



Results from the Programme for the International Assessment of Adult Competencies (PIAAC):

Low proficiency and skills use and skills requirement in work in Ireland – literacy, numeracy and problem solving in technology rich environments (PSTRE).

Introduction

In 2012 AONTAS, the National Adult Learning Organisation was invited by the Department of Education and Skills to assume the role of National Co-ordinator for the Implementation of the European Agenda for Adult Learning (EAAL). Key stakeholders in the project include The National Adult Literacy Agency (NALA) Education and Training Boards Ireland (ETBI). Projects are funded under the Lifelong Learning Programme across 27 European countries to promote adult learning and increase participation by adults, especially those with low or no qualifications. The Irish project is co-financed by the Department of Education and Skills through SOLAS, the Further Education and Training Authority. One of the objectives of the project was to carry out an analysis of the OECD's Programme for the International Assessment of Adult Competencies (PIAAC) data around specific themes, present the information in a seminar to inform the work of the Further Education and Training (FET) Strategy, and use the data to improve services for those most distanced from education, training and the labour market.

This research work was undertaken by NALA¹ and is presented in a series of Research Bulletins which draw on the rich data from PIAAC which was collected in Ireland between August 2011 and March 2012.

In the following pages we compare the extent to which adults with low proficiency (level 1 or less) and adults with level 2 proficiency use different types of skills in the workplace. We then compare the skills requirement and mismatch among these groups. In some cases, adults report that they are not challenged enough in work while others report that they need more training. Furthermore, some adults feel that a lack of ICT skills affects their career. Finally, we investigate how this skills requirement and mismatch is associated with earnings and job satisfaction for adults with low proficiency.

This Bulletin focuses on each of the three proficiency domains (literacy, numeracy and PSTRE) separately. Figures are presented throughout to support the findings.

¹ The research team who worked on this Bulletin are; Dr Sarah Gibney, Adjunct Research Fellow UCD and Tina Byrne, Research Officer, NALA

Policy Context

In 2013, data from PIAAC was published by the Central Statistics Office. The results showed that Ireland had the third highest response rates of participating counties at 72% (5,983 adults) between the ages of 16 and 65 years. PIAAC focuses on adult skills and competencies in the areas of literacy, numeracy and problem solving in technology rich environments (PSTRE). According to the OECD, the Irish PIAAC results show that there is a significant number of adults aged 16 to 65 with low skills proficiency (at or below level 1): 17.5% in literacy, 25.3% in numeracy and 62.5% in PSTRE. Low proficiency levels are often associated with negative outcomes for the individual. These outcomes include poorer economic circumstances through lower wages and a higher probability of unemployment both short and long term.

When the PIAAC results are compared with the results of the 1997 International Adult Literacy Survey (IALS) the literacy trends for Ireland show no statistical change between the average scores in the IALS and PIAAC. However, in IALS 22% of Irish adults were assessed as being at Level 1. Current DES policy states that adult literacy programmes should be focused on learning outcomes at Quality and Qualifications Ireland (QQI) Levels 1-3.

In 2013, prior to the publication of the PIAAC results the Government published its Review of the adult literacy provision in Ireland. The Review set out 32 recommendations to improve adult literacy provision. Following the publication of the Review the Government enshrined an Adult Literacy and Numeracy Strategy as part of the Further Education and Training (FET) Strategy in the Further Education and Training Act.

In 2014, two major publications were launched that focus on the development of further education and training in Ireland. Further Education and Training in Ireland: Past, Present and Future (ESRI, 2014) sets out the historical evolution of further education and training provision in Ireland. It details patterns of provision in terms of overall distribution of places and the balance between full-time labour market programmes and part-time provision with a more community education and adult literacy focus. The Further Education and Training Strategy 2014-2019, accompanied by implementation plans, aims to develop a high quality integrated system of further education and training in Ireland. The two broad objectives of the FET Strategy are that it will meet the further education and training needs of citizens and promote economic development (SOLAS, 2014).

Methodology

Through intensive testing, the PIAAC survey produced an estimate of the literacy, numeracy and PSTRE skills proficiency of the study participants. These estimates were categorized into meaningful skill levels. We focus on profiling differences in every day skills use between adults who have low proficiency at or below level 1 and level 2 proficiency as measured in the PIAAC survey. The subsample comprises 55% of the total sample of adults for whom a literacy level was estimated, 58% of the sample for whom a numeracy score was estimated and 95% of the sample for whom a PSTRE score was estimated.

Measures

Low proficiency

Low proficiency is defined as a proficiency score at or below level 1. For the purpose of this analysis, a dichotomous variable with two categories was created whereby low proficiency = 1 and level 2 = 0. Within the low proficiency category below level 1 and level 1 are combined. Levels 3, 4 and 5 are not included in this analysis for reasons outlined in the analytic strategy below.

Skills use in work

Four combined, index, measures of frequency of skills use are presented. These single index measures capture a variety of different activities related to reading, writing, numeracy and PSTRE and the frequency with which these activities are completed.

- Reading skills
 - Letters, memos or emails; articles in newspapers, magazines or newsletters; bills, invoices, bank statements or other financial statements; books, fiction or non-fiction; directions or instructions; manuals or reference materials; and articles in professional journals or scholarly publications; and diagrams, maps or schematics.
- Writing skills
 - Letters, memos or emails; fill in forms; write reports; and write articles for newspapers, magazines or newsletters.

- Numeracy skills
 - Calculate prices, costs or budgets; use a calculator – either hand-held or computer based; use or calculate fractions, decimals or percentages; use simple algebra or formulas; use more advanced maths or statistics such as calculus, complex algebra, trigonometry or use of regression techniques; and prepare charts, graphs or tables.
- PSTRE skills
 - Use email; use the internet in order to better understand issues related to, for example, your health or illnesses, financial matters, or environmental issues; conduct transactions on the internet, for example, buying or selling products or services, or banking; use a word processor, for example Word; take part in real-time discussions on the internet, for example, online conferences or chat groups; use spreadsheet software, for example Excel; and use a programming language to programme or write computer code.

These indices provide a standard indicator of how often all the skills in one domain are used, such as all writing skills. Index scores range from 0 (infrequent use) to 4 (frequent use).

Occupational classification

Four skills-based occupational classifications are used in this analysis, which cover several industry classifications. These are summarised below.

Skilled occupations: Legislators, senior officials and managers; professionals; technicians and associate professionals.
Semi-skilled, white collar occupations: Clerks; service workers, shop and market sales workers.
Semi-skilled, blue-collar occupations: Skilled agricultural and fishery workers, plant and machine operators and assemblers.
Elementary occupations: Sales and service elementary occupations; agricultural and fishery related labour; labourers in mining, construction, manufacturing and transportation.

Economic sector

In this analysis, economic sector is classified as ‘private’, ‘public’ or ‘non-profit organisation’. The public sector comprises the general government sector plus all public corporations including the central bank. A non-profit organisation is a legally constituted organisation whose objective is to support or engage in activities of public or private interest without any external commercial or monetary profit.

Gender

Gender is categorised as either male or female.

Education

Education is measured as the highest level of formal education obtained using 6 categories derived from the International Standard Classification of Education (ISCED) (UNESCO, 2011). The education variable used includes 6 categories include: 1, lower secondary or less; 2, upper secondary; 3, post-secondary, non-tertiary; 4, tertiary professional degree; 5, tertiary bachelor degree; 6, tertiary masters/research degree.

Age

The age of respondents in the PIAAC survey ranges from 16 to 65 years. In this analysis age is measured in 10 year bands: 24 or less; 25-34; 35-44; 45-54; 55-65.

Income

We used hourly earnings (including bonuses for wage and salary earners) reported in US \$ adjusted for purchasing power parity (PPP). This variable is derived from information collected on wages and bonuses.

Job satisfaction

Job satisfaction was rated on a 5-point scale, 1 indicating extremely satisfied and 5 indicating extremely dissatisfied.

PIAAC sample and study subsample(s)

A total of 5,983 adults aged 16 and older participated in the PIAAC survey in Ireland. These participants had varying levels of proficiency in literacy, numeracy and PSTRE. The percentage of the sample at each proficiency level is summarised in the table below. The shaded area indicates the subsample of adults that this study focuses on.

Literacy

- More than half (53.9%) of adults with level 1 or less, and (56.8%) of adults with level 2 literacy are women.
- The average age of the respondents with level 1 or less is 43.7 years and respondents with level 2 is 40.8 years.
- Over half (54.9%) of the sample with level 1 or less has lower secondary education or less.
- Approximately one third (33.6%) of the sample with level 1 or less have had no paid work in the last 5 years.

Numeracy

- Over half (59.5%) of the sample with level 1 or less and (58.2%) of the sample with level 2 are women.
- The average age of the respondents with level 1 or less is 43.0 years.
- Almost half (49.1%) of the sample with level 1 or less has lower secondary education or less, whereas almost half (47.8%) of the sample with level 2 has upper secondary education or less.
- Almost one third (31.1%) of the sample with level 1 or less have had no paid work in the last 5 years.

Problem-solving in Technology Rich Environments (PSTRE)

- Over half (57.6%) of the sample with level 1 or less and (51.6%) of the sample with level 2 are women.
- The average age of the respondents with level 1 or less is 39.1 years and respondents with level 2 is 34.4 years.
- Over one quarter (26%) of respondents with level 2 have upper secondary education or less and 22.3% have tertiary education bachelor degree. The data shows that (41%) of respondents with level 1 or less have upper secondary education or less, and (21.8%) have post-secondary (non-tertiary) education.

Table: Percentage of adults at each literacy, numeracy and problem solving in technology rich environments level in Ireland

	Below Level 1	At Level 1	At Level 2	At Level 3	At Level 4	At Level 5
Literacy	4.3	13.2	37.7	36.2	8.1	#
Numeracy	7.1	18.2	38.2	29.0	7.0	0.6
PSTRE	18.7	43.8	32.9	4.7		

Source: OECD (PIAAC), 2012. Note: # indicates less than 1% (rounds to zero). Note: The research sample is the shaded area.

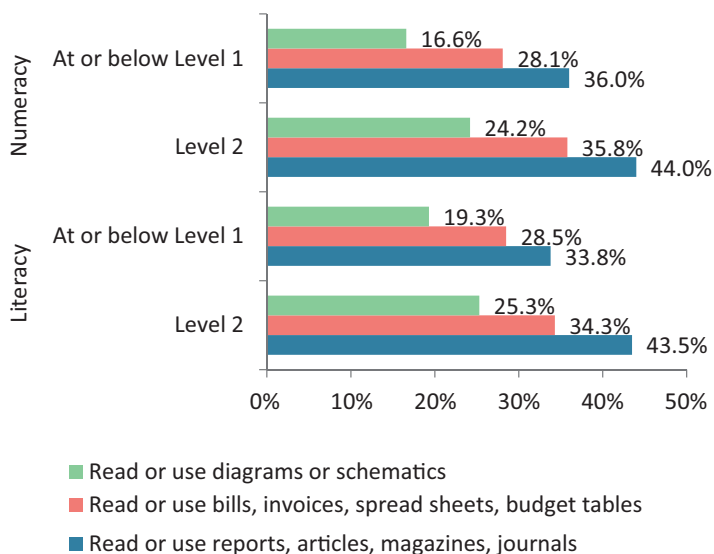
Low proficiency and skills requirement in work

The PIAAC results show that an individual's occupation is more strongly associated with how that person uses skills at work than either her or his educational attainment or the type of employment contract s/he has (OECD, 2013).

Key findings

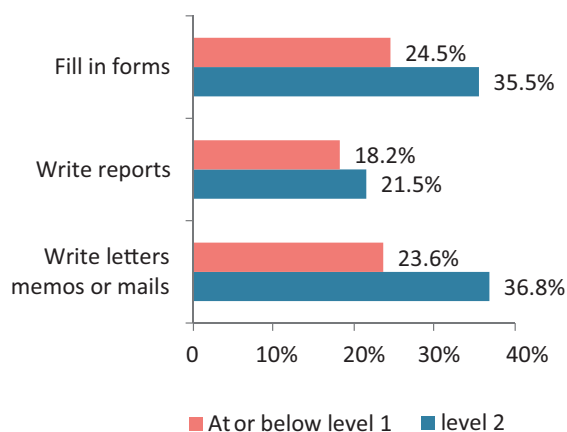
- Significantly more adults with level 1 or less literacy, numeracy and PSTRE, report they use their skills less when compared with adults at level 2. They also report not being challenged enough in work. The greatest difference is between adults at level 1 and level 2 in numeracy (15%) compared with (9.1%).
- Significantly more adults with level 2 numeracy report needing more training (25.5%) compared with level 1 (2%).
- Twice as many adults with level 2 PSTRE report that their level of computer use in work is complex (10.8%) compared with (5.7%) of adults with level 1 PSTRE.
- For PSTRE more adults with level 2 (96.4%) report that they have the skills they need compared with adults at or below level 1 (90.7%).

Figure 1: Reading in work once a week or more



- Consistently more adults with level 2 literacy read or use reports, articles, magazines and journals, read or use bills, invoices, spread sheets and budget tables and read or use diagrams or schematics compared with adults at or below level 1 literacy.
- This is shown by the higher percentages of adults at level 2 who complete these tasks at least once a week.

Figure 2: Writing skills use in work every day



- Significantly more adults at level 2 literacy write letters memos or mails, write reports and fill in forms every day as part of their job compared with adults at level 1 or less.
- There is no significant difference in the percentages of adults at level 2 and at or below level 1 literacy who write articles as part of their job (less than 1% of adults in each case).

Figure 3: Numeracy skills use in work every day

- Significantly more adults with level 2 numeracy compared with at or below level 1 numeracy completed numeracy related tasks in work every day.
- In particular, approximately 10% more adults at level 2 calculate costs or budgets, use or calculate fractions or percentages and use a calculator every day.

■ At or below Level 1 ■ Level 2

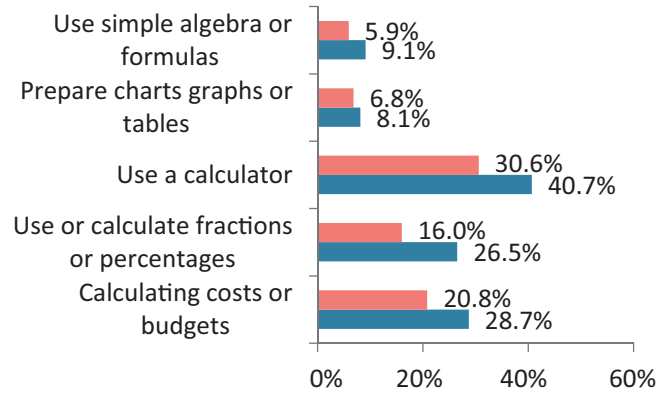
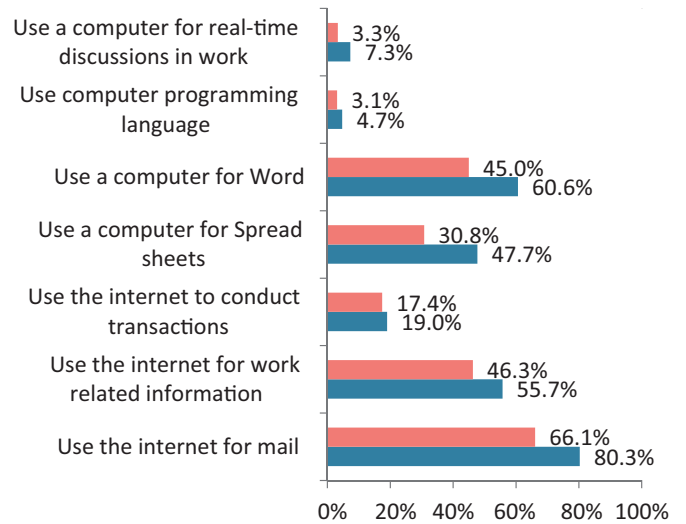


Figure 4: ICT Skills use in work (every day)

- Adults with level 2 PSTRE consistently use these different ICT skills more often than adults with level 1 or less.
- Particular differences are seen in the larger percentages of adults with level 2 PSTRE who use the internet for mail, use the internet for work related information, use a computer for spread sheets and use a computer for Word in work every day.
- Smaller differences are seen between the number of adult at level 2 and adults at level 1 or less PSTRE who use the internet for conducting transactions, for real-time discussions and who use computer programming language.

■ At or below Level 1 ■ Level 2



Skills use in the work place

The following graphs illustrate the average use of different skills in the workplace for adults with level 1 or less and level 2 proficiency in each domain. Skills are grouped and reported as indexes. These indexes capture various skills, for example, the Reading index demonstrates how often an adult uses a set of reading skills. Scores of 0 indicate low use whereas higher scores indicate more frequent use.

- In each domain the average index scores for learning and readiness to learn are higher among adult with level 2 proficiency compared with adults at or below level 1.

■ Learning ■ Readiness to learn

Figure 5: Average index scores for learning in the work place and readiness to learn in the work place

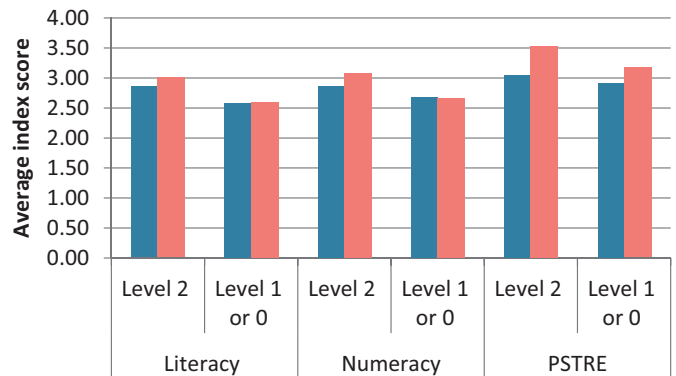
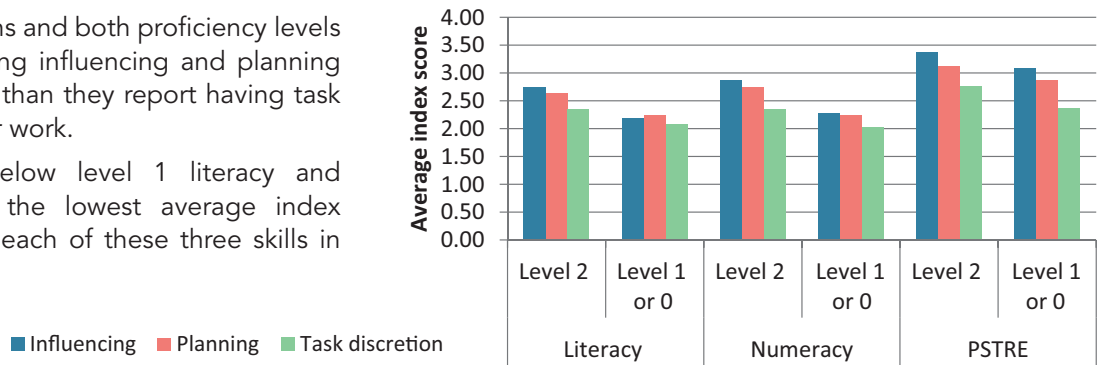


Figure 6: Average index scores for influencing, planning and task discretion in the work place

- Across all domains and both proficiency levels adults report using influencing and planning skills more often than they report having task discretion in their work.
- Adults at or below level 1 literacy and numeracy have the lowest average index scores for using each of these three skills in the workplace.



Reading skills in work

Figure 7: Average index scores for reading skills in work for men and women

- This figure shows that both men and women at level 2 use reading skills in work more than men and women at or below level 1.

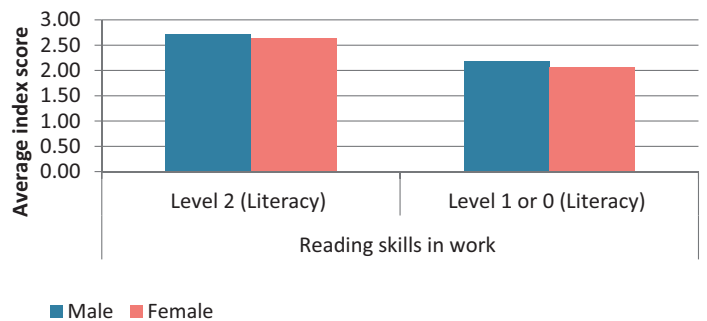


Figure 8: Average index score for reading skills use in work by age group

- Adults at level 2 use reading skills more often than adults at or below level at all ages. Within each proficiency level average reading skills use is similar for all adults from age 24 onwards.

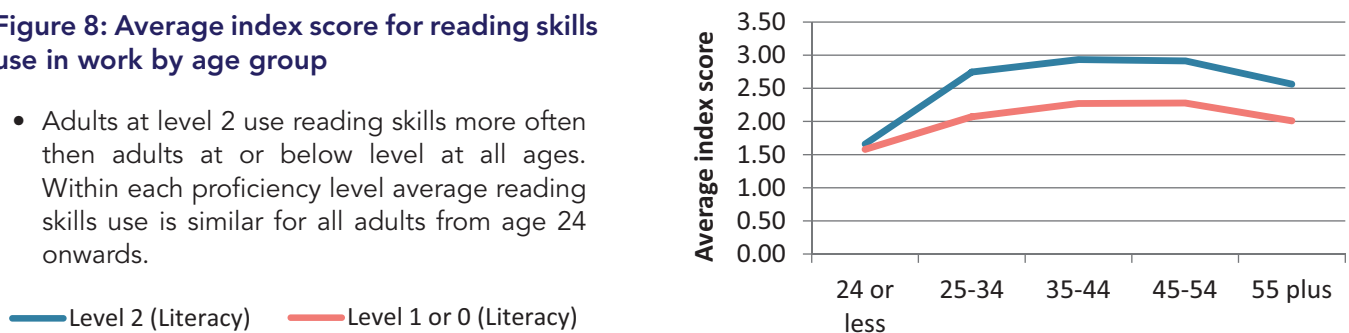


Figure 9: Average index score for reading skills use in work by completed education level

- Average reading skills use increases up to age 33 and then declines. At all ages, average reading skills use is more frequent among adults at level 2 compared with those at level 1 or less.

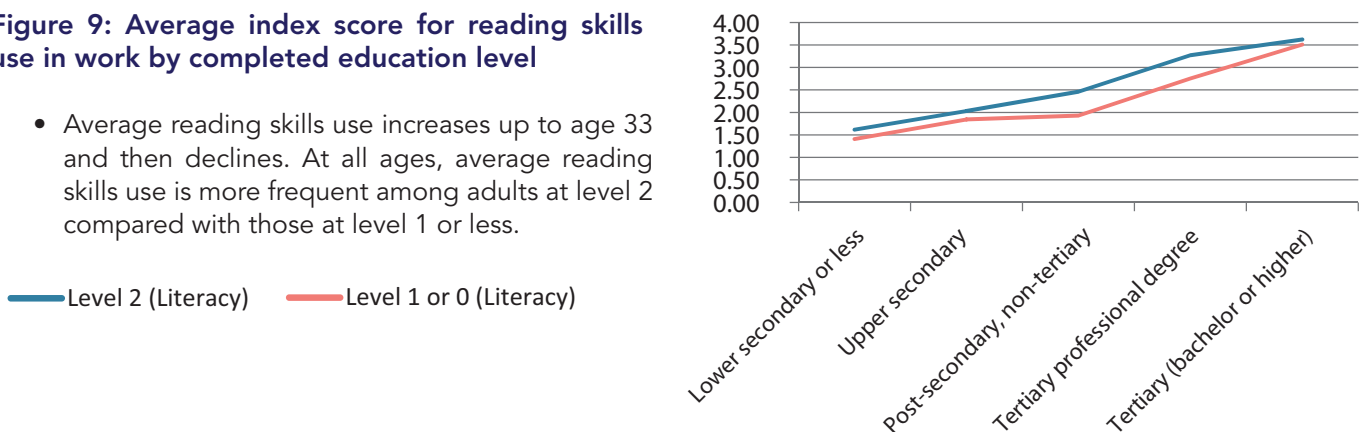
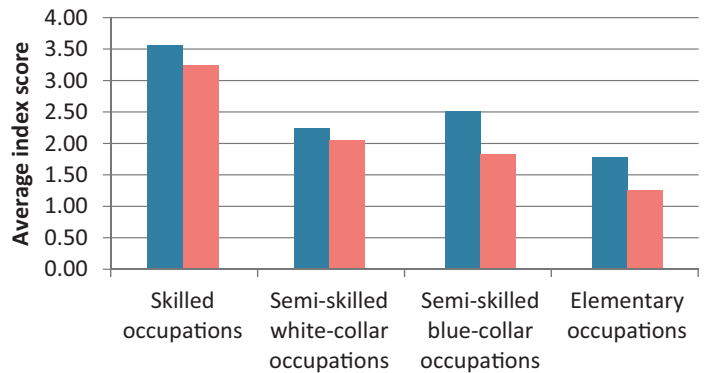


Figure 10: Average index score for reading skills use in work by skill-based occupation

- Reading skills are used more frequently among adults with skilled and semi-skilled occupations and average index scores are consistently higher among adults with level 2 compared with level 1 or less in literacy.

■ Level 2 (Literacy) ■ Level 1 or 0 (Literacy)



Writing skills use in work

Figure 11: Average index scores for writing skills use in work for men and women

- Average index scores for writing are higher among women at level 2 compared with men at level 2. There is no significant difference in average writing skills use between men and women at or below level 1 in literacy.

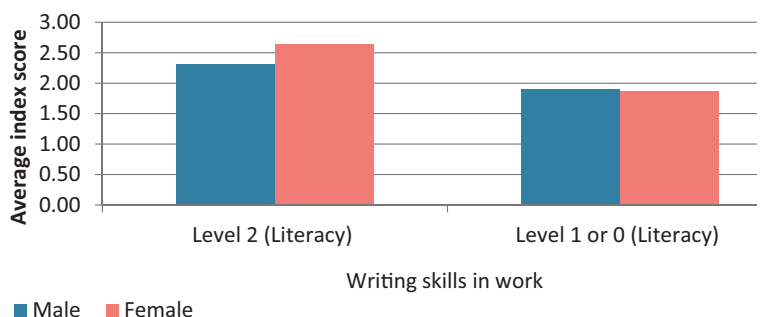


Figure 12: Average index scores for writing skills use in work by age group

- Average writing skills index scores are higher among adults with level 2 literacy. Among adults with level 1 or less, average writing skills use increases up to age 54 and declines thereafter. Among adults with level 2, this decline begins from age 44.

■ Level 2 (Literacy) ■ Level 1 or 0 (Literacy)

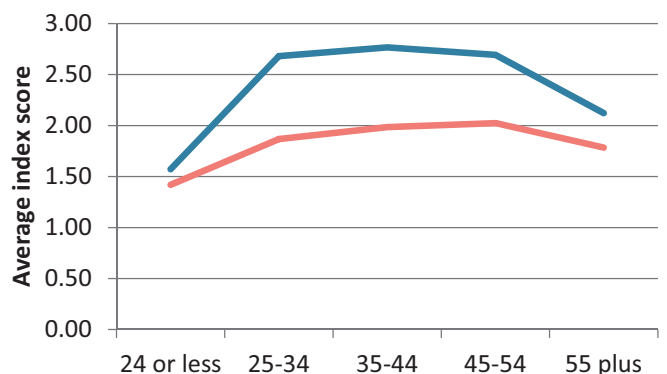


Figure 13: Average index scores for writing skills use in work by completed education level

- Average writing skills use in work increases steadily among adults at both proficiency levels across each additional level of educational attainment.

■ Level 2 (Literacy) ■ Level 1 or 0 (Literacy)

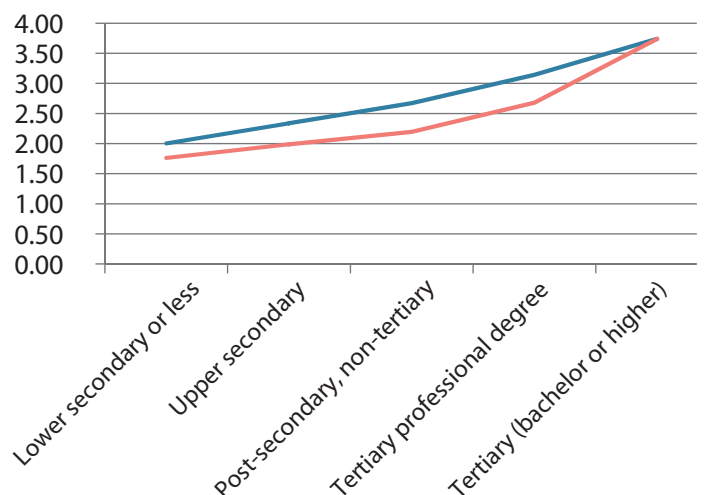
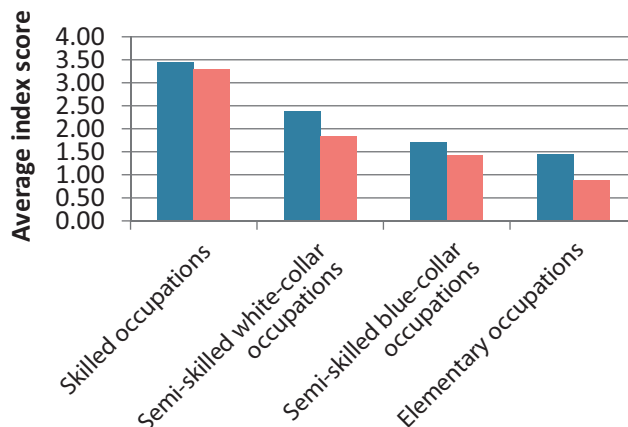


Figure 14: Average index scores for writing skills use in work by skills-based occupation

- Average index scores for writing in work are higher among skilled occupations, and particularly low among elementary occupations.

■ Level 2 (Literacy) ■ Level 1 or 0 (Literacy)



Numeracy skills use in work

Figure 15: Average index scores for numeracy skills use in work for men and women

- This figure shows that both men and women at level 2 use numeracy skills in work more than men and women at or below level 1. The difference between average numeracy skills use for men and women is not significant among those at or below level 1.

■ Male ■ Female

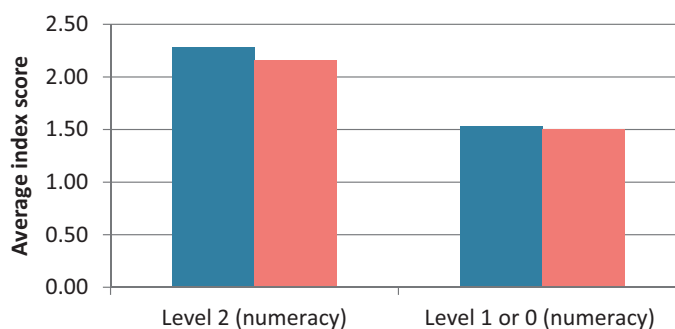


Figure 16: Average index scores for numeracy skills use in work by age group

- Average numeracy skills use is greatest among those aged 25-34 with level 2 numeracy whereas it is greatest among those age 35-44 for those with level 1 or less.

— Level 2 (Literacy) — Level 1 or 0 (Literacy)

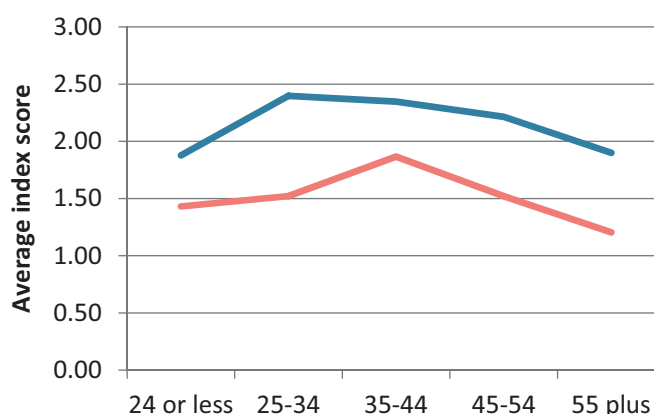


Figure 17: Average index scores for numeracy skills use in work by completed education level

- Average numeracy skills use in work increases steadily among adults at both proficiency levels across each additional level of educational attainment.

— Level 2 (Literacy) — Level 1 or 0 (Literacy)

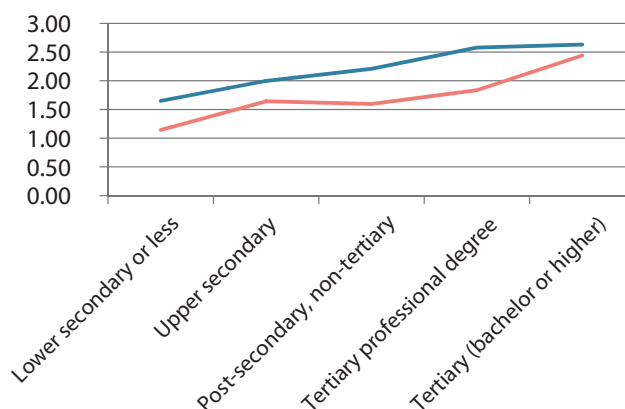
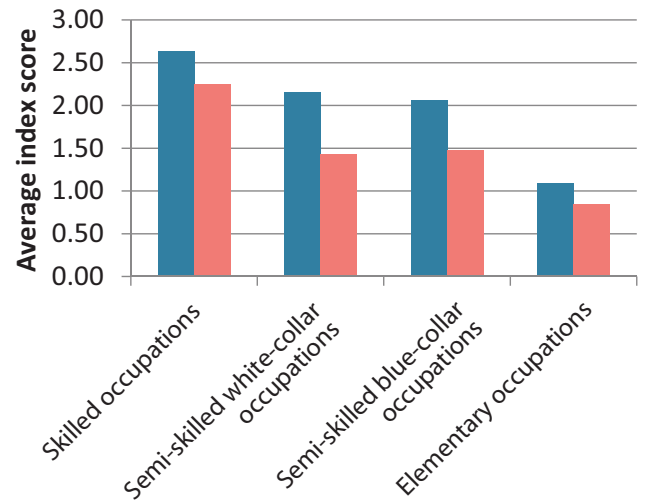


Figure 18: Average index scores for numeracy skills use in work by skills-based occupational classification

- Average index scores for numeracy in work area higher among skilled occupations, and particularly low among elementary occupations.

■ Level 2 (Literacy) ■ Level 1 or 0 (Literacy)



PSTRE skills use in work

Figure 19: Complexity of ICT skills use in work

- Significantly more adults with level 2 PSTRE, numeracy and literacy use moderate or complex computer skills in work compared with straightforward computer use.

■ Straightforward ■ Moderate ■ Complex

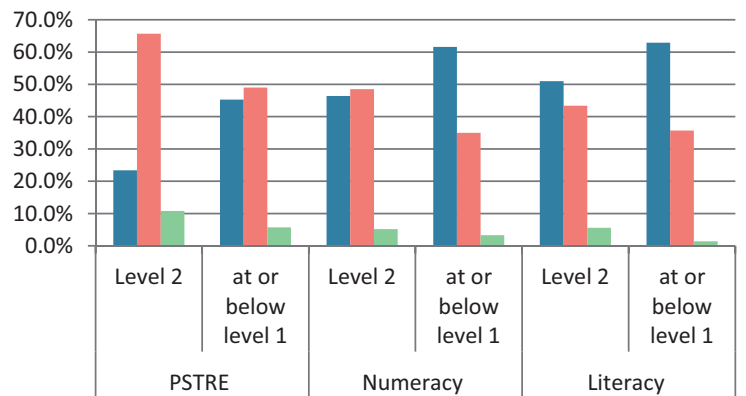


Figure 20: Average index scores for PSTRE skills use in work for men and women

- Average PSTRE skills use is greater for adults at level 2 compared with level 1 or less. Among adults at level 1 or less, average index scores are slightly higher for women compared with men.

■ Male ■ Female

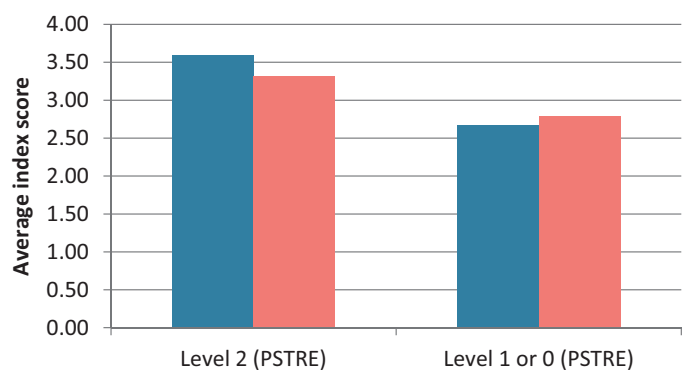


Figure 21: Average index scores for PSTRE skills use in work by age group

- Average PSTRE skills use is greatest among those aged 35-44 with level 2 numeracy whereas it is greatest among those age 45-54 for those with level 1 or less.

— Level 2 (Literacy) — Level 1 or 0 (Literacy)

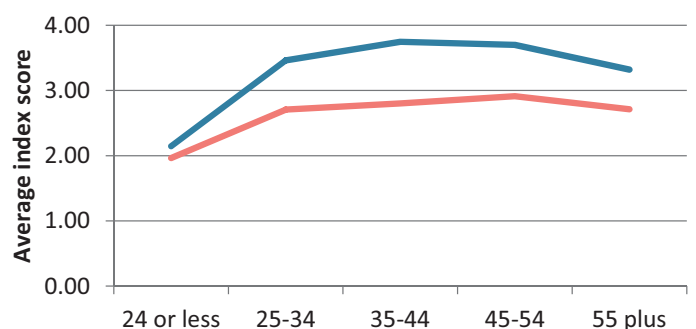


Figure 22: Average index scores for PSTRE skills use in work by completed education level

- Average PSTRE skills use in work increases steadily among adults at both proficiency levels across each additional level of educational attainment.

■ Level 2 (PSTRE) ■ Level 1 or 0 (PSTRE)

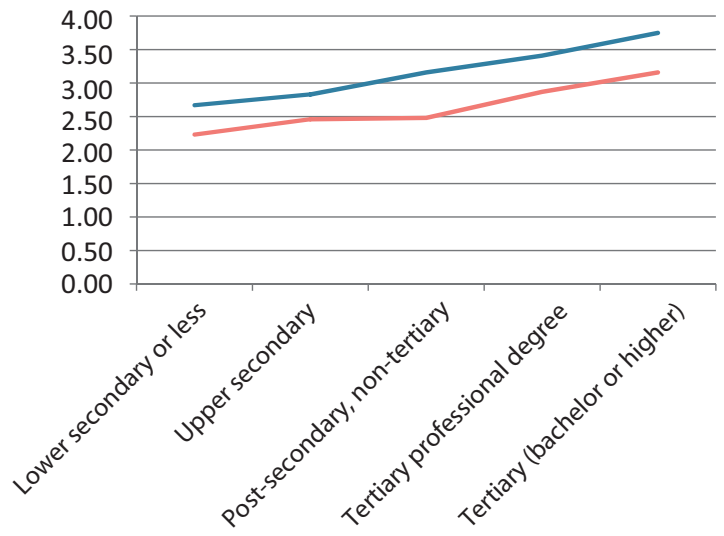
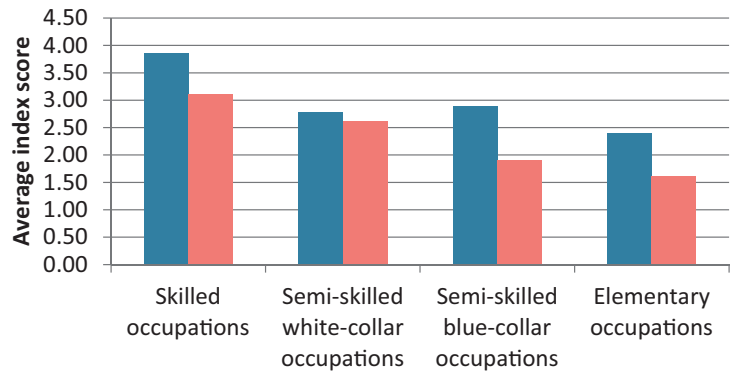


Figure 23: Average index scores for PSTRE skills use in work by skills-based occupation

- Average index scores for PSTRE in work area higher among skilled occupations, and particularly low among elementary occupations.

■ Level 2 (PSTRE) ■ Level 1 or 0 (PSTRE)

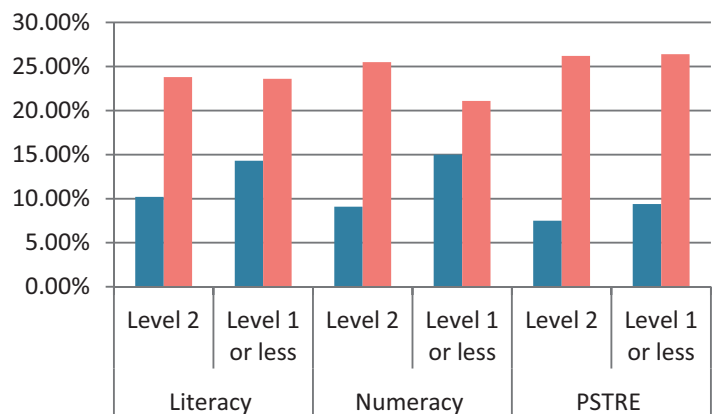


Skills requirement, earnings and job satisfaction

Figure 24: Self-reported skills requirement in work

- Over one quarter of adults at level 2 numeracy, level 2 PSTRE and level 1 or less PSTRE report that they need more training.
- A total of 15% of adults at level 1 numeracy report that they are not challenged enough in work.

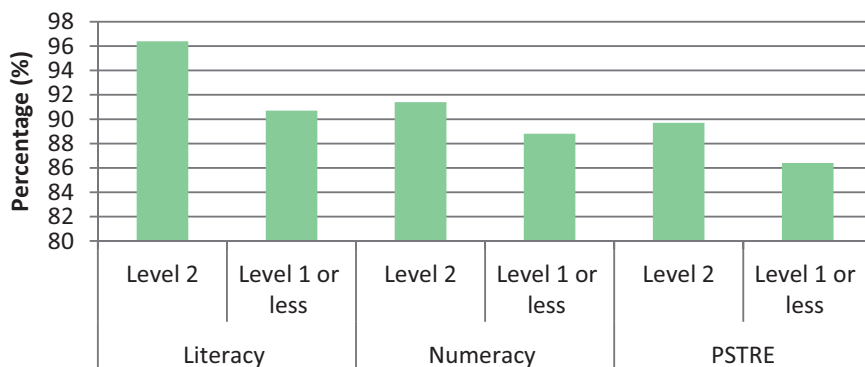
■ Not challenged enough in work ■ Need more training



Note: The percentage of adults who answered 'yes' is displayed.

Figure 25: I have the ICT skills I need

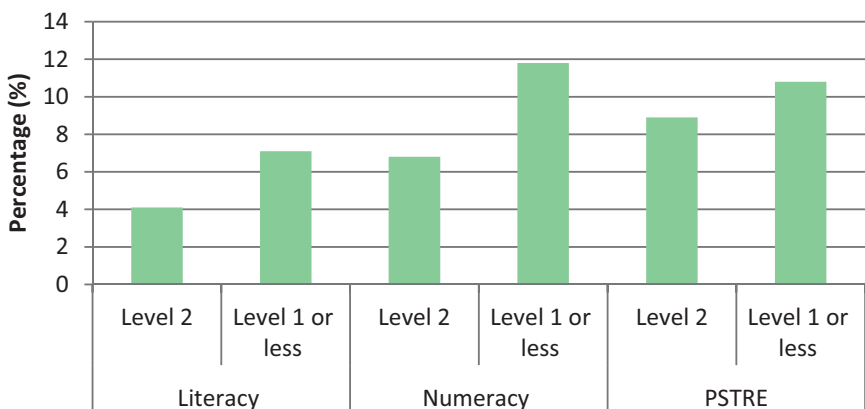
- Across each proficiency domain a high proportion of adults report that they have the ICT skills they need to do their job.
- For PSTRE, significantly more adults with level 2 report that they have they have the skills they need compared with adults at or below level 1.



Note: The percentage of adults who answered 'yes' is displayed.

Figure 26: Lack of ICT skills affects my career

- Compared with adult at level 2, significantly more adults who are at or below level 1 (PSTRE), numeracy and literacy report that a lack of ICT skills affects their careers.



Note: The percentage of adults who answered 'yes' is displayed.

We explored the effect of self-reported skills requirement on hourly wages and job satisfaction among adults with low literacy, numeracy and PSTRE in a series of linear regressions. Following OECD (2013) methodology, we used the log hourly earnings (including bonuses for wage and salary earners) reported in \$US adjusted for purchasing power parity (PPP) and self-reported job satisfaction. We also explored the relationship between self-reported skills requirement and the impact of a lack of ICT on a person's career on their job satisfaction. Job satisfaction was rated on a 5 point Likert scale, 1 indicating extremely satisfied and 5 indicating extremely dissatisfied.

We used indicators of needing more training and not challenged enough and "a lack of ICT skills affects my career" in their current work as indicators of self-reported skills requirement and mismatch in this analysis. In each model we controlled for a range of variables that could be influence a person's earnings and job satisfaction. These included: highest level of completed education, economic sector, type of contract, number of hours worked per week (current job), gender, born in Ireland, age and living with spouse or partner.

Hourly earnings

In the analysis models, among adults with level 2 numeracy, adults who reported being not challenged enough in work (they have the skills they need to completed more demanding duties) had, on average, 9.1% higher hourly earnings. There was no significant association between not being challenged and hourly earnings among adults with level 1 or less in literacy.

Job satisfaction

Among adults who have level 1 or lower (numeracy) and are in skilled occupations, reporting being challenged enough in work was associated with an .70 increase in their job satisfaction compared with adults who are not challenged enough.

Among adults who have level 1 or lower (PSTRE) and are in skilled occupations, reporting that a lack of ICT skills affects their career was associated with a .71 decrease in their job satisfaction compared with adults who reported that their career was not affected.

Summary

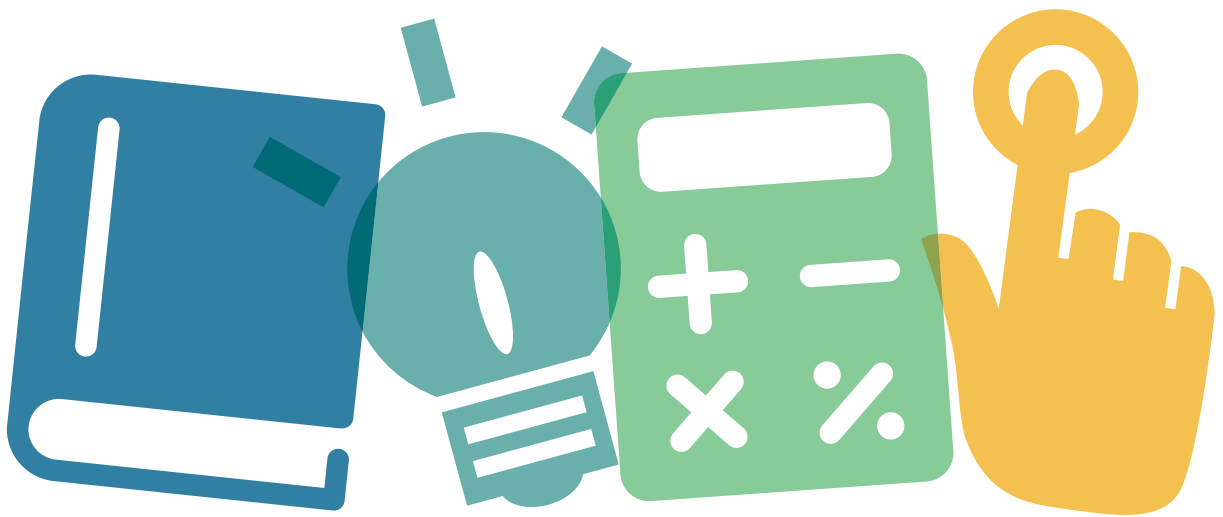
The data in this Bulletin shows that adults with level 2 proficiency report that they have the workplace skills they need compared with adults at or below level 1. The PIAAC results show that the single most important factor shaping the distribution of skills use in the workplace is the distribution of workers across occupations. Workers who have higher scores in literacy numeracy and PSTRE are more likely to be employed and earn more than those who score at the lower end of the scale.

For the Irish economy to continue to grow there is a need for a skilled workforce across all sectors. However, according to a recent report from the Expert Group on Future Skills Need (EGFSN) employers struggle to retain staff in the services and care sectors. This can be due to low pay and poor working conditions. On the other hand employment figures from the CSO show above average growth for more skilled sectors. There is also a continuing demand for IT skills and continued difficulty by employers to fill some of these positions (EGFSN, 2015). As demand for a more educated and skilled workforce continues to grow those with low skills are at high risk of being in low paid jobs or unemployed. Low proficiency skills across the three domains also limits the possibility of promotion, engaging in workplace training or indeed participating in further education and training. This in turn impacts on health, financial wellbeing and overall improvement in living standards.

The results in this section shows that for PSTRE, significantly more adults with level 2 report that they have the skills they need to complete more demanding duties compared with adults at or below level 1. Across each proficiency domain a high proportion of adults at level 2 report that they have the ICT skills they need to do their job. In comparison, significantly more adults who are at or below level 1 PSTRE, numeracy and literacy report that a lack of ICT skills affects their careers.

The profile of the participants show that on average they are 40 years of age. This has implications at policy level as EurWork has highlighted that national ageing policies need to support the development of existing competencies and skills. Irish research supports this finding and further suggests that workers productivity does not necessarily decline with age. It argues that any decline in physical activity is easily compensated by skills and qualities acquired through experience (Department of Health, 2013).

These findings have implications at both policy and practice level particularly when it comes to investing in training for people at the lower end of the skills spectrum. For example, in 2012 a report commissioned by NALA shows that when adults with literacy and numeracy difficulties receive training, they benefit by up to three times the average (Kelly et al, 2012). This highlights the value of investing in people at the lower levels as well as those who score at the higher levels.



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