Pacific adults’ literacy, numeracy and problem solving skills

Survey of Adult Skills (PIAAC)
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Executive summary

This is part of a series of in-depth reports from the Survey of Adult Skills. This report covers how the literacy, numeracy and problem solving skills (measured in English) of Pacific adults relate to their education and work. It also looks at how these skills compare to those of non-Pacific adults and how they have changed over time.

Summary of key findings

» The first language learned at home for about half of New Zealand’s Pacific 16 to 65 year olds is a Pacific language.
» Since 1996, Pacific people’s average English-based literacy skill has increased slightly, and since 2006 their numeracy skill has also increased slightly.
» Pacific people were much less likely than non-Pacific people to be able and willing to undertake the skill assessment on a computer.
» Pacific people born in New Zealand or who migrated aged up to 12 years have much stronger English-based literacy, numeracy and problem solving skills on average than those who were older when they first arrived.
» Pacific professionals and managers have strong English-based literacy skills – not significantly different from non-Pacific managers and professionals, but Pacific people are less likely to be in these occupations.
» Employed Pacific and non-Pacific people have similar earnings at the same literacy and numeracy skill levels.
» Pacific people are less likely to rate their health as excellent or very good compared to non-Pacific people. For Pacific people, self-rated health status is unrelated to literacy skills, whereas for non-Pacific people literacy skills and health status are strongly associated.

About the Survey of Adult Skills

The 2014 Survey of Adult Skills measured the skills of New Zealand adults aged 16 to 65 years in literacy, numeracy and problem solving in technology-rich environments. In New Zealand, the Survey was undertaken in English. Detailed information was also collected from respondents on their education, employment and occupation, skills and qualifications required for their jobs, the use of skills at work and at home, parents’ education and occupation, languages spoken and migration status. The Survey measured literacy skills comparably to the similar surveys in 1996 and 2006. Numeracy skills were measured comparably to the Survey in 2006.

The findings in this report relate to Pacific people aged 16 to 65 years in 2014. The older members of this population group participated in education in the 1950s and 1960s, and, for a large proportion, their education was in their homelands and in the medium of their national languages. In contrast, some of the younger people in the sample were students at English-medium schools in New Zealand at the time of their interview. Differences in overall education, language, work and life experiences over many decades are important contextual factors that background the findings for this wide age group.

Key findings

Pacific languages

The first language learned at home for about half of New Zealand’s Pacific 16 to 65 year olds was a Pacific language. For over a third the first language was English and for about one in 10 Pacific people it was both a Pacific language and English. Cook Islands Māori were much more likely to have learned only English as their first language compared to Samoans and Tongans.
The main home language of about one-third of Pacific 16 to 65 year olds is a Pacific language.

Migration
In 2014, half of the 16 to 65 year old Pacific population was born in New Zealand. Eight in 10 Pacific 55 to 65 year olds were born overseas, compared with three in 10 16 to 24 year olds.

Literacy and numeracy skills over time
Since 1996, the average English-based literacy score for Pacific people has increased from 227 to 242 scale score points. However, because of relatively small Pacific sample sizes, this increase is not statistically significant. The non-Pacific population's average literacy skills have also increased since 1996, with barely any narrowing of the Pacific/non-Pacific gap. From 1996 to 2014, the proportion of Pacific people with low literacy skills decreased.

Since 2006, the average numeracy score for Pacific people has shown a slight increase from 218 to 224 scale score points.

Problem solving skills
Problem solving in technology-rich environments was a new skill domain in the 2014 Survey. It measured people’s skill in using computer applications to acquire and evaluate information, and to communicate with others. Twenty-two percent of Pacific and 46% of non-Pacific had at least moderate problem solving skills.

Pacific people were much less likely to be able and willing to use a computer to do the assessment. One in five Pacific 16 to 65 year olds either had no computer experience, did not pass a simple computer use assessment, or declined to use a computer. This compares with one in 10 non-Pacific 16 to 65 year olds.

Skills and migration
Pacific people born in New Zealand have much stronger skills on average, as measured in English, compared with those born overseas. This applies to all three skill domains (literacy, numeracy and problem solving). Average skills are similar for Pacific people born in New Zealand or who first arrived aged up to 12 years. Average skills are lower for those who first arrived aged 13 years or more.

Skills and qualifications
On average, higher qualifications are associated with stronger skills for both Pacific and non-Pacific people – with the proviso that post-school qualifications below degree level are associated with a similar literacy skill to upper-secondary qualifications. Pacific people have lower average literacy scores at every qualification level.

Pacific people show less upward intergenerational education mobility than non-Pacific people. Pacific people whose parents’ education is less than upper secondary are more likely than non-Pacific to have gained only this level of schooling themselves. In addition, Pacific people whose parents’ education is upper secondary or higher are less likely to have gained a degree-level qualification than non-Pacific people. Possible reasons for this are:

» Pacific people are more likely than non-Pacific people to report unmet aspirations for learning activities over the previous 12 months. A factor that commonly limits Pacific people’s participation in learning activities is child care or family responsibilities.

» Pacific people are significantly less likely to report that they use the learning strategy: relating new ideas to real life situations.

» Tertiary education statistics show that Pacific people have lower completion rates for formal qualifications.

Skills and employment
For both Pacific and non-Pacific people, being employed is associated with stronger literacy skills compared to being unemployed. Pacific professionals and managers have strong English-based literacy skills – not significantly different from non-Pacific managers and professionals. However, Pacific people are much less likely to be managers or professionals, and

1 The Appendix contains an explanation of scale scores.
more likely to be community and personal services workers, machinery operators or labourers. Pacific people in these occupations have much lower literacy skills than non-Pacific people. Managers are the occupation group with the smallest Pacific/non-Pacific numeracy skills gap.

Employed Pacific and non-Pacific people have similar earnings at the same literacy and numeracy skill levels.

**Social participation and well-being**

Pacific and non-Pacific people are just as likely to participate in voluntary work, but, on average, those Pacific people that do participate do so more often. Pacific and non-Pacific people have the same levels of belief that they can influence government. However, Pacific people have lower levels of trust in other people. Pacific people are less likely to rate their health as excellent or very good, and more likely to rate their health as good, fair or poor compared to non-Pacific people. For non-Pacific people, stronger literacy skills were associated with higher self-reported health status. However, the literacy skills of Pacific people seem to be similar across health status ratings.

**Home environment factors and literacy**

Pacific people are less likely to use a computer in everyday life than non-Pacific people. However, the association between using a computer in everyday life and literacy skill is stronger for Pacific people.

Pacific people with more books at home have higher literacy skills than those that do not. Pacific people, on average, have far fewer books than non-Pacific people. Literacy skills and having more than 100 books at home have a similar strength of association for Pacific and non-Pacific peoples.

The proportion of Pacific people that reported reading books at least weekly in everyday life was lower than non-Pacific people. However, for Pacific people the association with literacy skill is not significantly different from zero. This suggests that Pacific people with low literacy skill are just as likely to read frequently as those with strong literacy skills.

**Supporting Pacific people to study at any level of formal education, and also attain bachelors or higher qualifications may help increase literacy skill in English**

Pacific people with a bachelors or higher qualification have higher English-based literacy scores than those who do not, including those with non-degree post-school education. Of Pacific people, 21% have a bachelors or higher qualification, compared to 45% of non-Pacific people. Degree-level qualifications and literacy skill are similarly associated for Pacific and non-Pacific peoples. This suggests that the proportion of Pacific people with bachelors or higher qualifications has scope to increase, together with a potential increase in literacy skill.

Pacific people who have been studying at any level of formal education in the past 12 months have much higher literacy skills than those who have not been studying.

**Workplaces utilise Pacific people’s literacy skill**

Pacific people who reported writing letters, memos or emails for work at least weekly have higher skills than Pacific people who do not – an average literacy score of 266 compared with 230. Though they are less likely to do this than non-Pacific people, the strength of association between the activity and literacy skill is similar.
Introduction

What is the Survey of Adult Skills?

The 2014 Survey of Adult Skills measured the skills of New Zealand adults in literacy, numeracy and problem solving in technology-rich environments. It is part of the OECD’s Programme for the International Assessment of Adult Competencies (PIAAC). The Survey of Adult Skills provides the first picture of skills for 16 to 65 year olds in New Zealand since 2006.

The Survey had a representative sample of 16 to 65 year olds living in New Zealand households. In total, 6,177 people were surveyed, of whom 426 were Pacific. Each record of the total sample was statistically weighted to represent the 2014 New Zealand population of 2,750,000 16 to 65 year olds, of whom 175,000 were Pacific. The Pacific sample size is sufficient for much analysis, but does have some limitations.

The interview was conducted in English and included an extensive background questionnaire covering education, employment, and the use of skills at work and in everyday life. The respondents were then tested on their literacy, numeracy and problem solving skills, also in English. The primary rationale for this is that English is the most widely spoken language in New Zealand’s society, communities and economy. The Survey collects information about first and home languages, but is not suited for studying skills through the medium of less widely spoken languages.

Literacy, numeracy and problem solving skills are becoming more important in the modern workplace and in everyday life. For New Zealand, this includes the skills of Pacific people, whether based in their respective national languages or English. Higher skills are associated with better jobs, higher incomes and greater well-being. The Survey of Adult Skills can help answer key questions related to English-based skills for Pacific people in New Zealand, such as:

» What are the characteristics of the most skilled and least skilled Pacific people in terms of education, employment, income, and well-being?

» How do Pacific people in New Zealand use their skills at work and at home?

» What factors are most associated with the skills of Pacific adults?

What skills are measured in the Survey and how are they measured?

Literacy

Literacy is the ability to understand, evaluate, use and engage with written texts to get everyday things done. This includes:

» understanding written words and sentences

» comprehending text in charts and diagrams

» comprehending, interpreting and evaluating complex texts.

Numeracy

Numeracy is the ability to use, interpret and communicate mathematical information and ideas in order to engage in and manage the mathematical demands of a range of situations. This includes:

» quantity

» dimension and shapes

» patterns

» data and chance

» visual displays.

Problem solving in technology-rich environments

Problem solving in technology-rich environments is the ability to use computers to acquire and evaluate information, communicate with others and perform practical tasks. All tasks are completed on a computer that simulates real-world tasks with standard applications. This includes:

» completing tasks using different everyday computer applications

» finding specific information in everyday computer applications
» using common functions to complete tasks in everyday computer applications.

Each respondent was asked to undertake an assessment that included tasks of a wide range of difficulty. Skills were measured on continuous scales covering a wide range of abilities. The scales can be divided into levels to group people within similar ranges of ability. These levels help describe the kinds of tasks these groups of people can do. However, the levels on their own do not describe benchmarks or thresholds for participation in society and the economy.

**Reporting findings from the Survey of Adult Skills**

**Analytical approach**

This report uses analysis of the Survey of Adult Skills data to show socio-demographic profiles that make comparisons within the Pacific population and also compare Pacific with non-Pacific people. Small sample sizes limit the scope for separately analysing the individual Pacific ethnicities.

**Measuring skills over time**

Previous surveys allow adult literacy skills in 2014 to be compared to those in 1996 and 2006. Adult numeracy skills in 2014 can be compared to numeracy skills in 2006. Problem solving in technology-rich environments was measured for the first time in the 2014 Survey of Adult Skills.

An important dimension of measuring skills over time using a 2014 snapshot of 16 to 65 year olds is that the older Pacific cohorts participated in education in the 1950s and 1960s and, for a large proportion, their education was in their home nations in the medium of their national languages. In contrast, some of the younger members were at English-medium schools in New Zealand at the time of their interview. Differences in education, language background, work and life experiences over many decades are important considerations when looking at Survey findings for this wide group. The experiences, practices and policies of the past in education, skill and work may long continue to have an impact on individuals and communities.

**How Pacific are counted in the Survey of Adult Skills**

In New Zealand, the Survey of Adult Skills asked an ethnic identification question that allowed for multiple responses. In this report, Pacific are those who reported belonging to one or more Pacific ethnic groups, whether or not they reported any non-Pacific ethnic identifications. Ethnic identification, of course, differs from citizenship or birthplace and the report, for example, does not cover people with European or Asian ethnicity (such as Fijian Indians) who were born in Pacific nations.

**Graphs and statistical significance**

Most of the graphs in this report include confidence intervals – black lines extending either side of the calculated values. They represent the uncertainty that all sample surveys have. Where the confidence intervals do not overlap, there is at least 95% certainty that the difference is not due to chance alone.

More detail about the Survey of Adult Skills is in the Appendix.
New Zealand’s Pacific population: the context²

Pacific peoples in New Zealand

New Zealand’s Pacific peoples are diverse. Pacific nations differ in culture, language and history, in their relationships with New Zealand, and in population and geographical size. Pacific people’s migration patterns to, and geographical spread within, New Zealand also differ because of different citizenship statuses, changing immigration policy, and also because of the diversity of their national origins.

However, a common factor for most Pacific groups was the beginning of large-scale migration to New Zealand from the 1950s. This was in response to increasing post-war labour demand from New Zealand’s expanding manufacturing and service industries.

Another important common factor is the youthfulness of Pacific populations. In 2013, 46% of Pacific people were less than 20 years old, compared to 27% of the total New Zealand population.

According to the 2013 Census, nearly 300,000 people (7.4%) identified with at least one Pacific ethnicity. Table 1 shows the 2013 figures for the larger Pacific populations. Because this report is based on data from a sample survey, the analysis focuses mainly on the aggregate Pacific population. But it also looks at the Pacific groups with the largest New Zealand populations: Samoan, Cook Islands Māori and Tongan. The next largest groups are Niuean, Fijian and Tokelauan. We cannot present results for the many other Pacific groups because too few or none were in the Survey sample.

Table 1: Pacific populations, 2013³

<table>
<thead>
<tr>
<th>Pacific groups</th>
<th>Number</th>
<th>Proportion %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samoan</td>
<td>144,100</td>
<td>49</td>
</tr>
<tr>
<td>Cook Islands Māori</td>
<td>61,800</td>
<td>21</td>
</tr>
<tr>
<td>Tongan</td>
<td>60,300</td>
<td>20</td>
</tr>
<tr>
<td>Niuean</td>
<td>23,900</td>
<td>8</td>
</tr>
<tr>
<td>Fijian</td>
<td>14,400</td>
<td>5</td>
</tr>
<tr>
<td>Tokelauan</td>
<td>7,200</td>
<td>2</td>
</tr>
<tr>
<td>Other Pacific</td>
<td>12,200</td>
<td>4</td>
</tr>
<tr>
<td>Total Pacific</td>
<td>295,900</td>
<td>100</td>
</tr>
</tbody>
</table>


² Sources include: Ministry for Pacific Peoples (2016) and the Ministry of Culture and Heritage’s Te Ara – The Encyclopedia of New Zealand.
³ Numbers add to more than the total, and proportions add to more than 100% because of multiple Pacific responses to the ethnic question. The table includes all ages, though the Survey and this report cover 16 to 65 year olds. Other Pacific includes, for example, Solomon Islanders, Ni Vanuatu, Nauruans, Kiribati, Marshall Islanders, Tuvaluans, Hawaiians Tahitians, and Easter Islanders.
Migration to New Zealand

Most migration from the Pacific to New Zealand came from the Cook Islands, Niue, Tokelau, Samoa, Tonga, and Fiji. People from the Cook Islands, Niue, and Tokelau held New Zealand citizenship and therefore had unrestricted rights of entry and settlement in New Zealand. People from other Pacific nations, particularly Samoa, Tonga, and Fiji, entered New Zealand in a range of ways, including temporary permits, quota schemes and family reunification policies.

This migration fuelled population growth in the 1960s and 1970s, so that by the time of the 1976 Census almost 65,700 Pacific people were living in New Zealand, making up 2.1% of the total population. Economic downturn in the 1970s resulted in a more restrictive immigration policy, but many Pacific people retained rights of entry to New Zealand, and so migration continued, albeit at lower levels. Since the mid-1990s, net migration gains from the Pacific have averaged 3,300 per year⁴.

Migration and settlement patterns

The size and resources of different Pacific nations, and their relationships with New Zealand, have influenced migration timing, volume and the resulting mix of New Zealand and home nation residents. Changing New Zealand immigration policies and programmes have been important for nations that do not have New Zealand citizenship rights.

The groups with the highest proportions (over 70%) of New Zealand-born people are from the nations with citizenship rights in New Zealand – reflecting earlier and easier migration. Around 60% of all Samoans and Tongans were born in New Zealand. The proportion of Fijians born in New Zealand is lower – 40% – reflecting, in part, their later migration.

Pacific migrants tended to settle in the North Island, particularly Auckland. In 2013, 93% of Pacific people were in the North Island and 66% were in Auckland. For most Pacific groups the proportion in Auckland is 60-80%. Tokelauans are an exception, with half in Wellington.

The proportions of the total Pacific populations that are resident in New Zealand vary significantly across the different nations. Nearly 95% of all Niueans live in New Zealand, around 80% of Tokelauans and Cook Islands Maori, around 40% of Samoans and Tongans, but only 3% of indigenous Fijians.

Factors impacting on the skills of Pacific people in New Zealand

A wide range of interrelated factors have directly or indirectly impacted on Pacific people’s skills as expressed or measured in the English language.

Almost all Pacific migrants will have arrived in English-dominant New Zealand speaking their national language with little or no English, or if they had good English it was almost certainly their second language. Where Pacific migrants remained in New Zealand, their national languages have continued for generations as vital elements of their different cultural environments, even as New Zealand-born Pacific children and young people’s education was in English medium. English may become the main language spoken in the home, while Pacific languages continue to be important in communities, churches and extended families. This report will look at some aspects of the relationship between Pacific languages, English and skills as measured in English.

Many Pacific migrants came to New Zealand for employment in agriculture, manufacturing and service industries. This has resulted in the Pacific population having overall lower socio-economic status than non-Pacific people, as measured by indicators such as earnings, homeownership, housing quality and health status. On average, Pacific people have lower qualifications than non-Pacific, though Pacific young people’s NCEA achievement has increased in recent years.⁵

Economic restructuring in the late 1980s and 1990s resulted in job losses in agriculture, forestry and manufacturing where many Pacific people worked. For many, this created additional pressure towards lower socio-economic status, and less ability to maintain and develop skills, especially in an English language context.

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⁴ Statistics New Zealand (n.d.).
Pacific languages and migration

First languages learned and current main home language

The Survey of Adult Skills asked for up to two languages that people first learned as a child at home and still understand. It also collected the main language spoken at home at the time of the interview. This data paints a broad picture of the patterns of Pacific people’s linguistic backgrounds and current practice. We see a complex relationship between Pacific languages together with English which differs between Pacific nations and relates to immigration patterns over time.

The first language learned at home for about half of New Zealand’s Pacific 16 to 65 year olds was a Pacific language. For over a third that language was English and for about one in 10 Pacific people it was both a Pacific language and English. See Figure 1.

Figure 1: First languages for Pacific 16 to 65 year olds

Samoan and Tongan 16 to 65 year olds in New Zealand have a similar first language pattern to each other, and to Pacific as a whole. However Cook Island Māori in New Zealand are much more likely to have learned only English as their first language and less likely to have learned Cook Islands Māori (te Reo Māori Kūki Āirani) – compared to Samoans and Tongans first learning their languages. This may reflect Cook Islands Māori being more likely to be New Zealand-born because of their earlier migration to New Zealand. See Figures 2 to 4. Sample sizes for the other Pacific ethnicities are too small for reliable analysis.

6 Proportions add to slightly less than 100% because the first languages of a small proportion of Pacific were neither a Pacific language nor English.
7 The Cook Islands became a New Zealand colony in 1901. However, after a push for self-determination in the 1960s, it became self-governing in ‘free association’ with New Zealand in 1965. This means that the Cook Islands administers its own affairs but Cook Islands Māori are New Zealand citizens who are free to live and work in New Zealand. (Ministry of Foreign Affairs and Trade, n.d.)
Figure 2: First languages for Samoan 16 to 65 year olds

![Bar chart showing proportions of Samoan and English first languages.]

- Samoan & not English: 53%
- Samoan & English: 10%
- English & not Samoan: 34%

Figure 3: First languages for Tongan 16 to 65 year olds

![Bar chart showing proportions of Tongan and English first languages.]

- Tongan & not English: 58%
- Tongan & English: 0%
- English & not Tongan: 22%

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8 The proportion of Tongans whose first languages was Tongan and English is suppressed because of very small sample size.
The main home language of about one-third of Pacific 16 to 65 year olds is a Pacific language, and for about two-thirds it is English. This pattern was the same for the Samoan and Tongan populations, but for Cook Islands Māori the main home language of nine in 10 is English and not Cook Islands Māori. See Figure 5.

How long someone has been resident in New Zealand, how many generations since a family’s first arrival, having multiple Pacific or other ethnic identifications, level of connection to Pacific communities and intermarriage are all important factors underlying what someone’s main home language is.

The language context of Pacific people is therefore very multilingual. The home languages of many Pacific families will not be only their ‘main’ home language. The Census further illustrates this. It collects different language data from the Survey of Adult Skills, asking people to report all the languages that they can hold a conversation in about ‘a lot of everyday things’. According to the 2013 Census, 43% of Pacific people can speak at least two languages, compared to only 17% of the total New Zealand population.10

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9 The proportion of Cook Islands Māori whose first languages were Cook Islands Māori and English is suppressed because of very small sample size.
10 Ministry for Pacific Peoples (2016, p.67).
Timing of migration

With Pacific migration to New Zealand beginning in earnest in the 1950s, by 2014 half of the 16 to 65 year old Pacific population were born in New Zealand. Some will be children or grandchildren (or even great-grandchildren) of the adult migrants of the 1950s who are all now older than 65, if still living. A relatively small proportion of 2014’s 16 to 65 year old Pacific people arrived in New Zealand in the 30 years to 1979, but over 20% have arrived since 2000. See Figure 6.

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11 The proportions may add to slightly less than 100% because the main home language of small proportions of Pacific people is not their own island nation language or not any Pacific language. Multiple Pacific ethnic affiliations and intermarriage are factors behind this. The proportion of Cook Island Māori whose main home language is Cook Islands Māori is suppressed because of very small sample size.
Figure 6: Timing of 16 to 65 year old Pacific people’s migration to New Zealand

Figure 7 provides a different view of Pacific migration to New Zealand. About 5% of 2014’s Pacific 16 to 65 year olds arrived in New Zealand aged 5 years old or younger, therefore likely having had all their education in New Zealand. Another approximately 14% arrived between 6 and 18 years of age, and this group will mostly have had some primary and secondary education in New Zealand. About 30% arrived aged 19 or older – some of this group will have had tertiary education in New Zealand.

Figure 7: Age of 16 to 65 year old Pacific people at migration to New Zealand
The Pacific age profile shows a young population where half the 16 to 65 year old population is aged under 35; and only 37% of non-Pacific 16 to 65 year olds are aged under 35. A very strong relationship exists between age and how likely Pacific people are to be Pacific-born. Eight in 10 Pacific 55 to 65 year olds were born overseas, compared with three in 10 16 to 24 year olds. See Figures 8 and 9.

Figure 8: 2014 age profile of 16 to 65 year old Pacific people in New Zealand

Figure 9: Whether Pacific people were born in New Zealand by age group\(^\text{12}\)

\(^{12}\) The proportion of Pacific 55-65 year olds born in New Zealand is suppressed because of very small sample size.
Literacy and numeracy skills over time

Literacy at three time points

Two earlier skill surveys measured literacy comparably to the Survey of Adult Skills. This creates a time series for 1996, 2006 and 2014.

Since 1996, the average literacy score for Pacific people increased from 227 to 242 scale score points. See Figure 10. This reflects this period’s decreasing proportions of Pacific people with no qualifications, increasing proportions of Pacific people with upper-secondary qualifications or higher, and increasing proportions whose whole lives have been in New Zealand. It also reflects that all but the youngest of the first generation of Pacific migrants in the 1950s will have been over 65 by 2014, and therefore outside of the scope of the Survey.

However, because of relatively small Pacific sample sizes, particularly in 1996, we cannot be sure of the statistical significance of this increase. The non-Pacific population’s average literacy skills have also increased since 1996, and there has been only a slight narrowing of the overall Pacific/non-Pacific gap.

Figure 10: Average literacy scores for 16 to 65 year old Pacific and non-Pacific people, 1996, 2006 and 2014

The proportion of Pacific with high literacy skills increased while the proportion with low literacy skills decreased

The following analysis helps show how changes in the spread of literacy skill contributed to the overall increase in Pacific people’s average literacy skill.

From 1996 to 2014, the proportion of Pacific people with high (level 4 or 5) literacy skills increased slightly from 2% in 1996 to 4% in 2014, and the proportion with above level 3 or above literacy skills increased from 20% to 26%. The proportion with level 2 literacy scores remained relatively unchanged but, the proportion of Pacific people with low (level 1 or below) literacy skills decreased from 47% in 1996 to 35% in 2014 – though because of small sample sizes, particularly in 1996, this is not statistically significant. Since 1996, the increase in the proportion of Pacific with level 3 or above literacy skills, and

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13 The 1996 International Adult Literacy Survey and the 2006 Adult Literacy and Life Skills Survey.
the decrease in the proportion with level 1 or below skills seems greater than for non-Pacific. This has slightly narrowed the gap between Pacific and non-Pacific literacy skills. See Figure 11.

**Figure 11: Distribution of literacy skills over time for Pacific and non-Pacific people aged 16 to 65**

![Figure 11: Distribution of literacy skills over time for Pacific and non-Pacific people aged 16 to 65](image1)

**Numeracy skills at two points in time**

For numeracy we have comparable measures for 2006 and 2014. Since 2006, the average numeracy score for Pacific people has increased slightly from 218 to 224 scale score points. See Figure 12. Though this is not a statistically significant increase, it is consistent with the overall increasing rate of higher qualifications amongst the Pacific population. Non-Pacific people’s average numeracy skill did not change over this period.

**Figure 12: Average numeracy scores for 16 to 65 year old Pacific and non-Pacific people, 2006 and 2014**

![Figure 12: Average numeracy scores for 16 to 65 year old Pacific and non-Pacific people, 2006 and 2014](image2)
The following analysis of proportions at different numeracy levels show how different changes in different parts of the spread of numeracy skill have contributed to the overall increase. For Pacific people, there was a small decrease in the proportion with very low skills and a small increase at level 3. See Figure 13.

**Problem solving skills at one point in time**

Problem solving in technology-rich environments was a new skill domain in 2014. It measures people’s skill in using computer applications to acquire and evaluate information, and to communicate with others. 14 Twenty-two percent of Pacific and 46% of non-Pacific had at least moderate or level 2 problem solving skills. Pacific people were much less likely to be able and willing to use a computer to do the assessment. One in five Pacific 16 to 65 year olds either had no computer experience, did not pass a simple computer use assessment, or declined to use a computer. This compares with one in 10 non-Pacific 16 to 65 year olds. This suggests that Pacific people may have less access to computers and therefore less opportunity to become skilled and confident with using computers. See Figure 14.

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14 The skill domain problem solving in technology-rich environments is measured only by a computer-based assessment. Where Survey respondents could not use a computer, or declined to, they could not be assessed and assigned a score. The proportion of people that the average problem solving score relates to is therefore less than for literacy and numeracy and differs between Pacific and non-Pacific people, and older and younger people.
Figure 14: Distribution of problem solving skills for Pacific and non-Pacific people aged 16 to 65
Migration, languages and skills

Pacific people born in New Zealand have much stronger skills on average, as measured in English, compared with those born overseas. This applies to all three skill domains; literacy, numeracy and problem solving. But for non-Pacific, skills are not significantly different between those born in New Zealand and those born overseas. Two key background factors to this are that many non-Pacific migrants to New Zealand are native English language speakers, and that migration policies applying to non-Pacific countries of origin have explicitly selected for skill.

In addition, New Zealand-born Pacific people have lower skills than New Zealand-born non-Pacific people. This indicates that growing up in New Zealand and a New Zealand education are not the only factors that impact on Pacific people’s English-based skills. See Figure 15.

Figure 15: Literacy, numeracy and problem solving skills for Pacific and non-Pacific 16 to 65 year olds by whether New Zealand-born

Figure 16 analyses average skill scores for overseas-born Pacific people by their age at first arrival in New Zealand. This is at the limits of what is possible given the Survey’s Pacific sample size, as the wide error bars signal. Though we cannot say definitely from the data, it suggests, as expected, that the older people were when they migrated, the more likely they are to have lower English-based skills.

Average skills are similar for Pacific people born in New Zealand or who first arrived aged up to 12 years. Average skills are lower for those who first arrived as teenagers or older. So we can tentatively identify New Zealand’s English-medium primary schooling as contributing to Pacific people’s English-based skills in later life.
Figures 17 and 18 analyse how different first and home languages relate to skills measured in English. Having an English-only first language background is associated with the highest English-based skills – all three of literacy, numeracy and problem solving. The association appears stronger for literacy and numeracy than for problem solving.

Pacific people’s current main home language being English is associated with much stronger English-based skills.

This clearly identifies the ongoing challenge for Pacific communities of simultaneously maintaining language and cultural traditions and supporting strong skills in English.

Figure 17: English-based literacy, numeracy and problem solving skills for 16 to 65 year old Pacific people by first language
Figure 18: English-based literacy, numeracy and problem solving skills for 16 to 65 year old Pacific people by main home language
Learning, qualifications and skills

Almost all New Zealand-born Pacific people gained their highest qualification in New Zealand. This compares with a little under half of overseas-born Pacific people, which is consistent with about 40% of overseas-born Pacific people being 18 or younger when they arrived first to live in New Zealand. See Figure 19.

Figure 19: Where 16 to 65 year old Pacific people obtained their highest qualification by whether born in New Zealand\textsuperscript{15}

The highest qualifications of Pacific people (whether gained in New Zealand or elsewhere) are much more likely to be only school level compared with non-Pacific people. And their highest qualifications are much less likely to be at degree level or above. See Figure 20.

\textsuperscript{15} The figures on overseas highest qualifications should be treated rather cautiously. This is because some respondents answered as if their highest qualification was gained in New Zealand, when they also reported they gained it before their first arrival in New Zealand. The figures have been adjust for this, but some New Zealand-born people who gained an overseas highest qualification may still be misclassified. We have suppressed the proportion of people born in New Zealand who gained an overseas highest qualification because of this reason and also because of very small sample size.
While Pacific sample sizes are too small for very strong conclusions, a similar relationship is seen between qualification level and literacy skill for both Pacific and non-Pacific people. The higher the qualification the stronger the skill, with the proviso that post-school qualifications that are below degree level are associated with a similar literacy skill to upper-secondary qualifications\textsuperscript{17}. But Pacific people have lower average literacy scores at every qualification level. See Figure 21.

The relationship between qualification level and numeracy skills is similar to literacy, but Pacific average numeracy scores are lower overall. Pacific people’s problem solving skills are less strongly related to education level than literacy and numeracy, which is the same pattern for non-Pacific people. However, a larger proportion of Pacific people were unable or unwilling to undertake the assessment on a computer. These people therefore do not have a skill measure for problem solving, and averages are based on those who do have a score. See Figures 22 to 23.

\textsuperscript{16} Upper secondary or above is NCEA level 2 (or equivalent) or higher; below upper secondary education is NCEA level 1 (or equivalent) or less.

\textsuperscript{17} The level of many people’s below degree level qualifications is at Level 1-3 of the New Zealand Qualifications Framework – equivalent to NCEA Level 1-3.
Figure 21: Average literacy skill by highest qualification for Pacific and non-Pacific people aged 16 to 65 years old

Figure 22: Average numeracy skill by highest qualification for Pacific and non-Pacific people aged 16 to 65 years old
Figure 23: Average problem solving skill by highest qualification for Pacific and non-Pacific people aged 16 to 65 years old
Far less upward intergenerational education mobility can be seen for Pacific people than non-Pacific people when comparing people’s highest qualifications with their parents’ highest qualifications. Pacific people whose parents’ education was less than upper secondary are more likely than non-Pacific people to also have gained only this level of schooling themselves. In addition, Pacific people whose parents’ education was upper secondary or higher are less likely to have gained a degree-level qualification than non-Pacific people. For this analysis, we considered only those aged over 25 or more, in order to include only those who are most likely to have completed their initial education. This also helps adjust for the younger age structure of the Pacific population. See Figure 24.

Figure 24: Highest qualification by parents’ highest qualification for 25-65 year old Pacific and non-Pacific people aged 16 to 65 years old

<table>
<thead>
<tr>
<th></th>
<th>Both parents below upper secondary</th>
<th>At least one parent upper secondary or above</th>
<th>Both parents below upper secondary</th>
<th>At least one parent upper secondary or above</th>
</tr>
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<tbody>
<tr>
<td>Pacific</td>
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<td>42</td>
<td>38</td>
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<tr>
<td>non-Pacific</td>
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<td>30</td>
<td>40</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Both parents below upper secondary</th>
<th>At least one parent upper secondary or above</th>
<th>Both parents below upper secondary</th>
<th>At least one parent upper secondary or above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific</td>
<td>12</td>
<td>27</td>
<td>29</td>
<td>40</td>
</tr>
<tr>
<td>non-Pacific</td>
<td>24</td>
<td>30</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>

What might be barriers that prevent some Pacific people from gaining higher qualifications than their parents? Survey findings and other data point to possible reasons including: differences in learning strategies, differences in unmet aspirations for learning, and lower completion rates for formal qualifications.
When asked about using different learning strategies, Pacific people mostly report similar answers to non-Pacific people. However, Pacific people are significantly less likely to say that they relate new ideas to real-life situations to a high or very high extent. Also, the proportions are almost significantly different for liking to get to the bottom of difficult things. See Figure 25.

Understanding how differences in learning strategies might play a part in Pacific people’s lower rates of upward educational mobility would require more research, but we may be seeing the impact of a New Zealand education system that does not adequately reflect Pacific life contexts, and therefore not support Pacific students in relating new ideas to their own lives.

**Figure 25: Using learning strategies to a high or very high extent for Pacific and non-Pacific people aged 16 to 65 years old**
Pacific people are more likely than non-Pacific to report that they had unmet desires to participate in formal or non-formal learning activities over the previous 12 months; 48% of Pacific people have unmet aspirations for more learning activities compared to 37% of non-Pacific people. See Figure 26.

Figure 26: Proportions reporting unmet aspirations for learning activities, for Pacific and non-Pacific people aged 16 to 65 years old\textsuperscript{18}

\textsuperscript{18} 16-19 year olds who were in compulsory education were not asked about unmet learning aspirations.
The Survey also asked those who stated they had unmet learning aspirations for the main reason that prevented them from taking up these opportunities. Pacific people were significantly more likely to report that child care or family responsibilities prevented them from participating in these learning activities. Pacific people were also more likely to report that they were too busy at work, or courses were too expensive but these differences were not significant. See Figure 27.

Figure 27: Main reasons preventing participation in learning activities for Pacific and non-Pacific people aged 16 to 65 years old who had unmet learning aspirations

Tertiary education retention and achievement statistics show that the proportions of Pacific and non-Pacific currently studying for a formal qualification (18% of 16 to 65 year olds for both), and also the levels that they are studying at are very similar. So current participation in formal study is not a reason for Pacific people having lower qualifications than their parents.

However, lower completion rates for formal qualifications for Pacific people persist and may be another part of the answer. For example, the five-year completion rate for Pacific people who began studying in 2009 at bachelors degree level was 41% compared to 56% for the total population.

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19 Figures for some categories are suppressed because of very small sample size.

Work and skills

For both Pacific and non-Pacific people, being employed is associated with stronger literacy skills compared to being unemployed. See Figure 28. A similar pattern seems to apply to the relationship between labour force status and numeracy and problem solving skills but differences are less clear because of small sample sizes for those Pacific people who are unemployed and not in the labour force.

Figure 28: Literacy skills for Pacific and non-Pacific people 16 to 65 year olds by labour force status

While employed Pacific people have much lower literacy and numeracy skills compared to employed non-Pacific people, the mix of occupations is also very different. Pacific people are much less likely to be managers or professionals, and more likely to be community and personal services workers, machinery operators or labourers. Also, Pacific people are less likely to be employed and more likely to be unemployed or not in the labour force. See Figure 29.

Employed people are working; unemployed people are not working, but both actively seeking work and available for work; those not in the labour force are neither employed nor unemployed.

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21 Employed people are working; unemployed people are not working, but both actively seeking work and available for work; those not in the labour force are neither employed nor unemployed.
Even though employed Pacific people’s literacy skills are much lower on average than non-Pacific people’s, Pacific professionals and managers have strong English-based literacy skills – and not significantly different from non-Pacific and professionals. In contrast, Pacific labourers and community and personal service workers – occupations that Pacific people are much more likely to have than non-Pacific people – have much lower literacy skills than non-Pacific. However, for numeracy, managers are the occupation group with the smallest Pacific/non-Pacific skills gap – and this is almost significantly different. See Figures 30 and 31.

These findings are consistent with managers and professionals needing strong English-based literacy skills to do their jobs in the New Zealand economy, and employers recruiting Pacific staff on this basis. This looks doubtful, however, for professionals’ numeracy skills. The sample size is not sufficient to explore this point in more depth, and investigate whether fewer Pacific people hold the professional jobs that require strong numeracy skills.
A key indicator of how skills are valued in workplaces is earnings. Survey results showed that employed Pacific and non-Pacific people had similar earnings at the same literacy and numeracy skill levels. See Figures 32 and 33.

We see this in the New Zealand labour market too. The Survey shows that much smaller proportions of employed Pacific people have Level 3 or above literacy or numeracy skills compared to non-Pacific people – 30% compared to 63% for literacy and 19% compared to 55% for numeracy. In addition, Pacific people are more likely to work in lower-paid occupations than non-Pacific people and have lower skills across all occupation groups except managers and professionals. Pacific people may therefore be more likely to work in the subgroups of occupations that require lower skills.
Figure 32: Average annual earnings and literacy skill levels for employed Pacific and non-Pacific 16 to 65 year olds

Figure 33: Average annual earnings and numeracy skill levels for employed Pacific and non-Pacific people
Social participation, well-being and skills

The Survey provides an opportunity to look at some of the relationships between skills and aspects of social participation and well-being. Data collected includes participation in voluntary work, perceived influence on government, trust in others and self-assessed health status. However, the Survey can only provide a partial picture of Pacific people’s social participation and well-being.

Voluntary work

Pacific and non-Pacific people are just as likely to participate in voluntary work, but those Pacific people who do participate do so more often, on average. Pacific people are much more likely than non-Pacific people to do voluntary work at least once a week. See Figure 34. These findings are consistent with Statistics New Zealand’s 2016 New Zealand General Social Survey (NZGSS) which finds 33% of Pacific people undertaking voluntary work for an organization in the last four weeks, compared with 28% in the total population.22

Influence and trust

Pacific and non-Pacific people report the same levels of belief regarding their ability to influence government. See Figure 35. This result is consistent with the NZGSS finding that general election voting rates are the same for Pacific people and the total population.

However, the Survey of Adult Skills shows that Pacific people have lower levels of trust in other people. Pacific people are more likely than non-Pacific people to agree that ‘There are only a few people you can trust completely’ and ‘If you are not careful, other people will take advantage of you’. See Figures 36 to 37. NZGSS findings confirm the finding that Pacific people are less likely to trust others than the total population. See Table 2.

Health

The Survey shows that Pacific people are less likely to rate their health as excellent or very good, and more likely to rate their health as good, fair or poor compared to non-Pacific people.23 See Figure 38.

We can also look at the relationship between self-rated health status and literacy skill. For non-Pacific people, the stronger people’s literacy skills, the more likely they are to report very good or excellent health status. But for Pacific people there is no relationship between literacy skill and health status. Instead, each health status seems to have a similar mix of literacy skills. For numeracy skills, the data also shows a similar association between Pacific and non-Pacific people’s self-assessed health status. This indicates that the factors that bring about non-Pacific people’s strong correlation between reported health status and literacy and numeracy skills do not apply in the same way for Pacific people.

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22 Statistics New Zealand (2016).
23 The Survey findings on Pacific people’s self-rated health status are similar to those of the New Zealand Health Survey. However, the NZGSS provides a rather different picture with a higher proportion reporting excellent health. The differences may relate to differences across the three surveys in their in-scope populations — both according to age and also different inclusions and exclusions for people living in non-private dwellings. The different survey contexts and small sample sizes may also be factors. (Statistics New Zealand, 2016, and Ministry of Health, 2017).
Figure 34: How often 16 to 65 year old Pacific and non-Pacific people participated in voluntary work over the last year

Figure 35: Agreement/disagreement with ‘People like me don’t have any say about what the government does.’ for Pacific and non-Pacific people aged 16 to 65 years old
Figure 36: Agreement/disagreement with ‘There are only a few people you can trust completely.’ for Pacific and non-Pacific people aged 16 to 65 years old

Figure 37: Agreement/disagreement with ‘If you are not careful, other people will take advantage of you.’ for Pacific and non-Pacific people aged 16 to 65 years old
Table 2: Proportions holding different levels of trust for people in New Zealand for Pacific and non-Pacific people, New Zealand General Social Survey, 2016

<table>
<thead>
<tr>
<th>Trust held for people in New Zealand on a 0-10 scale</th>
<th>Pacific people</th>
<th>Non-Pacific people</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 4</td>
<td>10.5</td>
<td>8.5</td>
</tr>
<tr>
<td>5 to 6</td>
<td>36.8</td>
<td>23.6</td>
</tr>
<tr>
<td>7 to 8</td>
<td>41.9</td>
<td>52.5</td>
</tr>
<tr>
<td>9 to 10</td>
<td>10.8</td>
<td>15.4</td>
</tr>
</tbody>
</table>

Figure 38: Self-rated health status for Pacific and non-Pacific people aged 16 to 65 years old

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28 0 indicates low trust and 10 indicates high trust.
Figure 39: Self-rated health status and literacy skill for Pacific and non-Pacific people aged 16 to 65 years old
What factors are most strongly associated with Pacific people’s literacy skills?

Comparing factors related to higher literacy skill in English for Pacific people

Findings from the Survey of Adult Skills can tell us which factors are associated with higher literacy skills for Pacific people and how this compares to non-Pacific people. Together with findings on how likely Pacific people have these factors, this can point towards areas where changes could, over time, help strengthen overall skills for Pacific people. However, the conclusions are tentative because we cannot always be sure to what extent a causal relationship exists between factors, or whether factors are mutually supportive.

We used correlations\textsuperscript{25} to measure the strengths of association of various factors with literacy skills for Pacific people and compared these to non-Pacific people. The factors, grouped into three categories, were:

- **home environment factors:** at least 100 books in the home\textsuperscript{26}; read books at home; use a computer in everyday life; use the internet to understand issues
- **education factors:** have a bachelors or higher qualification; undertook formal education in the last year
- **work factors:** employed; participated in on-the-job training in the last year; read directions or instructions at work; write letters, memos or emails at work; write reports at work. See Figure 40.

We focused on factors that:

- are strongly related to Pacific people’s skills
- Pacific people are less likely to have than non-Pacific.

Some home environment factors are associated with higher literacy skill for Pacific people

For Pacific people, using a computer in everyday life is more strongly associated with literacy skill than for non-Pacific people. However, Pacific people are less likely to use a computer in everyday life. See Figures 40 and 41.

Pacific people who have more books at home have higher literacy skills than those who do not. Pacific people, on average, have far fewer books than non-Pacific people. The strength of association between literacy skills and having more than 100 books at home is similar for Pacific and non-Pacific people.

Pacific people read books at home a little less often than non-Pacific people, on average. However, for Pacific people the association with literacy skill is not significantly different from zero, which suggest that Pacific people with low literacy skill are just as likely to read frequently as those with strong skills.

Having many books at home and using a computer will be associated with other characteristics of the home environment. For example, home environment factors not examined in the Survey of Adult Skills, such as housing quality or access to transport or education services, may all be associated with skills. The affordability of books may also be important.

Supporting Pacific people to study at any level of formal education, and also attain bachelors or higher qualifications may help increase literacy skill in English

Pacific people with a bachelors or higher qualification have higher English-based literacy scores than those who do not, including those with non-degree post-school education. While a much lower proportion of Pacific people have a bachelors or higher qualification – 21% compared to 45% of non-Pacific people – there is a similar level of association with literacy skill as for non-Pacific people. See Figures 20 and 21. This suggests that the proportion of Pacific people with bachelors or higher qualifications has scope to increase, together with a potential increase in literacy skill. But other factors will also be

\textsuperscript{25} Correlation is a measure of how strongly two variables are associated. It takes values between 1 and -1. A correlation of 1 indicates the strongest possible agreement between the two variables, 0 indicates no relationship, and -1 means the strongest possible disagreement between the variables.

\textsuperscript{26} The number of books in the home continues to be strongly associated with skills, even as people’s reading shifts to digital media. See for example: OECD (2013, p. 237), Chamberlain (2014, p. 185) and Evans, Kelley, Sikora, & Treiman (2010).
involved. For example, those with lower literacy skills may be less likely to study for bachelors or higher qualifications, or if they do, choose different fields of study. Certainly, the Survey of Adult Skills shows that Pacific people who, in 2014, were studying for a bachelors or higher qualification had much stronger literacy skills than those studying at lower levels – average literacy scores of 283 compared with 245.

Pacific people who have been studying at any level of formal education in the previous 12 months also have much higher literacy skills than those who have not been studying – average scores of 263 compared with 235. As Figure 41 shows, studying is more strongly associated with literacy skill for Pacific than non-Pacific people.

**Workplaces utilise Pacific people’s literacy skill**

Pacific people who reported writing letters, memos or emails\(^{27}\) for work at least weekly have higher English-based literacy skills than Pacific people who do not – an average score of 266 compared with 230. Though they are less likely to do this activity than non-Pacific people, the strength of association with literacy skill is similar. Evidently, workplaces do utilise the abilities of Pacific employees who have strong literacy skills. This is supported by the finding that earnings of Pacific and non-Pacific people are similar at the same literacy skill level. See Figure 32.

On the other hand, Pacific people who reported writing reports for work at least weekly have similar literacy skills to those who do not. This is likely to be because writing letters, memos or emails is a much more common work activity than report writing, and many Pacific people with strong literacy skills have work that seldom requires report writing.

Reading directions and instructions is a common work activity. Non-Pacific people have the same average literacy skill whether they do this frequently or not, and we see zero association with literacy skills. But for Pacific people, the association is significantly above zero, and those who read directions and instructions at least weekly have stronger literacy skills.

The same proportions of Pacific and non-Pacific workers have participated in-the-job training in the last 12 months – close to 40%. The association between on-the-job training and literacy skill is similar for Pacific and non-Pacific people.

\(^{27}\) The Adult Skills Survey background questionnaire had a section on skill use which included asking how often people did different reading and writing activities for work and in everyday life.
Figure 40: Proportions of Pacific and non-Pacific 16 to 65 year olds with selected factors
Figure 41: Correlations between selected factors and literacy skill for Pacific and non-Pacific people aged 16-65 years old
References


Appendix

The Survey of Adult Skills

What is the Survey of Adult Skills?

The 2014 Survey of Adult Skills measured the skills of New Zealand adults in literacy, numeracy and problem solving in technology-rich environments. It is part of the OECD’s Programme for the International Assessment of Adult Competencies (PIAAC). The Survey of Adult Skills provided the first picture of skills for 16 to 65 year olds in New Zealand since 2006. The Survey was run in 32 other countries in many different languages, making it possible to compare the skills of adults in New Zealand internationally.

The Survey had a representative sample of 16 to 65 year olds living in New Zealand households. In total, 6,177 people were surveyed, of whom 426 (177 men and 249 women) were Pacific. Each record of the total sample was statistically weighted to represent the 2014 16 to 65 year old population: 2,750,000, of whom 175,000 were Pacific. The Pacific sample size is sufficient for much analysis, but does have some limitations. Because sampling errors are relatively large, differences may need to be large before we can say they are statistically significant.

The interview was conducted in English and included an extensive background questionnaire covering education, employment and the use of skills at work and in everyday life. The respondents were then tested on their literacy, numeracy and problem solving skills, also in English.

Skills are becoming more important in the modern workplace and in everyday life. Higher skills are associated with better jobs, higher income and greater well-being. The Survey of Adult Skills can help answer key questions related to skills in New Zealand, such as:

» What are the characteristics of the most skilled and least skilled people in New Zealand in terms of education, employment, income, well-being and other characteristics?
» How do New Zealanders use their skills at work and at home?
» What areas should we focus on to improve the skills of New Zealand adults?

The Survey measures skills on continuous scales which show the range of abilities from being able to deal with simpler through to more complex tasks. The survey does not measure whether people ‘pass’ or ‘fail’ certain standards, nor whether people are ‘literate’, ‘illiterate’, ‘numerate’ or ‘innumerate’.

The scales can be divided into levels to group people within similar ranges of ability. These levels help describe the kinds of tasks these groups of people can do. However, the levels, on their own, do not describe benchmarks or thresholds for participation in society and the economy.

Literacy

Literacy is the ability to understand, evaluate, use and engage with written texts to get everyday things done. The Survey of Adult Skills only measures reading literacy; there is no writing component. This includes:

» understanding written words and sentences
» comprehending text in charts and diagrams
» comprehending, interpreting and evaluating complex texts.

Numeracy

Numeracy is the ability to use, interpret and communicate mathematical information and ideas in order to engage in and manage the mathematical demands of a range of situations. This includes:

» quantity
» dimension and shapes
» patterns
» data and chance
» visual displays.
Problem solving in technology-rich environments

Problem solving in technology-rich environments is the ability to use computers to acquire and evaluate information, communicate with others and perform practical tasks. All tasks are completed on a computer that simulates real-world tasks with standard applications. This includes:

» completing tasks using different everyday computer applications
» finding specific information in everyday computer applications
» using common functions to complete tasks in everyday computer applications.

Reporting Survey of Adult Skills information

Analytical approach

This report uses analysis of the Survey of Adult Skills data to show socio-demographic profiles that compare within the Pacific population and also compare Pacific with non-Pacific. Small sample sizes limit the scope for separately analysing the individual Pacific ethnicities.

Measuring skills over time

Previous surveys allow adult literacy skills in 2014 to be compared to those in 1996 and 2006. Adult numeracy skills in 2014 can be compared with numeracy skills in 2006. Problem solving in technology-rich environments was measured for the first time in the 2014 Survey of Adult Skills.

Previous measures of adult skills come from the 2006 Adult Literacy and Life Skills Survey (ALL) and 1996 International Adult Literacy Survey (IALS). ALL and IALS previously reported literacy as two separate measures: ‘document literacy’ and ‘prose literacy’. These two separate scores have been remodelled into a single score that can be compared to the Survey of Adult Skills. The measures are not strictly the same, so some caution is needed when making comparisons between the 2014 Survey of Adult Skills and previous surveys.

Numeracy scores from the 2006 ALL Survey have also been re-calculated to match the measure used in the Survey of Adult Skills. The numeracy scores from 2006 used in this report will therefore differ from those in the Ministry of Education’s New Zealand reports from New Zealand ALL data.

The older participants in the 2014 Survey participated in education in the 1950s and 1960s, and for a large proportion their education was in their homelands and in the medium of their national language. In contrast, some of the younger people in the sample were at English-medium schools in New Zealand at the time of their interview. Differences in education, language backgrounds, and work and life experiences over many decades are important factors to consider when looking at findings that cover this wide age group. The education, skill and work experiences, practices and policies of the past may long continue to have an impact.

Skill levels, low skills and high skills

Literacy and numeracy scores are divided between the lowest scores that are below level 1 and the highest scores that are level 5. Those with scores at level 1 or below level 1 are considered to have low skills, while those at level 4 or level 5 have high skills.

Problem solving skills are divided between the lowest scores that are below level 1 and the highest scores that are level 3. Those with scores at level 1 or below are considered to have low skills, while those at level 3 are considered to have high skills.

A full list of skill levels and tasks people can complete at each level are provided in the tables at the end of this appendix.
How Pacific are counted in the Survey of Adult Skills

In New Zealand, the Survey of Adult Skills asked an ethnic identification question that allowed for multiple responses. In this report, Pacific are those who reported belonging to one or more Pacific ethnic groups, whether or not they reported any other ethnic identifications. Non-Pacific are those who did not report belonging to any Pacific ethnic group.

Graphs and statistical significance

Most of the graphs in this report include 90% confidence intervals – black lines extending either side of the calculated values. They represent the uncertainty that all sample surveys have. The report considers differences, over time or between groups, statistically significant where there is at least 95% certainty that the differences are not due to chance alone. Where the confidence intervals do not overlap, there is at least 95% certainty that the difference is not due to chance alone.

While the size of the Pacific sample limits the depth of possible analysis, a broad range of analysis is presented in the report, including some simple descriptive findings for the three largest Pacific groups: Samoan, Tongan and Cook Islands.

Age and other distributions

The Pacific and non-Pacific populations differ in their age distributions. The Pacific population has relatively greater proportions of young people, and smaller proportions of older people, compared to non-Pacific. However, adjusting for the different age distributions made little difference to the analysis, and no difference to the conclusions. We therefore decided not to include age-adjusted results in this report.

The Pacific and non-Pacific populations also differ in other ways that may be associated indirectly with skills. For example, the Pacific population is concentrated in different geographic areas of New Zealand compared to non-Pacific. This report does not attempt to include such factors in its analysis.

Literacy skill levels

Literacy scores in the Survey of Adult Skills are divided into six levels, ranging from below level 1 to level 5. People with high literacy scores are those at Level 4 and above. People at this level can:

» combine and synthesise information from multiple complex texts
» understand different competing ideas to form a conclusion about a specific piece of text.

People with low literacy skills are those at Level 1 or below. People at this level:

» have basic vocabulary skills and understand the meaning of sentences
» can find a short piece of text within a larger piece of text when it is identical to what they are looking for
» may have difficulty deciphering competing information from the same text.

Tables with full lists of skill levels and their descriptions are provided at the end of this appendix.

Numeracy skill levels

Numeracy scores, like literacy scores in the Survey of Adult Skills, are divided into six different levels, ranging from below level 1 to level 5. People with high numeracy scores are those at Level 4 or above. People at this level can:

» understand a broad range of complex mathematical information in unfamiliar contexts
» undertake tasks that have multiple steps
» understand quantities, statistics, chance, spatial relationships, proportions and formulas.

People with low numeracy skills are those at Level 1 or below. People at this level can:

» carry out basic mathematical tasks in concrete situations
» undertake one-step processes

28 The text of the ethnic question ran: “Which ethnic group do you belong to? You can select more than one ethnic group.” The interviewer provided a show-card listing the following ethnic groups: New Zealand European, Māori, Samoan, Cook Islands Māori, Tongan, Niuean, Chinese, Indian, Other. Interviewers asked respondents who selected Other to specify their other ethnic group or groups. Responses were classified using Statistics New Zealand’s 2005 Standard Classification of Ethnicity. Its category, Pacific Peoples, includes the indigenous peoples across the territories of the Pacific Ocean except for New Zealand. The scope is the southern, central and northern Pacific, from Australia to Papua New Guinea to Hawai`i to Tahiti to Easter Island to New Caledonia. It does not include Fijian Indians who are classified as Asian, or Europeans born in or citizens of Pacific nations.
» understand situations where mathematical content is explicit with minimal text
» understand simple percentages such as 50%.

**Problem solving skill levels**

Problem solving skills in the Survey of Adult Skills are divided differently from literacy and numeracy scores. The four skill levels begin at below level 1 and go to level 3. There is an additional category for people who were unable to complete basic computer tasks and were therefore not tested on their problem solving skills.

People with moderate-to-high problem solving skills score at Level 2 or Level 3. People at this level can:
» use multiple applications to solve problems
» find relevant information in complex environments, such as a large spreadsheet
» overcome unexpected impasses.

People with low skills at problem solving in technology-rich environments score at Level 1 or below and include those who:
» can do basic tasks using single functions
» can do simple tasks on standard applications, such as filing emails.

The problem solving skills of people who could not adequately use a computer to complete the assessment — or chose not to — were not measured.
## Literacy skill levels

<table>
<thead>
<tr>
<th>Literacy level</th>
<th>Type of tasks someone can perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below level 1</td>
<td>At this level, people can read brief texts on familiar topics and locate information in a longer piece of text if it is identical to what they are looking for. They should be able to understand signs and follow short basic instructions.</td>
</tr>
<tr>
<td>Level 1</td>
<td>At this level, people can read relatively short texts and diagrams to locate a single piece of information that is identical to what they are looking for. There will be little competing irrelevant information.</td>
</tr>
<tr>
<td>Level 2</td>
<td>At this level, people can navigate within digital texts to identify information. They can compare and contrast different pieces of information and make some inferences.</td>
</tr>
<tr>
<td>Level 3</td>
<td>At this level, people can understand dense and lengthy texts to find relevant information among irrelevant or competing information.</td>
</tr>
<tr>
<td>Level 4</td>
<td>At this level, people can perform multi-step operations to interpret and integrate information from complex texts. They can also apply background knowledge and interpret subtle arguments.</td>
</tr>
<tr>
<td>Level 5</td>
<td>At this level, people can use multiple dense texts to evaluate the reliability of different sources to evaluate evidence and arguments, find key information and synthesise familiar and contrasting ideas.</td>
</tr>
</tbody>
</table>
## Numeracy skill levels

<table>
<thead>
<tr>
<th>Numeracy level</th>
<th>Type of tasks someone can perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below level 1</td>
<td>At this level, people can carry out single tasks, such as counting, sorting and performing basic arithmetic with whole numbers and money. They can also recognise common spatial dimensions.</td>
</tr>
<tr>
<td>Level 1</td>
<td>At this level, people can carry out basic mathematical processes where the mathematical content is made explicit and there are few text distractions. They are also able to understand simple percentages such as 50%.</td>
</tr>
<tr>
<td>Level 2</td>
<td>At this level, people can perform mathematical tasks with two or more steps where the mathematical content is explicit. These operations may include common decimals, percentages and fractions. They are also able to interpret relatively simple graphs and spatial representations.</td>
</tr>
<tr>
<td>Level 3</td>
<td>At this level, people can understand mathematical contexts that are subtly embedded in text. They can make choices between different problem solving strategies. They can also perform basic analyses of statistics in texts, tables and graphs.</td>
</tr>
<tr>
<td>Level 4</td>
<td>At this level, people can understand mathematical information that may be complex or abstract and embedded in unfamiliar contexts. They can analyse complex reasoning about quantities, data, statistics, chance, spatial relationships, change, proportions and formulas.</td>
</tr>
<tr>
<td>Level 5</td>
<td>At this level, people can integrate and interpret several types of mathematical information. They can understand complex representations and abstract mathematical ideas embedded in complex texts.</td>
</tr>
</tbody>
</table>
### Problem solving skill levels

<table>
<thead>
<tr>
<th>Problem solving level</th>
<th>Type of tasks someone can perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not undertake computer-based test</td>
<td>People at this level did not undertake the survey on a computer. This was because they had no computer experience, failed a basic computer test or opted out of doing the survey on a computer.</td>
</tr>
<tr>
<td>Below level 1</td>
<td>People at this level can do tasks that have well-defined problems and require the use of only one function in a generic computer program.</td>
</tr>
<tr>
<td>Level 1</td>
<td>At this level, people can complete tasks where the goal is stated and there is only a small number of steps.</td>
</tr>
<tr>
<td>Level 2</td>
<td>At this level, people can use generic and more specific computer applications. They can undertake some tasks that require multiple steps and can use more than one application to solve a single problem.</td>
</tr>
<tr>
<td>Level 3</td>
<td>At this level, people can use more than one application to solve problems that have unexpected outcomes and impasses. They can also evaluate the reliability of information to discard anything that is irrelevant.</td>
</tr>
</tbody>
</table>