%	17.7%	22.7%	49.9%

Source: Survey of Adult Skills (PIAAC) (2012)

A13 Learning at work and productivity in England

Hourly earnings including bonuses for wage and salary earners, in deciles	Index of learning at work					
	All zero response	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Lowest decile	17.5%	28.7%	11.2%	15.7%	13.0%	13.9%
9th decile	8.7%	31.7%	10.0%	12.8%	14.8%	22.0%
8th decile	6.0%	19.0%	20.8%	16.5%	18.2%	19.5%
7th decile	9.5%	17.0%	17.0%	17.9%	13.9%	24.7%
6th decile	4.9%	21.3%	7.7%	22.0%	25.7%	18.3%
5th decile	2.9%	13.1%	20.7%	24.2%	15.6%	23.5%
4th decile	4.0%	20.4%	13.9%	17.8%	21.0%	22.9%
3rd decile	2.3%	8.7%	20.4%	23.8%	21.3%	23.6%
2nd decile	-	8.5%	18.1%	40.0%	5.1%	28.3%
Highest decile	-	1.7%	13.2%	27.3%	19.1%	38.7%

Source: Survey of Adult Skills (PIAAC) (2012)

A14 Use of reading skills at home and productivity in England

Hourly earnings including bonuses for wage and salary earners, in deciles	Index of use of reading skills at home (prose and document texts)					
	All zero response	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Lowest decile	3.6%	37.8%	18.1%	21.0%	9.4%	10.2%
9th decile	1.1%	22.7%	30.9%	14.3%	18.7%	12.3%
8th decile	.	15.6%	31.9%	23.3%	14.9%	14.2%
7th decile	.	9.6%	29.2%	29.1%	13.2%	19.0%
6th decile	2.8%	17.1%	21.6%	24.5%	20.9%	13.2%
5th decile	.	16.9%	24.6%	24.9%	15.3%	18.3%
4th decile	.	10.5%	24.0%	17.2%	16.4%	31.9%
3rd decile	.	12.4%	16.9%	32.2%	19.7%	18.8%
2nd decile	.	7.2%	39.7%	9.9%	17.9%	25.2%
Highest decile	.	19.5%	18.8%	31.2%	18.3%	12.2%

Source: Survey of Adult Skills (PIAAC) (2012)

A15 Use of numeracy skills at home and productivity in England

Hourly earnings including bonuses for wage and salary earners, in deciles	Index of use of numeracy skills at home (basic and advanced)					
	All zero response	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Lowest decile	20.1%	32.3%	18.3%	14.9%	8.7%	5.7%
9th decile	8.2%	40.6%	20.0%	17.8%	9.3%	4.0%
8th decile	18.5%	31.1%	28.9%	8.3%	7.9%	5.2%
7th decile	11.6%	25.8%	25.9%	13.8%	16.2%	6.7%
6th decile	17.2%	28.2%	22.1%	8.5%	17.0%	7.0%
5th decile	15.3%	26.7%	26.5%	13.6%	11.3%	6.7%
4th decile	14.8%	35.7%	21.4%	14.4%	8.6%	5.1%
3rd decile	5.4%	40.1%	11.6%	16.5%	16.2%	10.2%
2nd decile	21.7%	22.1%	15.0%	22.3%	14.4%	4.5%
Highest decile	28.1%	16.3%	40.1%	7.4%	3.0%	5.2%

Source: Survey of Adult Skills (PIAAC) (2012)

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BIS/14/1035