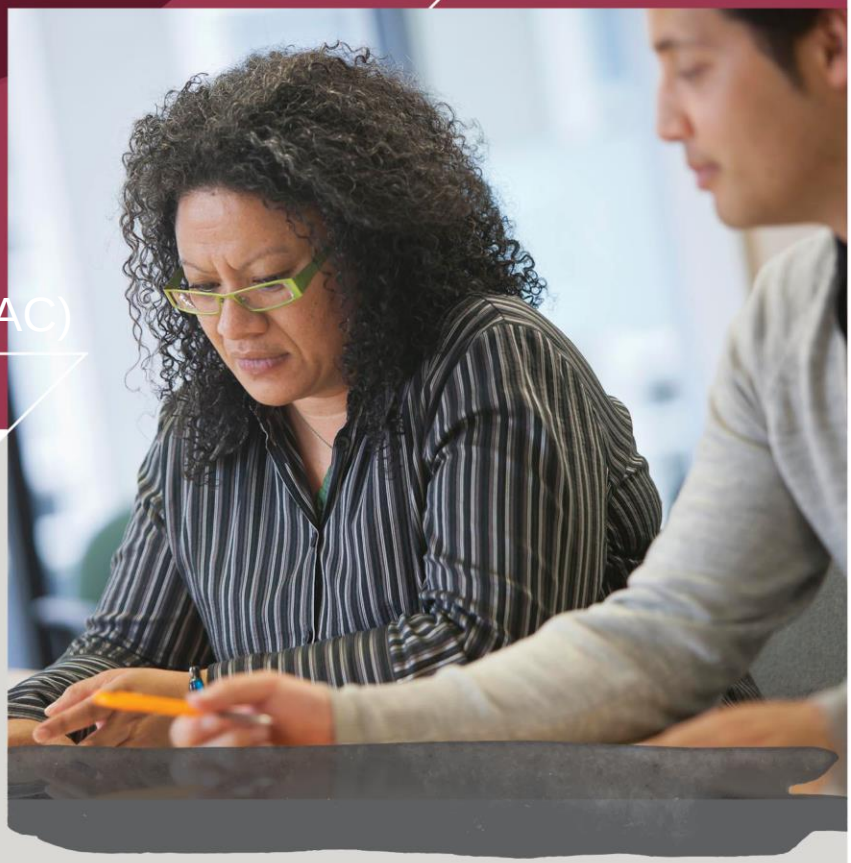
Māori adults' literacy, numeracy and problem solving skills

Survey of Adult Skills (PIAAC)



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TE TĀHUHU O TE MĀTAURANGA

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Executive summary

This is part of a series of in-depth reports from the 2014 Survey of Adult Skills. This report covers how the literacy, numeracy and problem solving skills (measured in English) of Māori adults relate to their education, work and speaking te reo Māori. It also looks at how these skills compare to those of non-Māori and how they have changed over time since previous surveys in 1996 and 2006.

Key findings

- The proportions of Māori with high literacy and with high numeracy skills have increased
- Increasing proportions of Māori gained school qualifications, but the proportion going on to bachelor-level study did not increase
- Māori and non-Māori at the same qualification levels had similar literacy and problem solving skills, but Māori had lower numeracy skills
- Māori were less likely than non-Māori to attain the same or higher qualification level as their parents
- Māori increased their skills faster than non-Māori as they got older

About the Survey of Adult Skills

The Survey of Adult Skills measures the skills of New Zealand adults aged 16 to 65 in literacy, numeracy and problem solving in technology-rich environments. In New Zealand, the survey is undertaken in English. Detailed information is 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 has been undertaken in 32 countries, so we can compare the skills of New Zealanders internationally. Previous surveys make it possible to compare literacy skills in 2014 to 1996 and 2006 and numeracy scores to 2006.

The findings in this report relate to Māori aged 16 to 65 in 2014. The older members of this population group participated in education in the 1950s and 1960s while the some of the younger members were still at school at the time of their interview. Differences in overall education, work and life experiences over many decades for Māori and non-Māori are important factors to consider when looking at findings that cover this wide age group. This point applies even more strongly where analysis involves characteristics of the respondents' parents.

Key findings

The proportions of Māori with high literacy and with high numeracy skills have increased

The proportion of Māori with high literacy skills increased at a faster rate than for non-Māori from 1996 to 2014. Also, the proportion of Māori with low literacy skills decreased. This has narrowed the gap between Māori and non-Māori. The proportion of Māori with high numeracy skills increased from 2006 to 2014. However, over a third of Māori still had low numeracy skills.

A smaller proportion of Māori than non-Māori had moderate or high problem solving skills

A smaller proportion of Māori than non-Māori had moderate or high problem solving skills. However, a similar proportion of Māori and non-Māori were able to complete the survey on a computer.

Increasing proportions of Māori gained school qualifications, but the proportion going on to bachelor-level study did not increase

Māori aged 20 to 30 were more likely to have gained NCEA Level 2 or equivalent when at school than Māori aged 31 to 50. However, Māori aged 20 to 30 were no more likely than Māori aged 31 to 50 to have obtained or be studying towards a bachelors or higher qualification.

Young Māori increased their skills faster than non-Māori as they got older …

Māori aged 24 to 32 and 33 to 44 in 2014 had higher skills than the same cohorts of Māori (aged 16 to 24 and 25 to 34) in 2006. The increase in skills between 2006 and 2014 for these cohorts was greater for Māori than non-Māori. Māori appear to gain fewer skills as children and youth in the education system compared to non-Māori.

… although Māori youth were less likely to be in formal education than non-Māori youth, while Māori in all other age groups were more likely than non-Māori to be in formal education

Māori aged 16 to 24 were less likely than non-Māori to be in formal education, while Māori aged 25 to 65 were more likely to be in formal education than non-Māori. This may be part of the reason Māori increased their skills faster compared to non-Māori as they got older, and is evidence that young Māori are gaining less from schooling than non-Māori.

Māori and non-Māori at the same qualification levels had similar literacy and problem solving skills, but Māori had lower numeracy skills

Māori and non-Māori at the same qualification levels had similar literacy and problem solving skills to non-Māori. However, at all qualification levels, Māori had lower numeracy skills than non-Māori. Māori with higher qualifications and a parent with a Level 5 or higher qualification also had lower numeracy skills than non-Māori with the same qualifications and parental background. But the gap was narrower for those who had studied science, technology, engineering or mathematics.

Māori were more likely than non-Māori to gain lower qualifications than their parents

Māori who had at least one parent with a qualification at Certificate Level 5 or above were less likely to achieve this qualification level than non-Māori with similarly qualified parents. Māori with a parent who had a Level 5 qualification were much more likely to have no qualification than non-Māori of this group.

Māori with highly qualified parents and Māori whose parents had high-skilled occupations had similar literacy and problem solving skills but lower numeracy skills compared to their non-Māori peers

Māori who were highly qualified and who had at least one parent with a Level 5 or higher qualification had similar literacy and problem solving skills compared to their non-Māori peers. Also, Māori whose occupation was professional or manager and had at least one parent who was a professional or manager had similar literacy and problem solving skills to their non-Māori peers. But a gap remained in numeracy skills.

Employed Māori with moderate skills had lower earnings than their non-Māori peers

The earnings of Māori with high literacy and numeracy skills were not significantly different from the earnings of non-Māori with high skills. However, Māori with moderate literacy and numeracy skills had lower earnings than non-Māori with similar skills.

Māori who spoke te reo Māori most often at home or who learned te reo Māori as a first language had lower English-based skills than other Māori

Māori whose language spoken most often at home was te reo Māori or who learned te reo Māori as a first language when they were a child had lower literacy and numeracy skills, when measured in English, than other Māori. However, this indicator of a background in te reo Māori does not include either proficiency in te reo Māori or having been a kōhanga reo or kura student.

Introduction

What is the Survey of Adult Skills?

The Survey of Adult Skills measures 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 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 was undertaken in New Zealand in 2014 with a representative sample of 16 to 65 year olds living in New Zealand households. In total, 6,177 people were surveyed, of which 1,146 were Māori. This was an 'oversample' of Māori within the total sample, so that more in-depth analysis would be possible. Each record of the total sample was statistically weighted to represent the 2014 16 to 65 year old population, 2,750,000, of which 373,000 were Māori.

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 assessed on their literacy, numeracy and problem solving skills, also in English. Most respondents were able and willing to undertake the assessment on a laptop while the interviewers provided a small proportion with paper booklets.

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?

This report, which focuses on the Māori population, analyses skills by a range of characteristics including: age, qualification level, parental qualifications, whether currently studying, how often people read books, occupation, earnings, and whether people have a background in te reo Māori.

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. Some skills required are:

- understanding of written words and sentences
- comprehension of text in charts and diagrams
- comprehension, interpretation and evaluation of complex texts.

The respondent does the literacy assessment on a laptop unless they are unable or unwilling to do so, in which case the interviewer provides a paper-and-pen alternative.

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. Some aspects that people are required to understand are:

- quantity
- dimension and shapes
- patterns
- data and chance
- visual displays.

As for literacy, the respondent does the numeracy assessment on a laptop, or on paper if they are unable or unwilling to use the laptop.

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. Some skills required are:

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

Because assessing this problem solving skill requires the respondent to use a laptop, those who are unable or unwilling to are not assessed in this skill.

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 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). The ALL and IALS surveys previously reported literacy as two separate measures: 'document literacy' and 'prose literacy'. These two separate scales have been remodelled into a single scale 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.

An important dimension of measuring skills over time using a 2014 snapshot of 16 to 65 year olds is that the older members of this population group participated in education in the 1950s and 1960s while some of the younger members were still at school at the time of their interview. Differences in overall education, work and life experiences over many decades are important factors to consider when looking at findings that cover this wide age group. This point applies even more strongly where analysis involves characteristics of the respondents' parents. The education and work experiences, the policies, practices, and the social environments 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 Appendix.

How Māori are counted in the Survey of Adult Skills

In New Zealand, the Survey of Adult Skills asked an ethnic affiliation question that allowed for multiple responses. [1] In this report, Māori are those who reported being Māori, whether or not they reported any other ethnic affiliations. Non-Māori are those who did not report being Māori as an ethnic affiliation.

Age and other distributions

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

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

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.

[1] 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 Maori, Tongan, Niuean, Chinese, Indian, Other. Interviewers asked respondents who selected Other to specify their other ethnic group or groups. The question text and the response options were the same as for the 2013 Census ethnic question.

Skill levels

The meaning of 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 or 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.

A full list of skill levels and what they mean is in the Appendix.

Literacy was measured comparably in 1996, 2006 and 2014.

Average literacy scores

The Survey of Adult Skills provides average literacy scores for population groups, as well as proportions at different levels. Since 1996, the average literacy score for Māori increased from 244 to 264 scale score points (Table 1). The following analysis of proportions at different literacy levels show how changes in different parts of the spread of literacy skill contributed to this overall increase.

Table 1: Average literacy scores for Māori, 1996, 2006, 2014

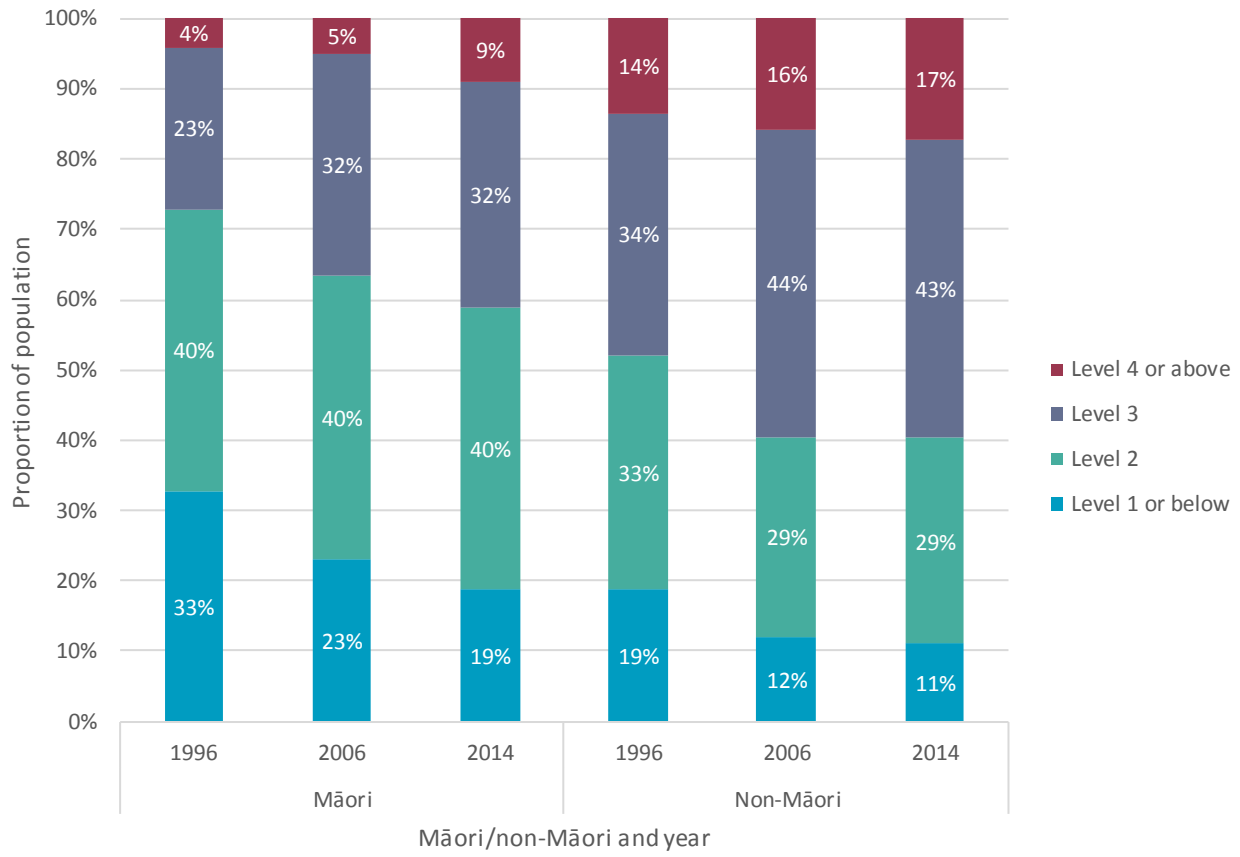
1996	2006	2014
244	257	264

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

For Māori, most change in the spread of literacy skills from 1996 to 2014 was at the highest and lowest ends of the distributions (Figure 1). The proportion of Māori with low literacy skills decreased significantly from 33% in 1996 to 19% in 2014. The proportion of Māori with level 2 literacy scores remained unchanged, and the proportion with high literacy skills increased by a statistically significant margin from 4% in 1996 to 9% in 2014. Since 1996, the increase in the proportion of Māori with level 3 or above literacy skills, and the decrease in the proportion with level 1 or below skills has been greater than for non-Māori. This has narrowed the gap between Māori and non-Māori literacy skills.

However, in 2014, a larger proportion of the Māori population still had low skills compared to non-Māori and a smaller proportion of Māori had high skills. Māori average skill scores were accordingly also lower compared to non-Māori.

Figure 1: Distribution of literacy skills over time for Māori and non-Māori aged 16 to 65



The meaning of 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
- understand situations where mathematical content is explicit with minimal text
- understand simple percentages such as 50%.

A full list of skill levels and what they mean is in the Appendix.

Numeracy was measured comparably in 2006 and 2014.

Average numeracy scores

The Survey of Adult Skills provides average numeracy scores for population groups, as well as proportions at different levels. Since 2006, the average numeracy score for Māori has increased from 242 to 247 scale score points (Table 2). 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 this overall increase.

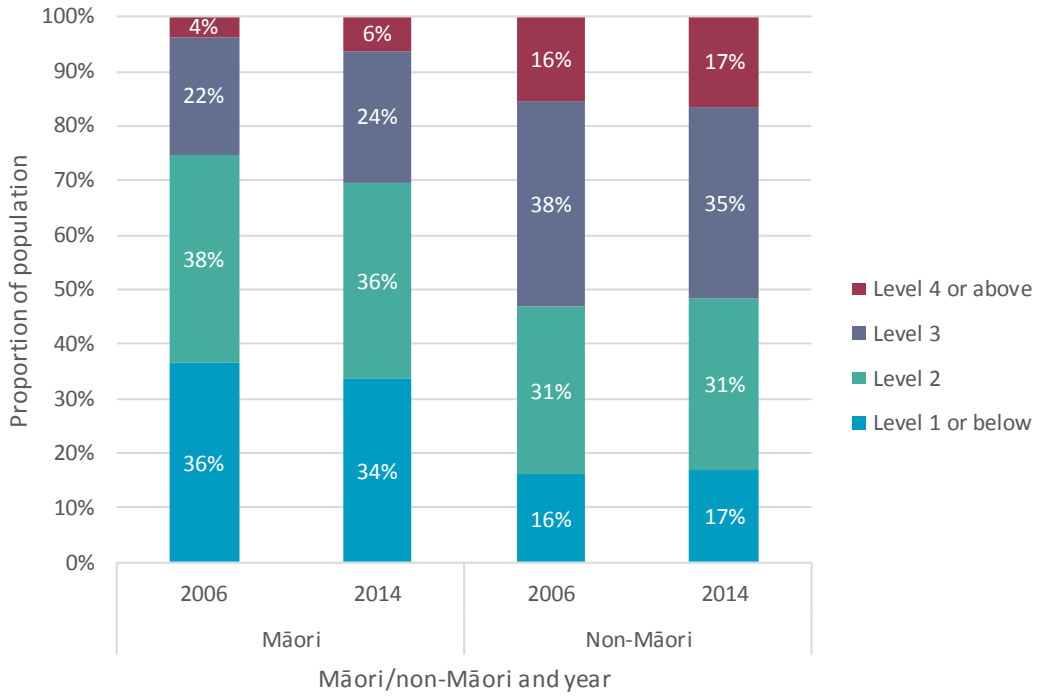
Table 2: Average numeracy scores for Māori, 2006 and 2014

2006	2014
242	247

The proportion of Māori with high numeracy skills increased

Less change in the spread of numeracy skills for Māori has occurred compared to literacy (Figure 2). Between 2006 and 2014, the proportion of Māori with high numeracy skills increased from 4% to 6%, though this was not statistically significant (Figure 2). The average Māori numeracy score also increased slightly, while non-Māori showed no measurable change. However, Māori numeracy scores on average continued much lower than those of non-Māori. Among Māori, 34% had low numeracy skills compared to 17% of non-Māori.

Figure 2: Distribution of numeracy skills over time for Māori and non-Māori aged 16 to 65



The meaning of 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. An additional category is 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.

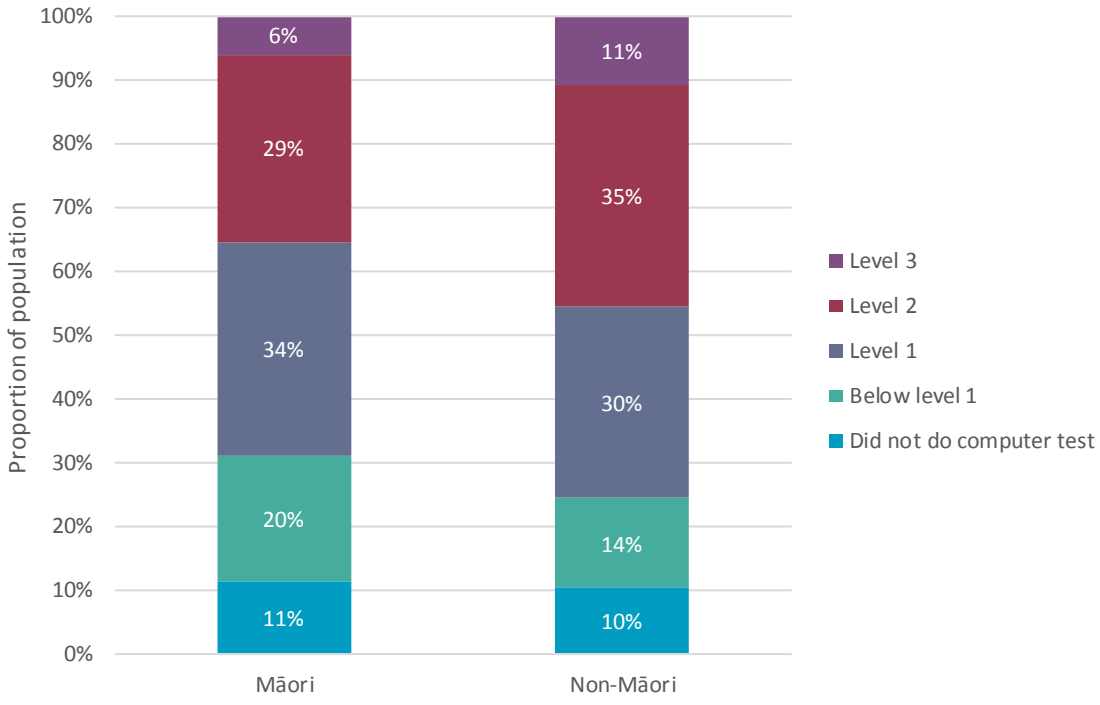
A full list of skill levels and what they mean in the Appendix.

Problem solving was measured only in 2014.

Fewer Māori than non-Māori had moderate to high problem solving skills

Thirty-five percent of Māori and 46% of non-Māori had at least moderate or level 2 problem solving skills. Māori were as likely as non-Māori to be able and willing to do the assessment on a computer (Figure 3). The proportion of Māori with level 2 or higher problem solving skills was higher than the OECD average of 31%. New Zealand as a whole ranked at the top of the OECD in the proportion with level 2 or higher problem solving skills.

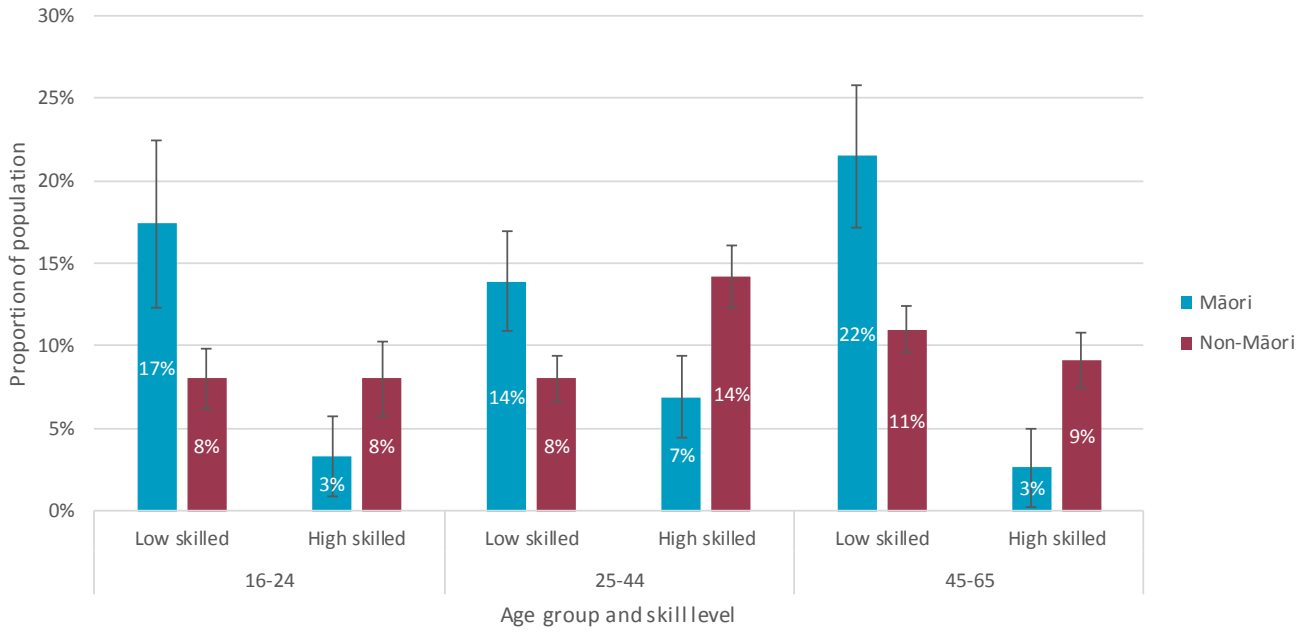
Figure 3: Distribution of problem solving skills for Māori and non-Māori, 2014



More Māori were low skilled in both literacy and numeracy than high skilled in all age groups

Across all age groups, a greater proportion of Māori than non-Māori were low skilled (ie Level 1 or below) in both literacy and numeracy than were high skilled (ie Level 4 or above) in both literacy and numeracy (Figure 4). The differences were greatest for those aged 16 to 24 and those aged 45 to 65. In addition, for all age groups, a greater proportion of Māori were low skilled in both literacy and numeracy, and a smaller proportion were high skilled, compared to non-Māori.

Figure 4: Low and high skills in both literacy and numeracy for Māori and non-Māori by age group



Qualifications

Younger Māori in 2014 were more likely to have gained NCEA Level 2 than older Māori, but were not more likely to be studying for a bachelor or higher qualification

Māori achievement at secondary school has increased over time. Figure 5 shows the proportions of Māori who have taken different pathways from school to post-school education and training. It compares younger Māori (aged 20 to 30 in 2014) with older Māori (aged 31 to 50 in 2014).

The proportion of Māori who had gained NCEA Level 2 or equivalent[2] at school was:

- 38% for Māori aged 31 to 50
- 52% for Māori aged 20 to 30.

In 2014, 20% of Māori aged 31 to 50 had or were studying towards a bachelors or higher qualification. Statistically the same proportion (18%) of Māori aged 20 to 30 had attained this qualification level or were studying towards it. For non-Māori, a greater proportion (37% compared to 33%) of those aged 20 to 30 had either a bachelors or higher qualification or were studying for one, compared to those aged 31 to 50 (Figure 6). Māori achievement at secondary school has increased over time, but this has not translated to participation and achievement at higher education levels.

[2] The mapping from New Zealand's previous qualification system to NCEA is:

School Certificate	NCEA Level 1
Sixth Form Certificate, University Entrance before 1986	NCEA Level 2
University Bursary, Scholarship	NCEA Level 3

Figure 5: Qualifications gained at school and post-school for Māori by age group

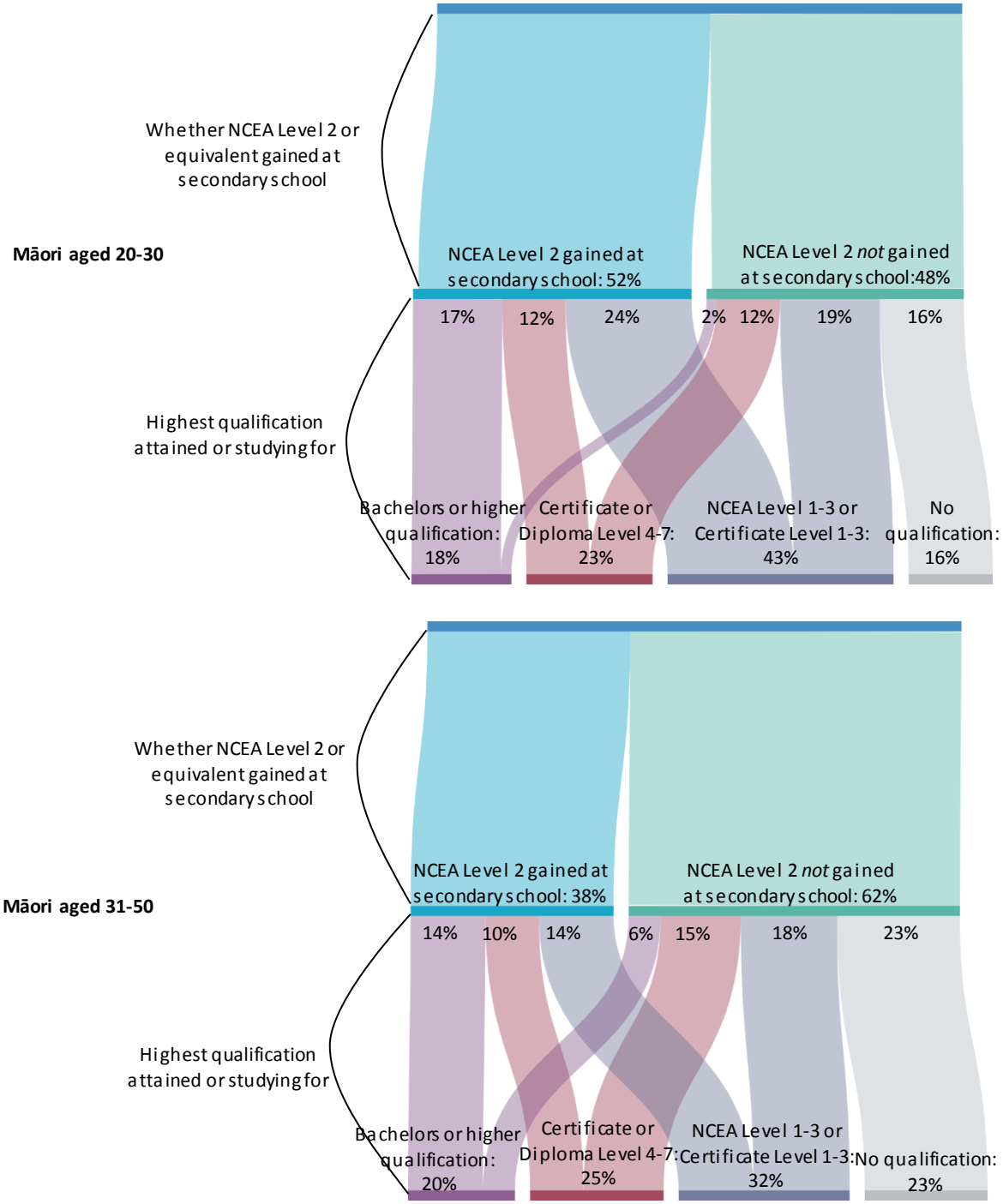
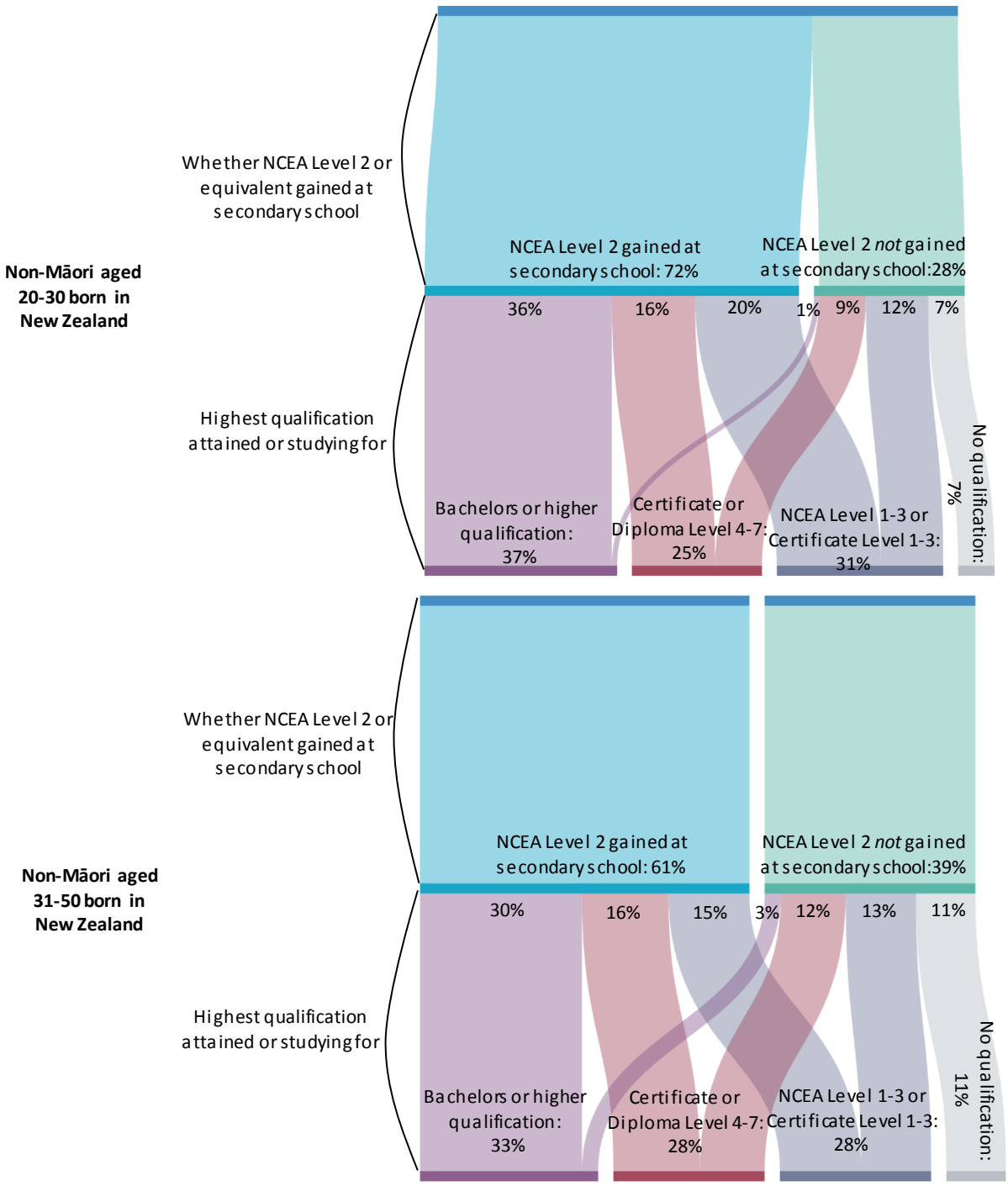


Figure 6: Qualifications gained at school and post-school for non-Māori by age group

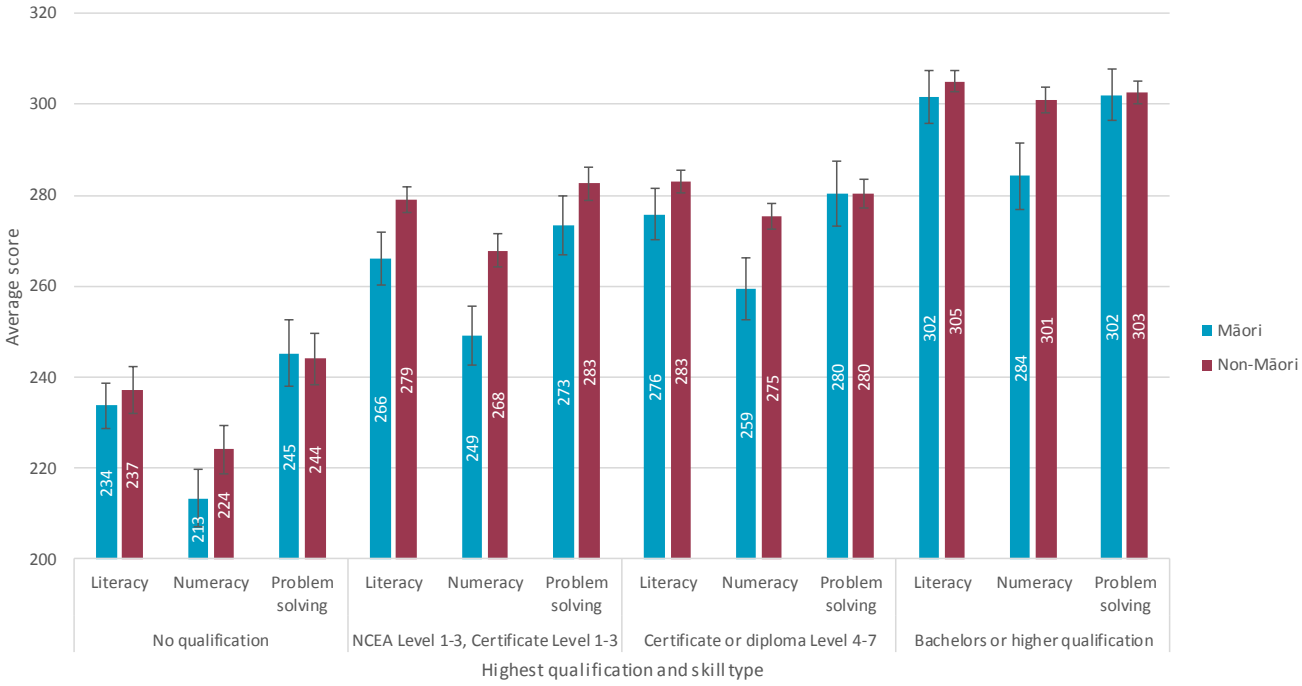


Māori with bachelors or higher qualifications had similar literacy and problem solving skills to non-Māori, but lower numeracy skills

At all qualification levels, Māori had similar problem solving skills on average to non-Māori. Māori with Level 4 or above qualifications have similar literacy skills to non-Māori. But at all qualification levels, Māori had lower numeracy skills than non-Māori (Figure 7).

Figures 8 and 9 show that Māori were less likely to have studied numeracy-rich subjects[3] for post-school qualifications but those who did had a narrower numeracy gap (and almost not statistically significant) with non-Māori.

Figure 7: Average scores and highest qualification for Māori and non-Māori



[3] Mathematics, technology, science or engineering.

Figure 8: Main field of study for highest qualification for Māori and non-Māori

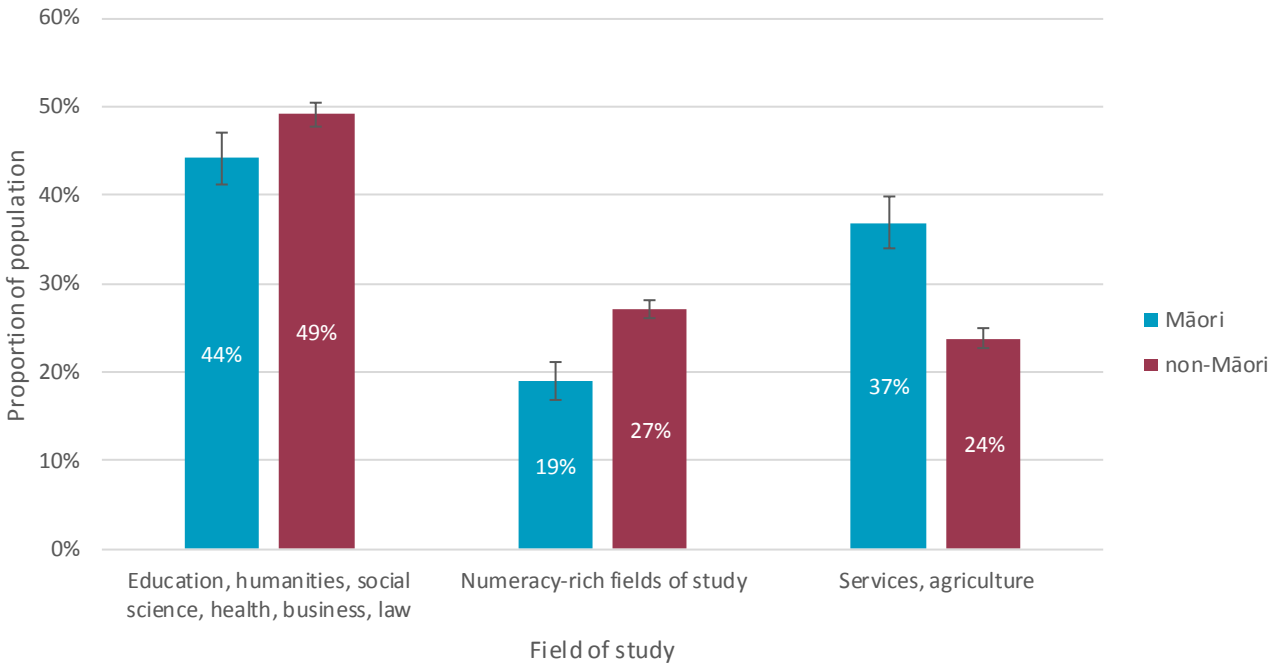
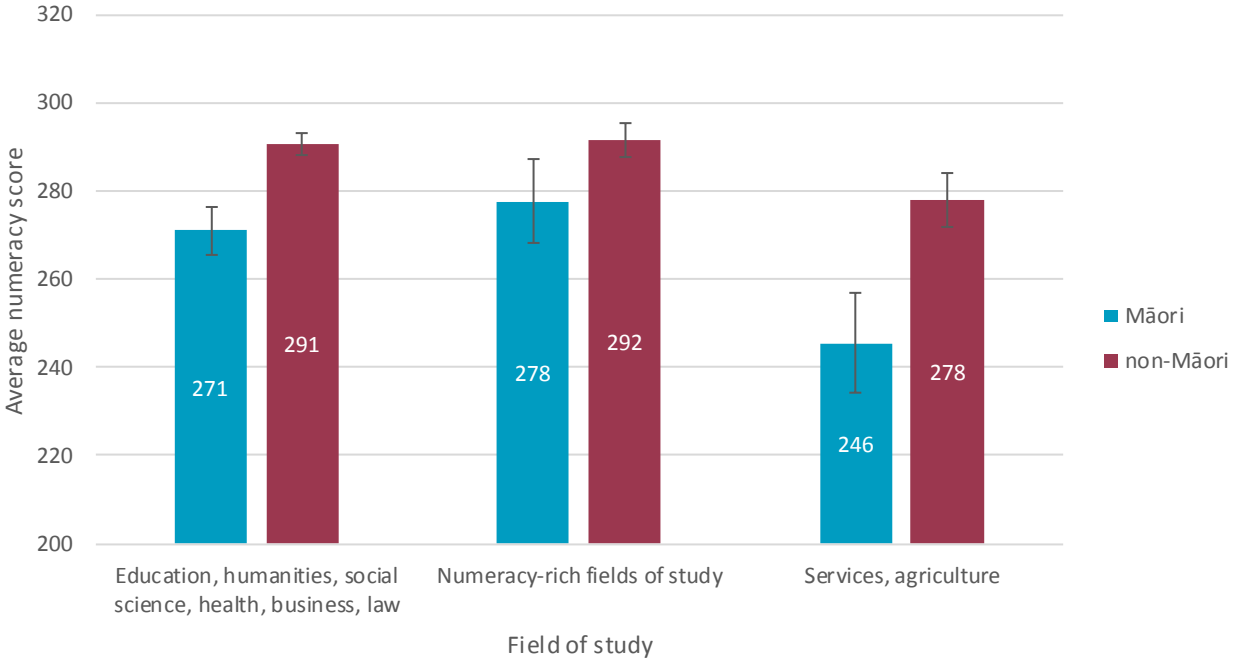


Figure 9: Numeracy skill by main field of study for highest qualification for Māori and non-Māori with post-school qualifications

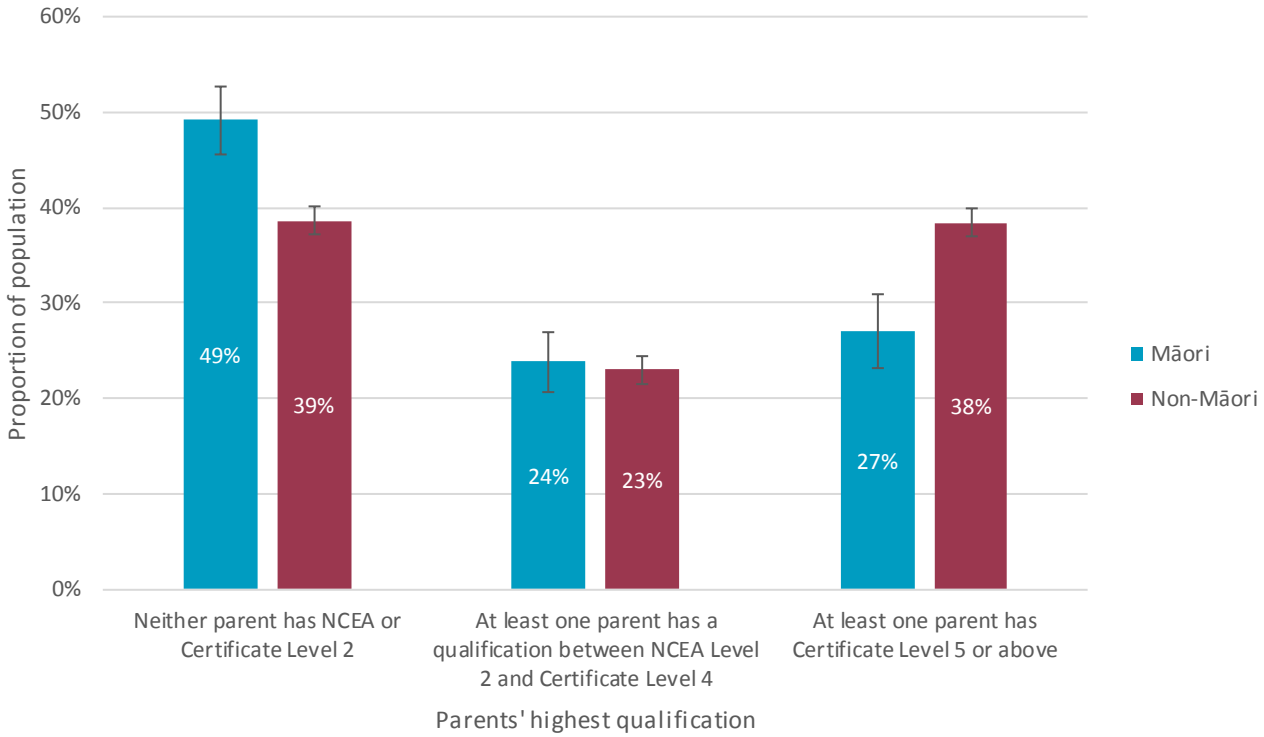


Māori were less likely to have parents with higher qualifications

The next sections look at the relationships between people's own qualifications and those of their parents. An important factor to keep in mind for this analysis is that the parents of the younger members of the survey population will have been at school in the 1960s and 1970s, and the older members' parents in approximately the 1920s or even earlier. The findings point to past education, work and social environments continuing to affect people's lives.

Among Māori aged 25 to 65, 49% did not have a parent with a qualification at NCEA Level 2 or equivalent (Figure 10). Among non-Māori, 39% did not have a parent with NCEA Level 2 or equivalent. Also, Māori were less likely to have parents with a Level 5 or higher qualification. However, Māori were more likely to have a mother as the more highly qualified parent than non-Māori.

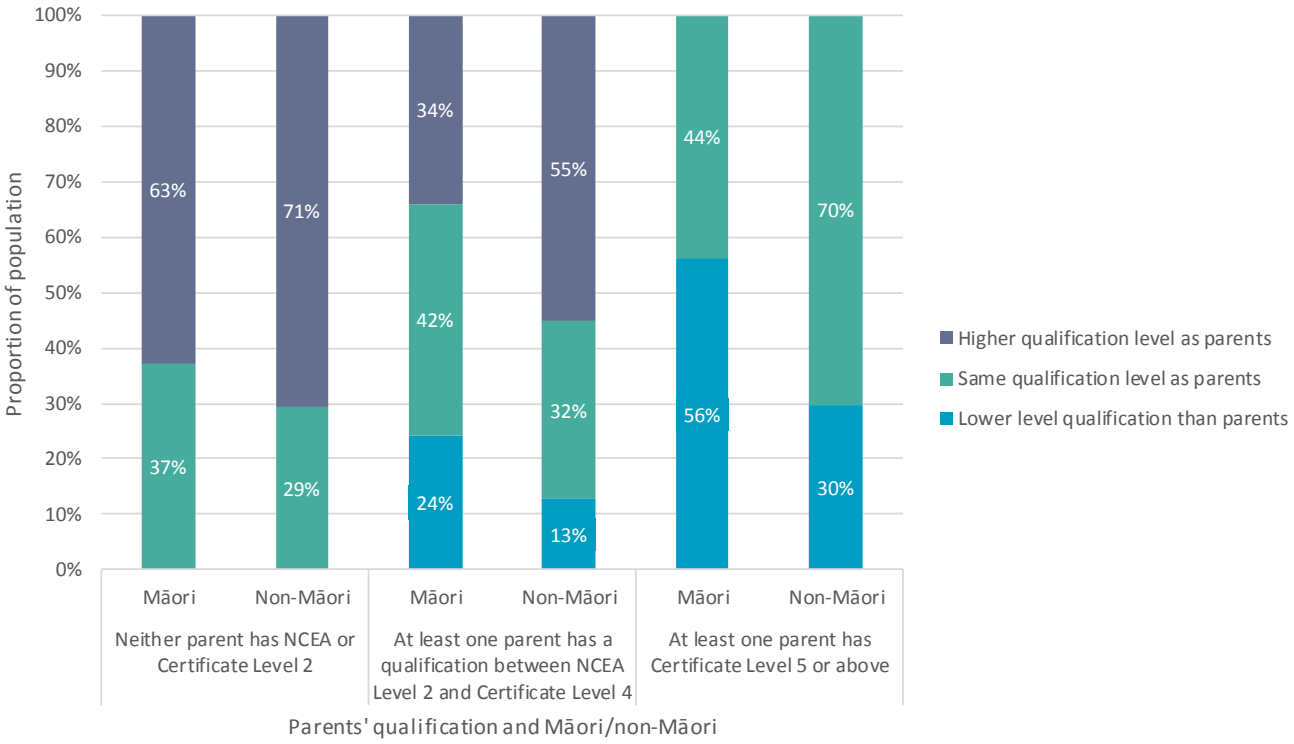
Figure 10: Parents' highest qualification for Māori and non-Māori aged 25 to 65



Māori were less likely than non-Māori to attain the same or higher qualifications than their parents

Of Māori aged 25 to 65 with at least one parent with a Level 5 or higher qualification[4], 56% had attained a lower qualification level than their parents (Figure 11). This compares with 30% of non-Māori with similarly qualified parents who had not attained this level. At all parental qualification levels, Māori were less likely to attain the same or a higher qualification level than their parents.

Figure 11: Whether Māori and non-Māori aged 25 to 65 have higher qualifications than their parents

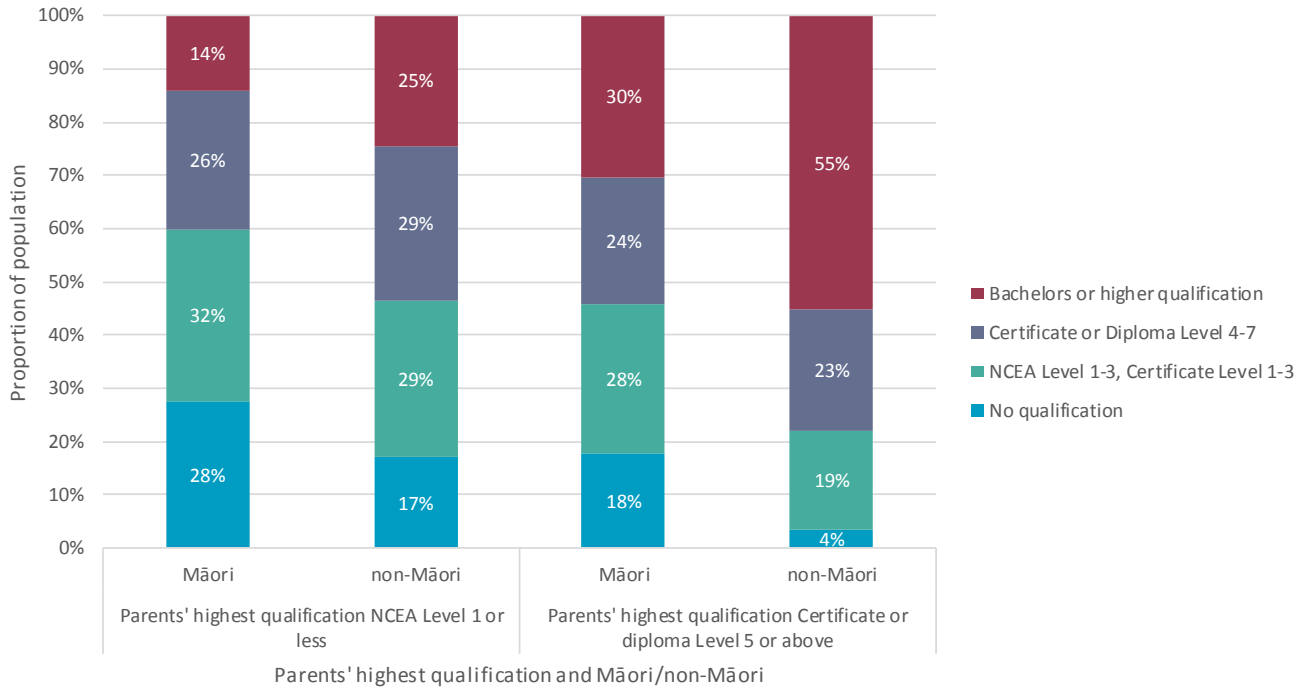


[4] The analysis is only to Level 5 or higher because relatively small proportions of respondents' parents had degree level qualifications.

Of Māori with at least one parent with a Level 5 or higher qualification, 18% have no qualification themselves (Figure 12). The equivalent figure for non-Māori was 4%. Of non-Māori in this group, 55% had bachelors or higher qualifications, while 30% of Māori had this level of qualification.

Māori whose parents had at least a Level 5 qualification were much more likely to have high qualifications themselves than Māori whose parents has NCEA level 1 qualification or less.

Figure 12: Highest qualification and parents' highest qualification for Māori and non-Māori aged 25 to 65



Māori with highly qualified parents and Māori whose parents had high-skilled occupations had similar literacy and problem solving skills but lower numeracy skills, compared to their non-Māori peers

This section takes a first step in looking at the extent to which lower average Māori skills compared to non-Māori are associated with lower proportions of Māori:

- being highly qualified or having highly qualified parents
- having high skill occupations or having parents with high skilled occupations.

Māori with a bachelors or higher qualification who also had at least one parent with a Level 5 or higher qualification on average have similar literacy and problem solving skills compared to their non-Māori peers (Figure 13). However, on average, Māori in this group had significantly lower numeracy skills compared to non-Māori.

Māori who had at least one parent who was a professional or manager, and who are also a professional or manager themselves, also had similar literacy and problem solving skills, but lower numeracy skills, than the equivalent non-Māori group (Figure 14).

When comparing Māori with non-Māori who have the similar qualifications or occupations as their parents, literacy and problem solving skills are the same, on average. However, a gap remains in numeracy skills. This shows that education, occupation and intergenerational factors are sufficient to explain the gap between Māori and non-Māori literacy and problem solving skills. However, these factors explain only part of the difference in numeracy skill.

Figure 13: Skills for Māori and non-Māori with bachelor or higher qualifications who also have parents with a Level 5 or higher qualification

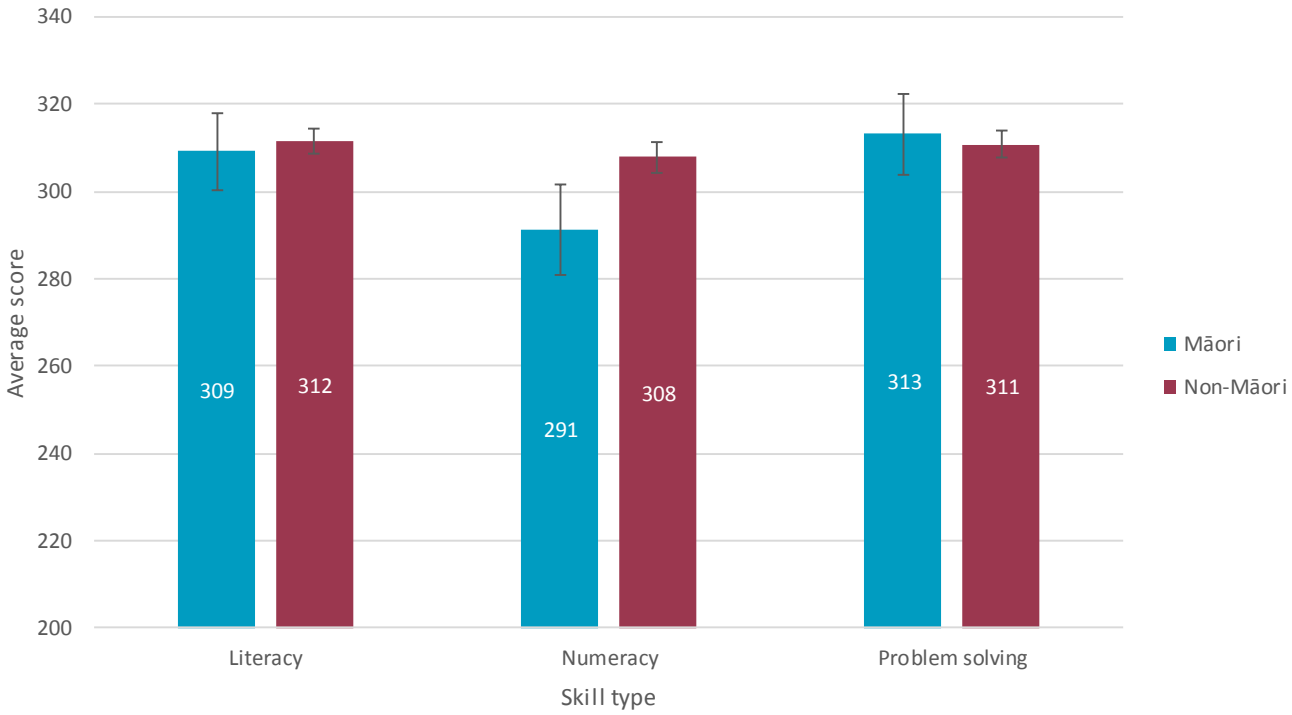
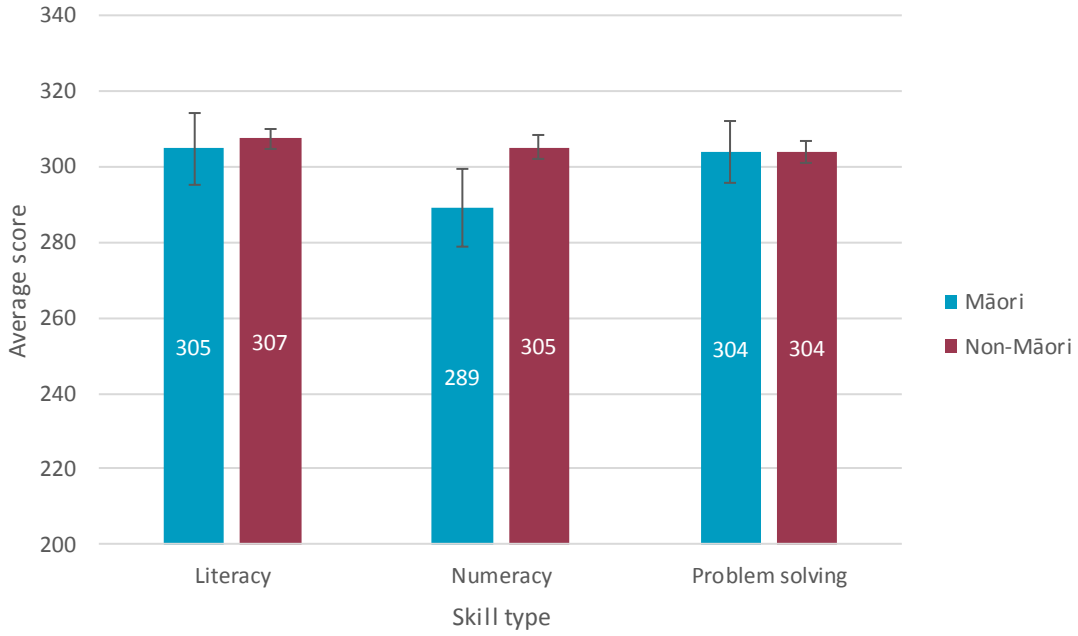


Figure 14: Skills for Māori and non-Māori who are managers or professionals and have at least one parent who was a manager or professional

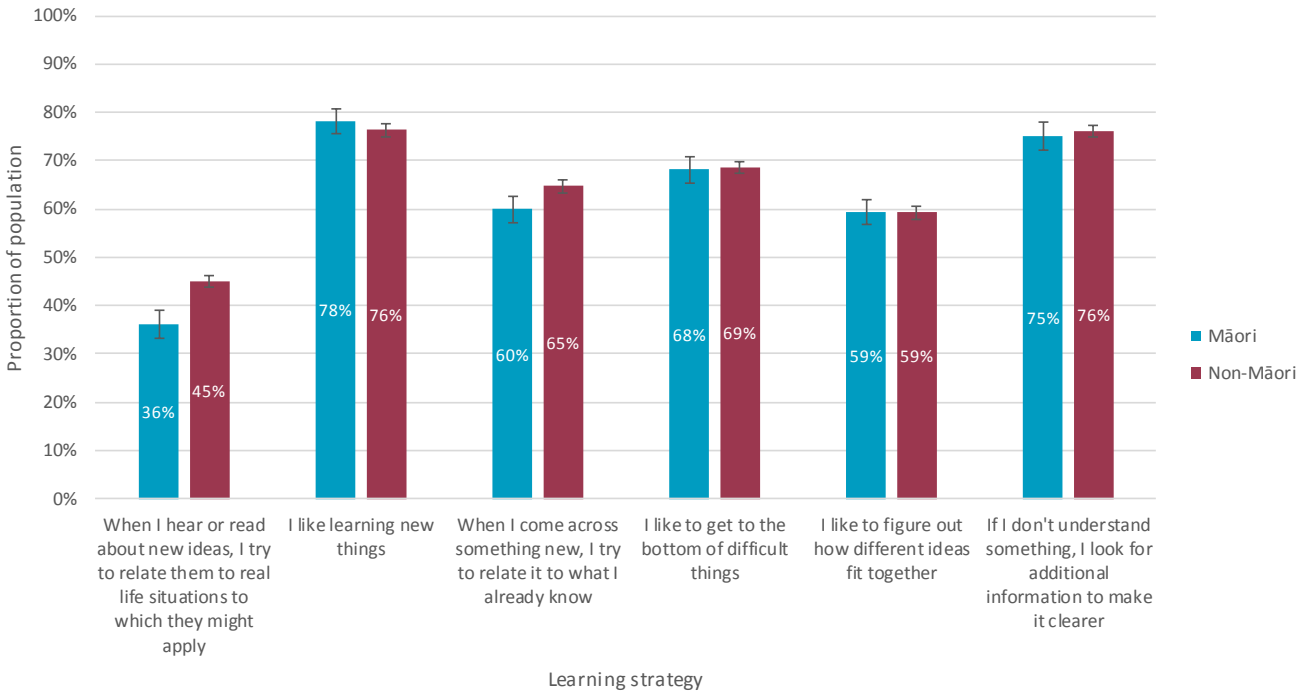


Learning and skills

Māori learning strategies were similar to non-Māori

When asked about using different learning strategies, Māori had very similar answers to non-Māori (Figure 15). Māori are slightly less likely to say they related new ideas to real life situations and related new things to what they already know. For other questions about dealing with problems and tasks, no statistically significant difference shows in how Māori and non-Māori answer.

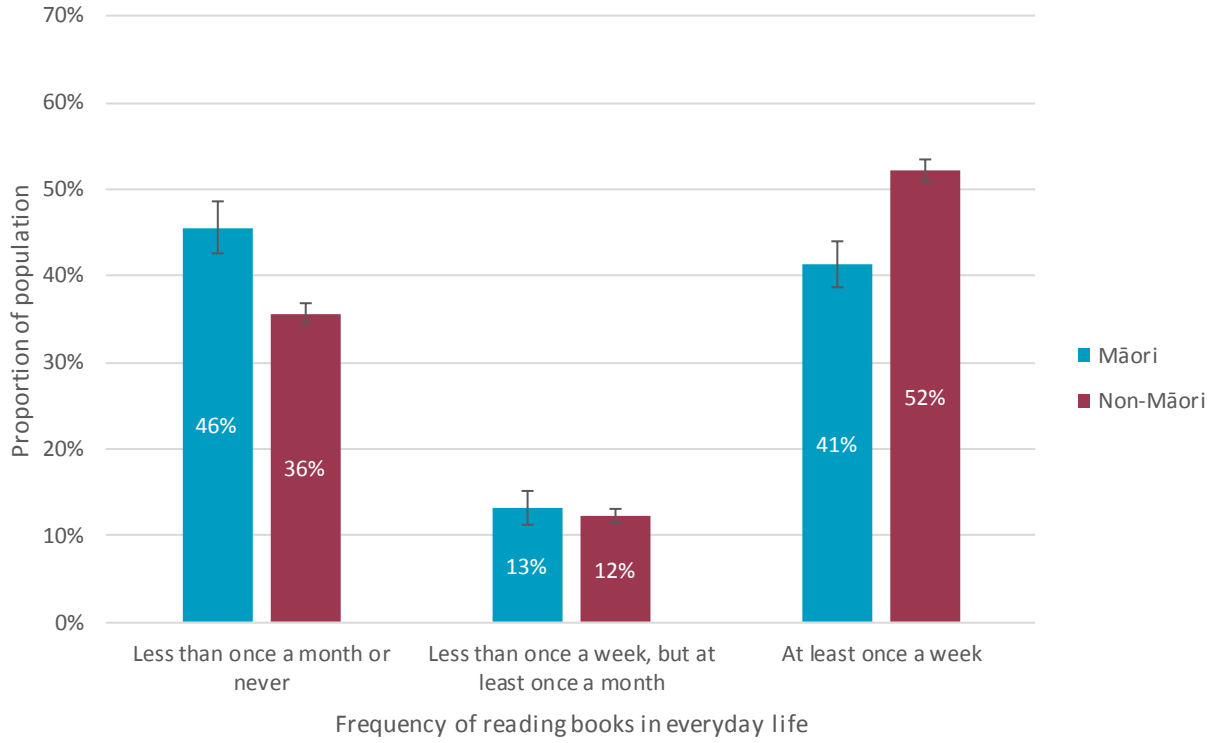
Figure 15: Proportions of Māori and non-Māori who report using learning strategies to a high or very high extent



Māori read books less frequently than non-Māori

While Māori and non-Māori were similar in how they report different learning strategies, they differed a little in how often they read books[5]. Of Māori, 41% read books in everyday life at least once a week, compared to 52% of non-Māori (Figure 16). For both Māori and non-Māori, having a bachelors degree or higher was associated with reading books much more often, but the Māori/non-Māori gap of around 10 percentage points remains (Figure 17). Reading books more frequently was associated with higher literacy skills (Figure 18), although at each frequency category Māori skills are lower than those of non-Māori. We see very similar patterns to other reading activities in everyday life. Reading material in any medium frequently is likely to help improve literacy skills, which may in turn contribute to more frequent reading of more challenging texts[6].

Figure 16: Frequency of reading books in everyday life for Māori and non-Māori



[5] The Adult Skills Survey background questionnaire had a section on skill use in everyday life which included asking how often people did reading activities. It asked separately about eight different types of material: directions or instructions; letters, memos or emails; articles in newspapers, magazines or newsletters; articles in professional journals or scholarly publications; books; manuals or reference materials; bills, invoices, bank statements or other financial statements; diagrams, maps or schematics.

[6] See: Biddulph, Biddulph & Biddulph (2003). Pages 123-129 discuss research findings on the impact of literacy practices on reading achievement including the importance of selecting 'relevant and challenging material'.

Figure 17: Frequency of reading books in everyday life for those with a bachelors degree or higher for Māori and non-Māori

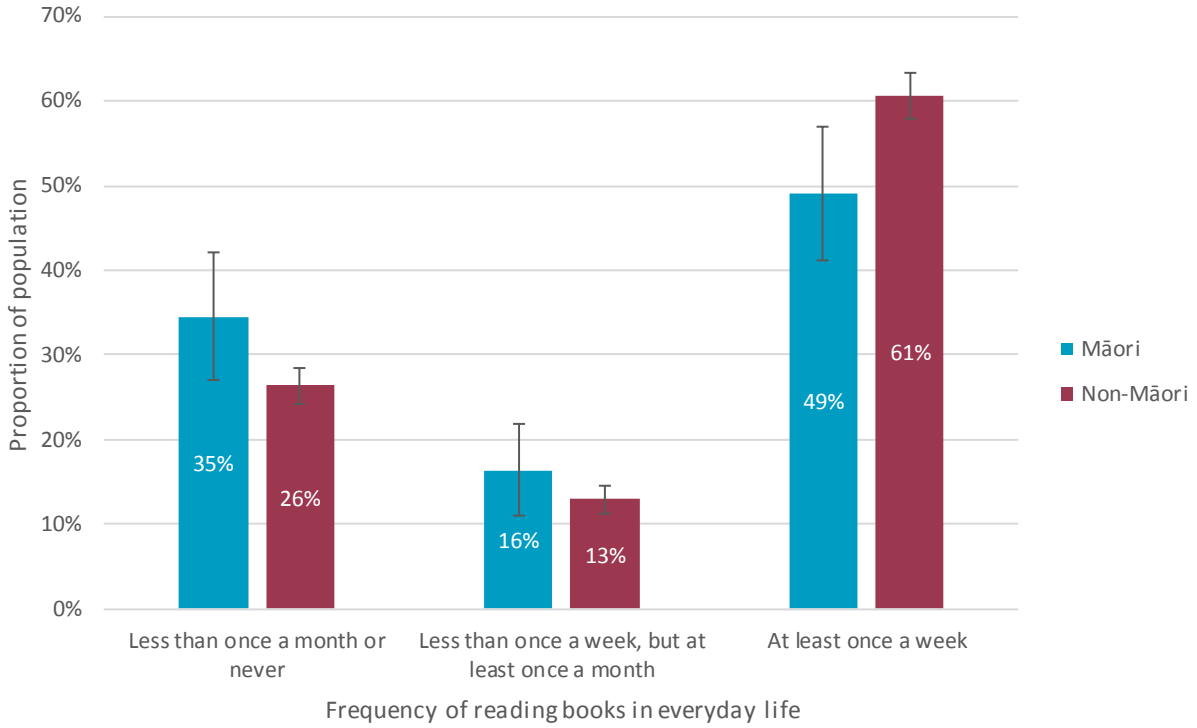
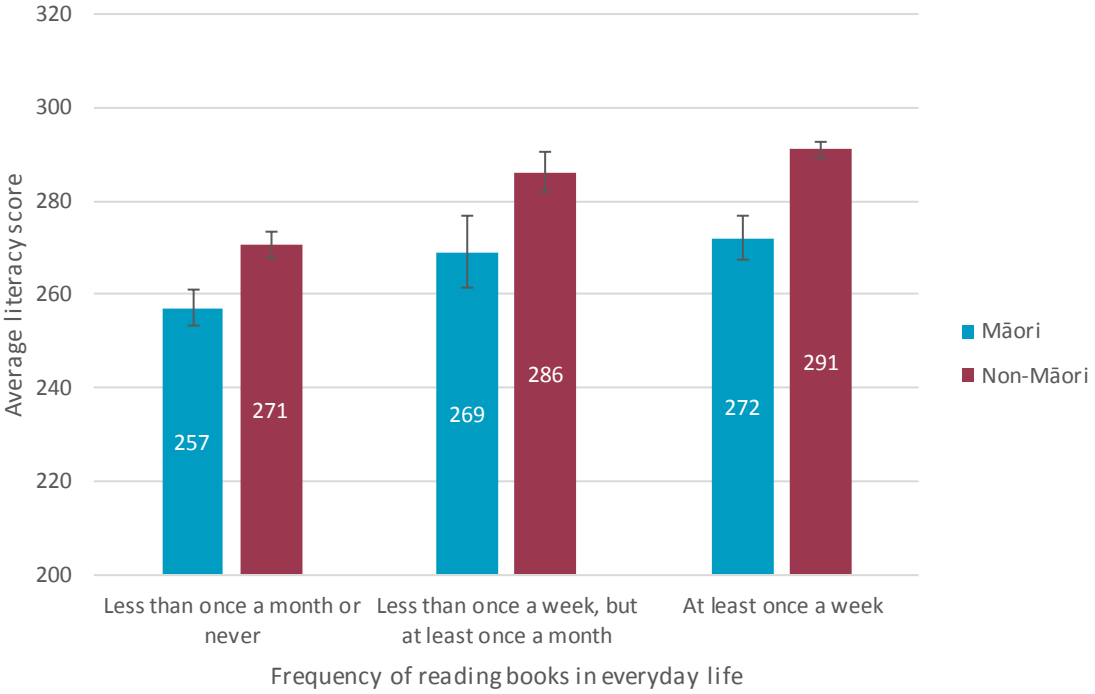


Figure 18: Literacy scores and frequency of reading books in everyday life for Māori and non-Māori



Skills and change over time

Measuring changes in literacy and numeracy skills as people get older

When looking at skills for different age groups at a single point in time, the reasons for differences may be difficult to assess. Skills may differ as a result of different experiences in education or gaining a broader range of experiences over time. For example, people aged 25 to 34 have higher average literacy and numeracy scores than those aged 16 to 24, but are their skills higher because people increase their skills as they get older or did the older age cohort have a better schooling experience?

One approach is to compare the average scores of youth aged 16 to 24 in 2006 with the average scores of the same cohort who were eight years older in 2014 and aged 24 to 32. The same people have not been surveyed twice, but the two surveys represent the same group of people. Those who were not born in New Zealand and arrived after 2006, and therefore could not be surveyed were excluded from this analysis so that a more similar group of people is compared.

Young Māori increased their skills faster than non-Māori

In 2006, Māori youth aged 16 to 24 had an average literacy score of 249 (Figure 19) and an average numeracy score of 233 (Figure 20). The same cohort of Māori aged 24 to 32 in 2014 had:

- an average literacy score that was 23 points higher, compared to 12 points higher for non-Māori
- an average numeracy score that was 25 points higher, compared to 10 points higher for non-Māori.

The literacy and numeracy scores for Māori aged 33 to 42 in 2014 were also higher (though not statistically significantly higher) than the same cohort aged 25 to 34 in 2006. This compares with similar average scores for non-Māori. Both Māori and non-Māori who were 35 or over in 2006 experienced decreases in average literacy and numeracy scores in the eight year period.

These patterns are consistent with (a) lower average Māori attainment at school compared to non-Māori with the gap narrowing steadily in recent years[7] and (b) the higher rates of Māori participation in tertiary education compared to non-Māori after age 25 (Figure 22).

[7] See: Ministry of Education (2016c).

Figure 19: Changes in average literacy score by Māori and non-Māori age groups, 2006 and 2014

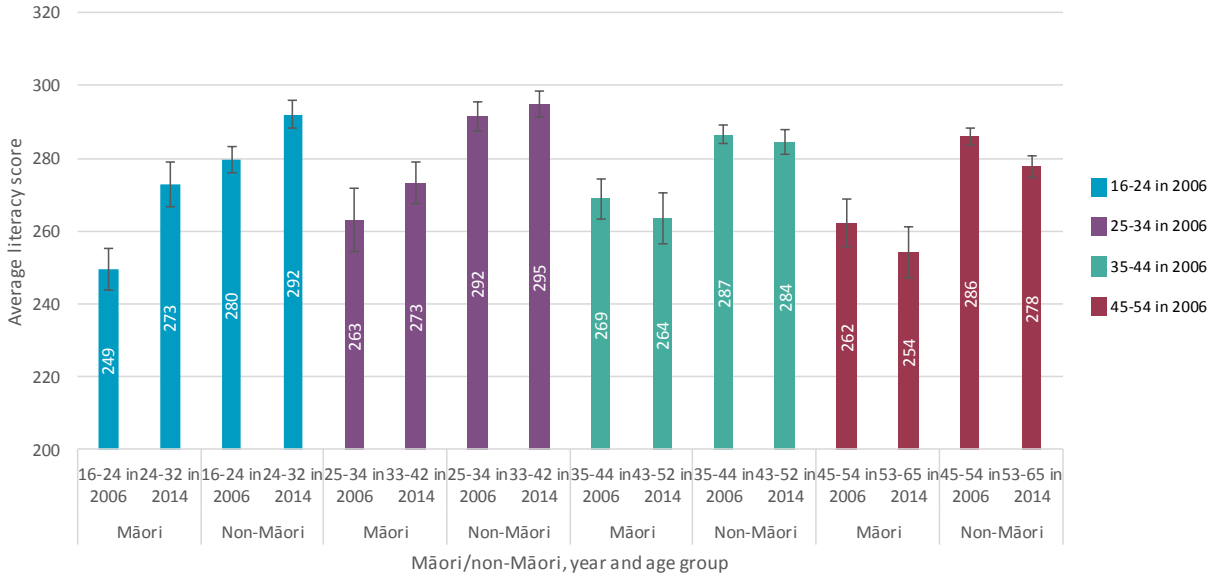
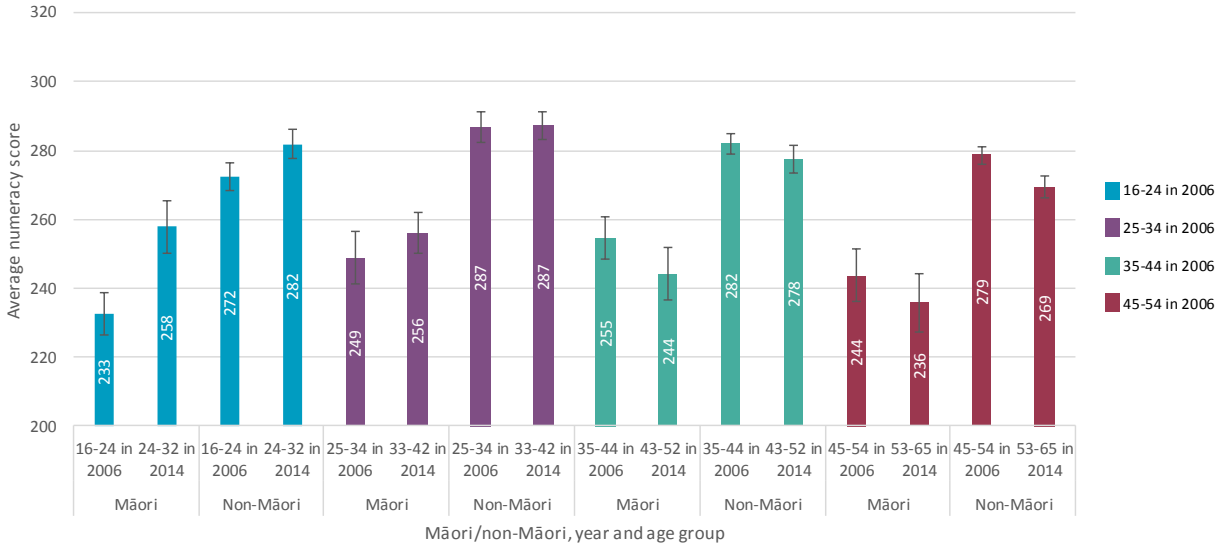


Figure 20: Changes in average numeracy score by Māori and non-Māori age groups, 2006 and 2014

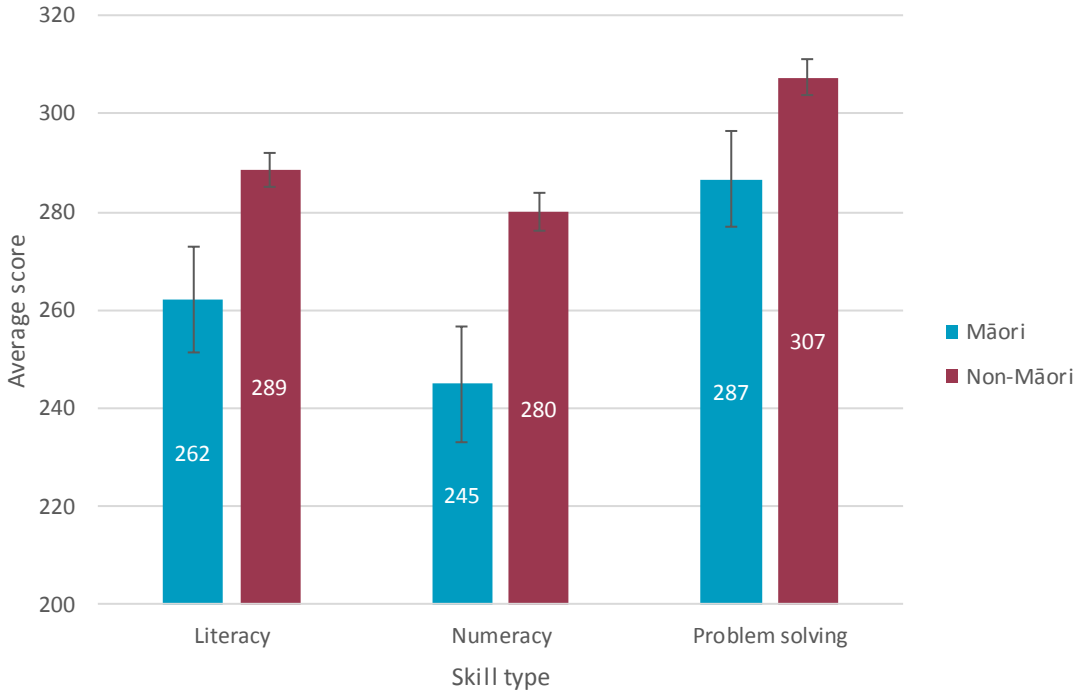


Māori youth who are studying have lower skills than non-Māori …

Māori youth who are currently studying towards a qualification have lower literacy, numeracy and problem solving skills than non-Māori (Figure 21). The sample in the Survey Adult Skills is not large enough to pinpoint the reasons for this. It is likely to be a combination of:

- more Māori studying at lower levels than non-Māori
- Māori having different fields of study from non-Māori
- Māori and non-Māori having different achievement levels and completion rates within the school and post-school qualifications they are studying.[8]

Figure 21: Skills for Māori and non-Māori aged 16 to 24 who were studying



[8] See Ministry of Education (2017) and Ministry of Education (2016b, p. 20) for figures on Māori completing school and post-school qualifications by level.

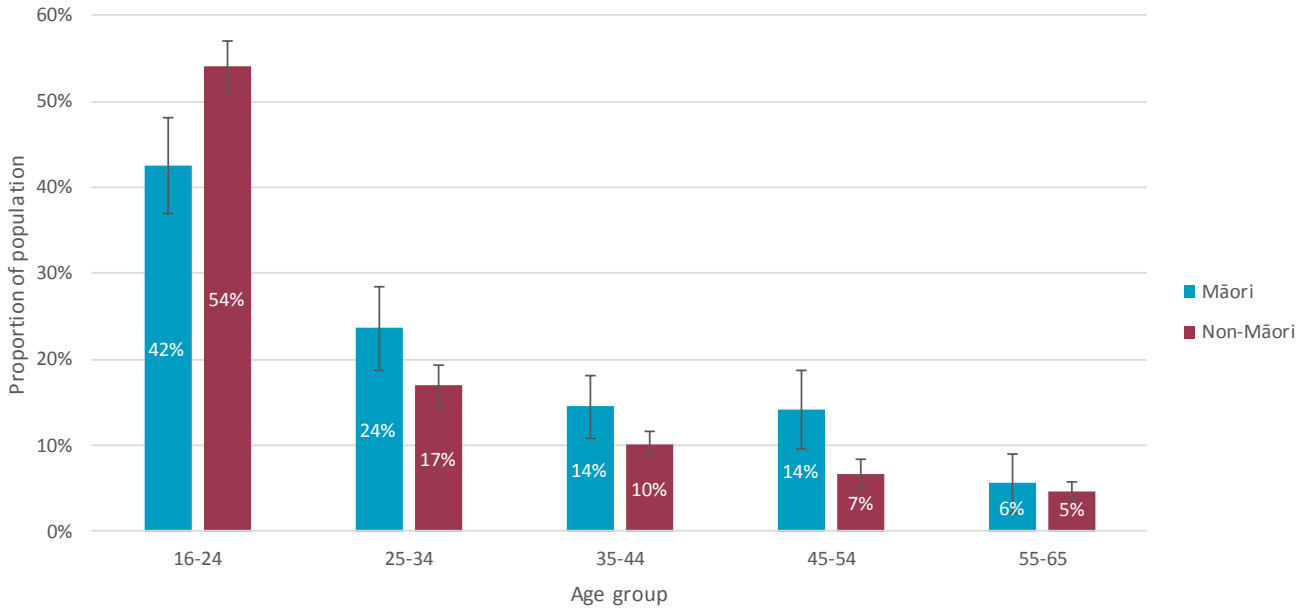
… but Māori youth are less likely to be currently studying than non-Māori, and a greater proportion of Māori are studying at all older age groups

Of Māori youth aged 16 to 24, 42% were currently studying compared to 54% of non-Māori (Figure 22)[9]. However, at all other age groups, Māori were more likely to be studying than non-Māori. For those aged 25 to 54, the differences are significant or close to significant, with the Māori and non-Māori proportions not equalising till 55 to 65. This may partially explain why Māori increased their skills more as they got older. Also, this is other evidence that young Māori are gaining less from schooling than non-Māori.

Māori being more likely than non-Māori to study at older ages is consistent with:

- high proportions of Māori are studying at non-degree level particularly at wānanga[10]
- Māori fertility rates are much greater than those of non-Māori from late teenage years to early twenties[11].

Figure 22: Proportion of Māori and non-Māori studying and age group



Māori did not report much more learning at work or having jobs mismatched to their qualification level

When asked about learning activities at work, younger Māori aged 16 to 44 reported similar activities to non-Māori. Māori were more likely to report learning by doing at work, but were no more likely to report learning from co-workers, doing on-the-job training or attending seminars and workshops. Māori and non-Māori were just as likely (10% compared to 8% of 16-44 year olds) to have a job with entry requirements above the level of their highest qualification.

The Survey of Adult Skills therefore does not give any evidence of different work activities contributing to younger Māori increasing their skills faster than non-Māori. Other Māori/non-Māori differences in work activities may exist that are not picked up in the Survey of Adult Skills, and deeper understanding would require further research.

[9] Other sources confirm that relatively high proportions of Māori aged 15 to 24 are not in employment, education or training. See Samoilenko & Carter (2015, p. 3).
[10] See Ministry of Education (2016a, p. 9).
[11] See Statistics New Zealand (n. d.).

Possible reasons Māori increased their skills faster as they got older

Māori increased their skills as they got older from mid-teens/early twenties to mid-twenties/early thirties faster than their non-Māori peers. The Survey of Adult Skills suggests that possible reasons for this include:

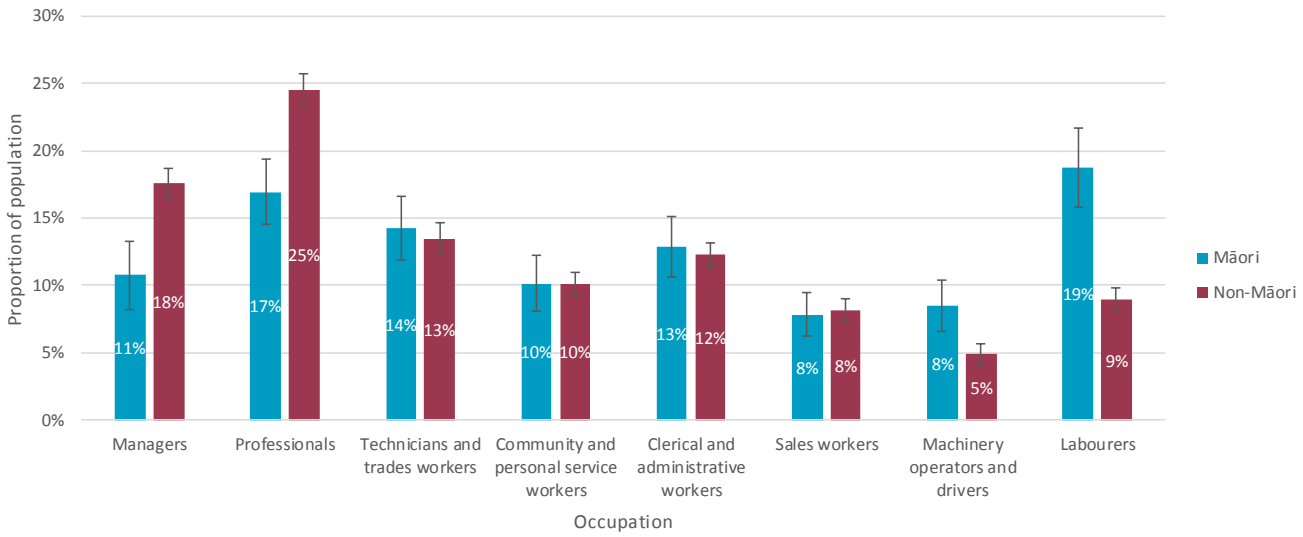
- Māori gained fewer skills as children and youth in the education system compared to non-Māori
- Māori in older age groups studied in greater proportions than non-Māori.

Work

Māori were more likely to work in lower skilled occupations

Māori were more concentrated in lower skilled occupations than non-Māori. Of Māori who are employed, 27% are employed as labourers or machine operators and drivers, compared to 14% of non-Māori (Figure 23). Of employed non-Māori, 42% work as professionals or managers, compared to 28% of Māori.

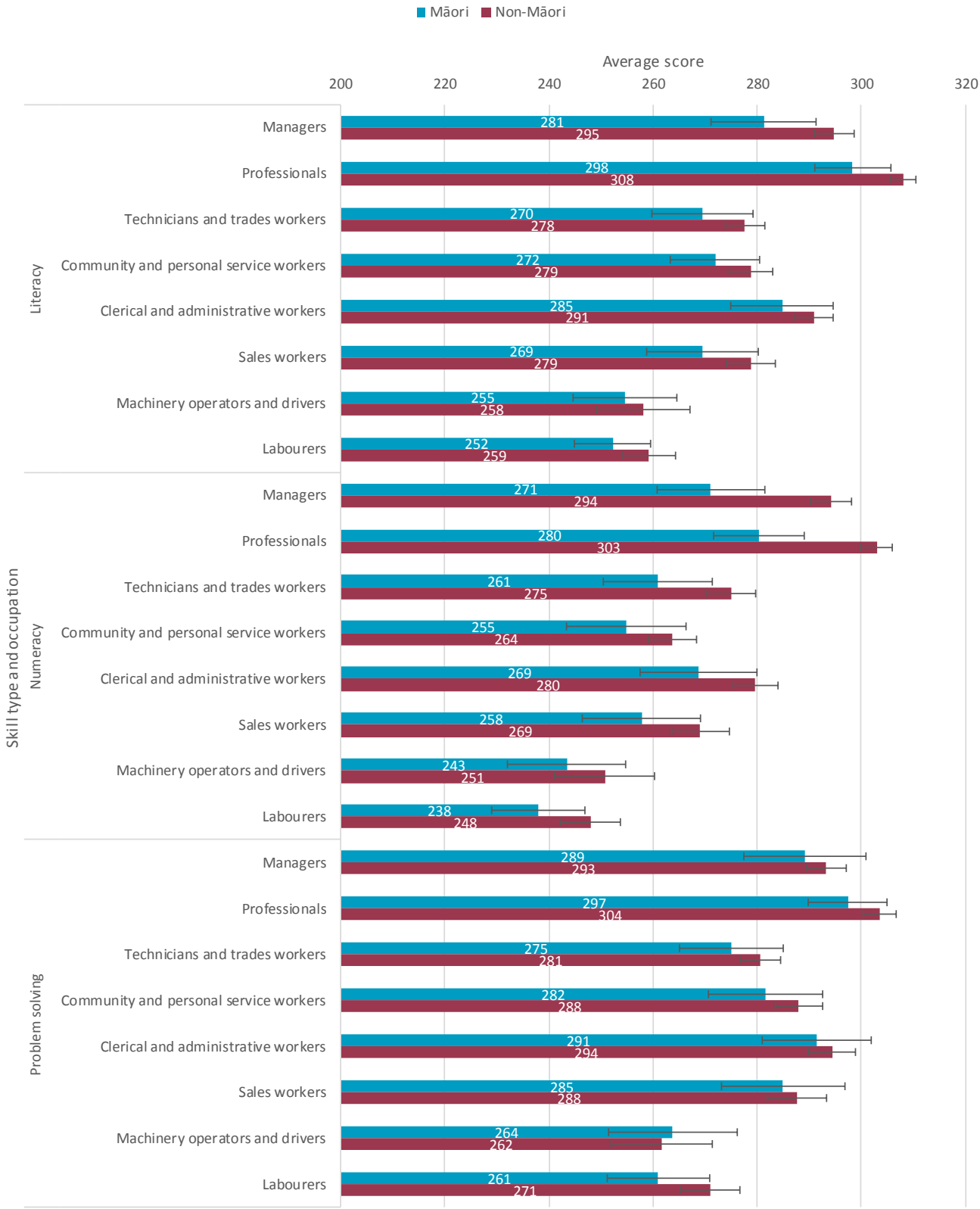
Figure 23: Proportion of employed Māori and non-Māori by occupation



Māori in high skill occupations had similar problem solving skills, slightly lower literacy skills, and significantly lower numeracy skills compared to non-Māori in high skill occupations

Māori professionals and managers had slightly lower literacy skills on average than non-Māori working in the same occupations (Figure 24). However, Māori professional and managers had significantly lower numeracy skills on average. For other occupations, Māori and non-Māori had similar average literacy skills, and their problem solving skills were similar for all occupations.

Figure 24: Skills and occupation for employed Māori and non-Māori



Māori with moderate literacy skills have lower earnings than non-Māori

Employed Māori with level 3 literacy skills have significantly lower average annual earnings than non-Māori with the same literacy skills (Figure 25). For numeracy, Māori with level 3 skills have slightly lower earnings than non-Māori (Figure 26). For Māori with high skills (level 4 or above) in literacy and numeracy, earnings are lower, but not by a statistically significant margin. The difference in earnings for those with moderate skills may be due to a range of factors including:

- the Māori population is younger on average than the non-Māori population, and therefore more Māori will have had fewer years of work experience
- differences in more job-specific skills than literacy and numeracy
- the greater concentration of Māori in lower paid occupations.

Māori with high literacy skills had average earnings $25,000 higher than Māori with low literacy skills. This skill premium was even greater for numeracy skills.

Figure 25: Average earnings and literacy skill levels for employed Māori and non-Māori

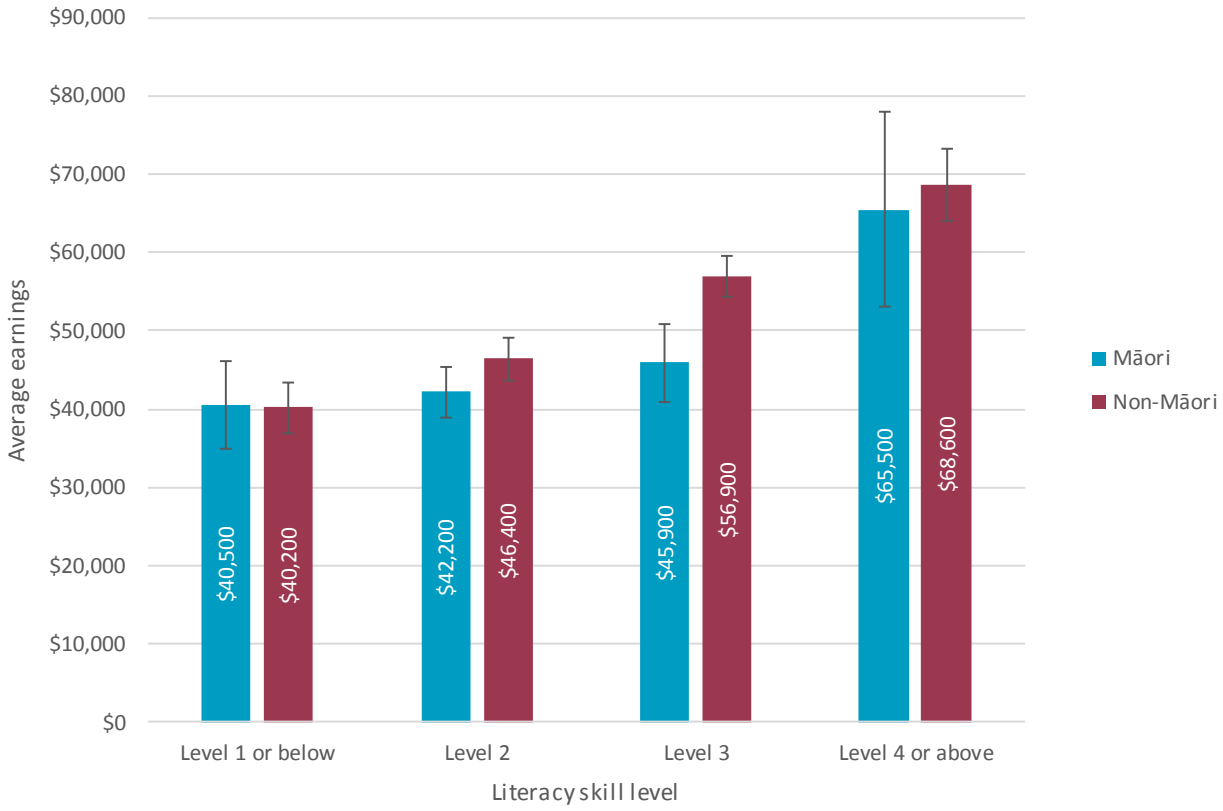
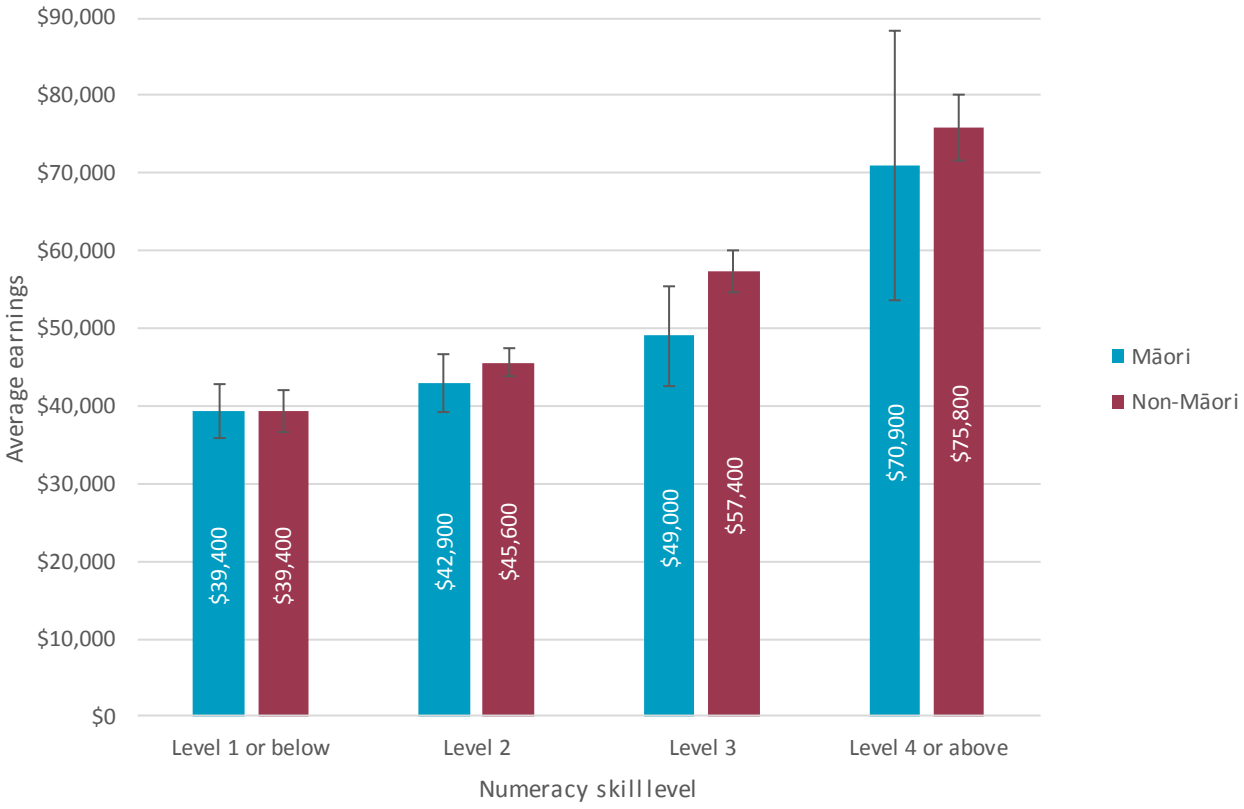


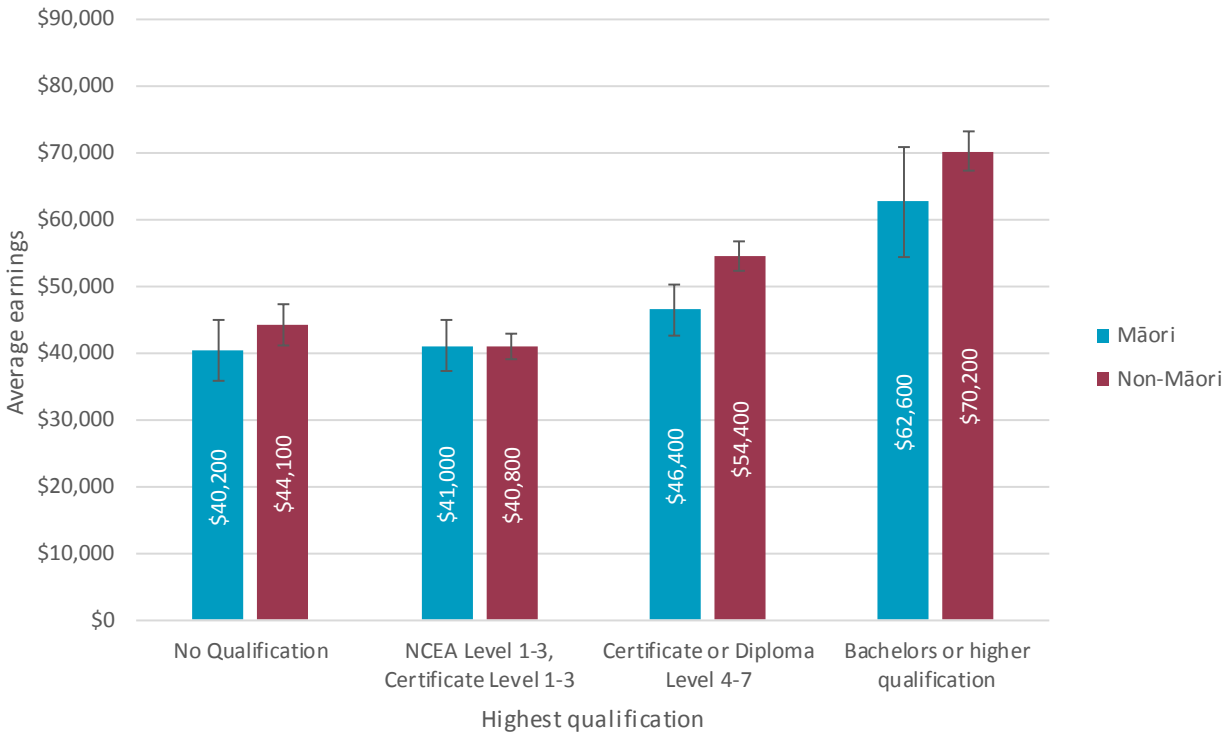
Figure 26: Average earnings and numeracy skill levels for employed Māori and non-Māori



Māori with post-school qualifications lower than degree level had lower earnings than similarly qualified non-Māori

Māori with a Level 4 to 7 certificate or diploma had lower average earnings than similarly qualified non-Māori (Figure 27). Māori and non-Māori with no qualifications, school, or degree qualifications had similar earnings. For both Māori and non-Māori, the relationship between qualifications and earnings was weaker than for literacy and numeracy skills and earnings. Māori with a bachelors or higher qualification had average annual earnings $22,000 higher than Māori with no qualification.

Figure 27: Average earnings and highest qualification for employed Māori and non-Māori



Improving Māori adults' skills in the future

Comparing attributes related to higher skills of Māori adults

Findings from the Survey of Adult Skills can give some insight into the attributes that are associated with higher literacy or numeracy skills among Māori and how Māori compare with non-Māori. This provides some indication of the areas where changes could result in higher overall skills for Māori.

We used correlations to measure the strengths of association of various attributes with literacy skills for Māori and compared these to non-Māori. The attributes, grouped into three categories, were:

- **home environment factors:** more than 200 books in the home[12]; read books at home; use a computer in everyday life; use the internet to understand issues
- **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
- **education factors:** have a bachelors or higher qualification; undertook formal education in the last year.

We focused on attributes that:

- were strongly related to Māori skills
- Māori were less likely to have than non-Māori.

This provides an indication of where potential may exist to increase the proportion of Māori with these attributes and thus influence skill improvement.

The relationships of each attribute to numeracy and problem solving skills were extremely similar to literacy.

Increasing the proportion of Māori earning bachelors or higher qualifications may increase skills

Māori with a bachelors or higher qualification have higher literacy scores than those who do not, including those with non-degree post-school education (Figure 7). Of Māori, 13% have a bachelors or higher qualification, compared to 31% of non-Māori. This suggests that the proportion of Māori with bachelors or higher qualifications has scope to increase. But other factors are also associated with how much skill increase relates to having a bachelors or higher qualification. For example, those with lower literacy skills may be less likely to study for bachelors or higher qualifications. Certainly, the Survey of Adult Skills shows that Māori 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 297 compared with 259.

While Māori who have a bachelors or higher qualification have higher skills than those that do not, Māori who have been in education in the past 12 months do not have much higher literacy skills than those who have not been in education. This is mainly due to different mixes of Māori and non-Māori participating in degree level and lower than degree level courses. Of Māori who are currently studying, 45% were studying towards a school-level qualification, compared to 34% of non-Māori. This likely reflects the younger age structure of the Māori population.

Home environment attributes are closely related to higher skills for Māori

Māori who have more books in the household and read books in their everyday life more often have higher literacy skills than those who do not. Māori are also less likely to have these attributes than non-Māori.

Having books in the household and reading at home may be associated with other characteristics of the home environment. Possibly increasing access to books and reading may increase Māori skills. However, it is also possible that Māori with higher skills are more likely to read a range of material. In addition, other home environment factors not examined in the Survey of Adult Skills, for example housing quality, or access to transport or education services may be associated with skills.

[12] 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).

Work activities may reflect skills required to get different jobs

Māori who read letters, memos or emails[13] at least once a week at work have higher skills than Māori who do not. However, Māori who write reports at least once a week have similar literacy skills to those who do not. This is likely to be because reading letters, memos or emails is a much more common work activity than report writing, and many Māori with strong literacy skills have work that seldom requires report writing.

[13] The Adult Skills Survey background questionnaire had a section on skill use for work which included asking how often people did reading activities for work. It asked separately about the same eight different types of material as for reading activities in everyday life. See page 24.

Te reo Māori and skills measured in English

Māori with a reo Māori background have lower skills, as measured in English, than Māori without a reo Māori background

The Survey of Adult Skills collects information that can be used to derive a measure of having a reo Māori background. This section uses the following definition of having a reo Māori background – if someone reports that either te reo Māori:

- is one of up to two languages they first learned as a child and/or
- is the language they speak most often at home

The Survey shows that 18% of Māori belong to this measure of having a reo Māori background.

Obviously, this is only a partial measure of a reo Māori background. For example, some people may speak, read or write te reo Māori very well, but neither learned te reo Māori as their first language, nor currently speak it most often at home. Some people who learned te reo Māori as their first language may not now be very proficient in te reo Māori. Also, this measure does not relate to whether Māori attended a kōhanga reo or a kura.

Māori with this Survey of Adult Skills measure of having a reo Māori background had lower skills in English language-based literacy, numeracy and similar skills in problem solving compared to Māori without a reo Māori background (Figure 28). The difference is greater in numeracy than literacy. Figure 29 shows the skill distributions for the two groups.

Figure 28: Literacy, numeracy and problem solving scores of Māori by whether they have a reo Māori background

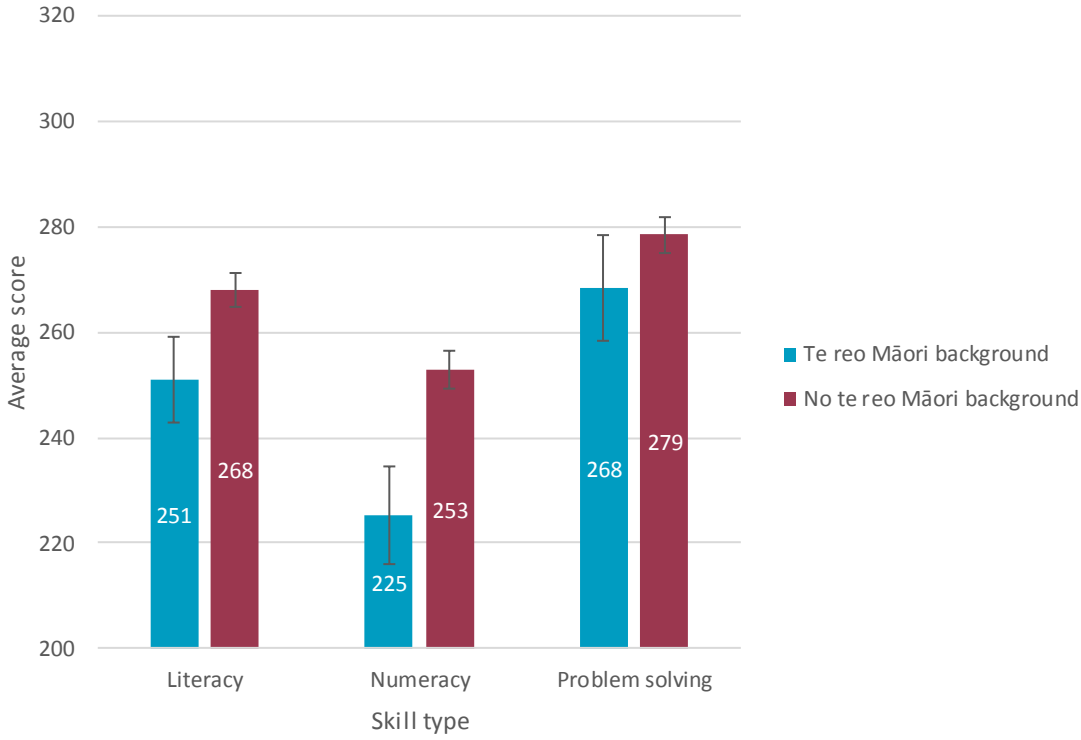
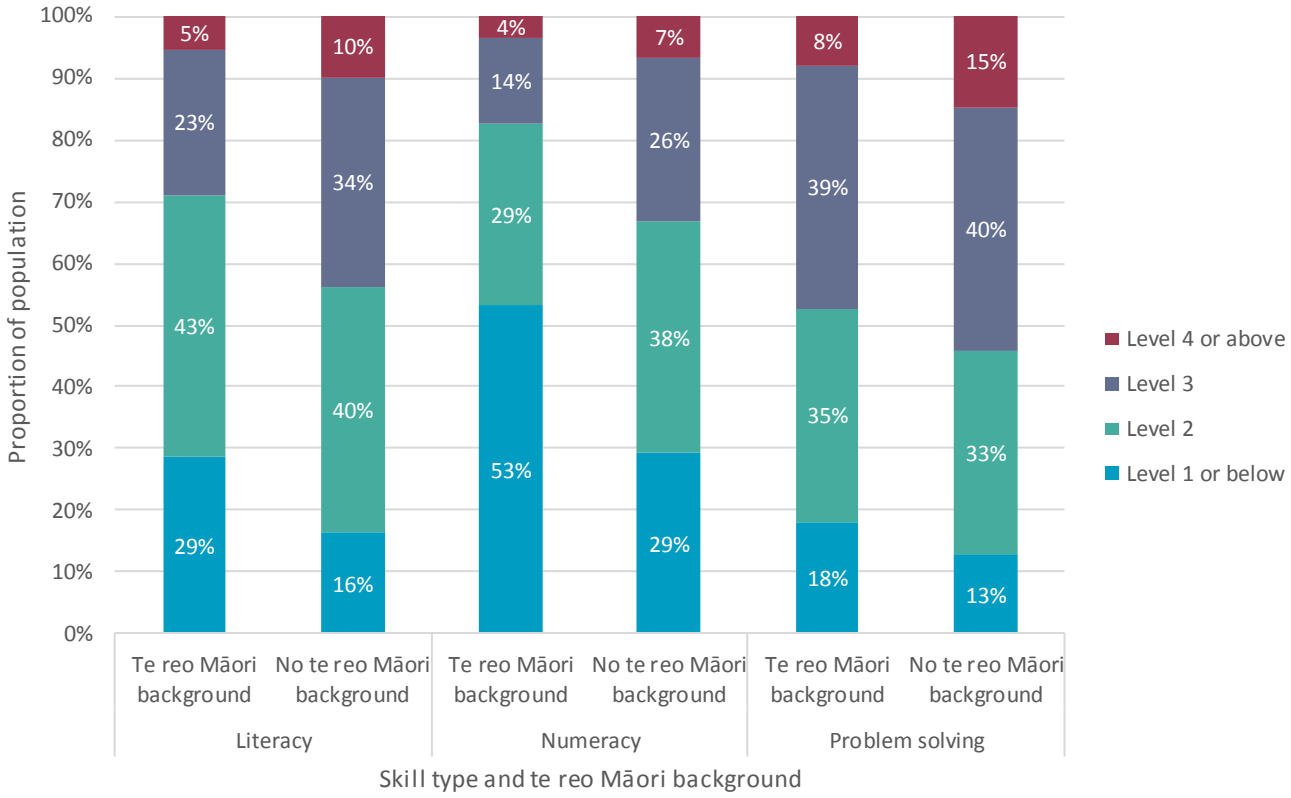


Figure 29: Distributions of literacy, numeracy and problem solving skills of Māori by whether they have a reo Māori background



Why might Māori with this measure of a reo Māori background have lower literacy and numeracy skills as measured in English? The Survey of Adult Skills collects information on two factors that could help account for some of the reasons. Compared to Māori without a reo Māori background, those with a reo Māori background are:

- more likely to live in areas of high deprivation
- less likely to have a mother with a higher qualification.

If these two factors are used to adjust skill measures:

- the difference in literacy skills reduces by 3 points
- the difference in numeracy skills reduces by 4 points.

Māori with this definition of a reo Māori background have different family background and social circumstances from those who do not. But adjusting for these circumstances explains only some of the difference in skills between Māori with and without a reo Māori background.

The Survey of Adult Skills and Te Kupenga

Statistics New Zealand's 2013 Te Kupenga, the survey of Māori well-being, is able to throw some further light on the relationships between a reo Māori background and skills measured in English. This is using both its measures of te reo Māori proficiency and also its similar measures of te reo Māori background to the Survey of Adult Skills. Te Kupenga asked for:

- one language first learned as a child (Survey of Adult Skills respondents could report up to two languages first learned.)
- the language spoken most often at home.

Using the same age bands, the two sources give different proportions of Māori that have a reo Māori background – 8.5% according to Te Kupenga and 18% according to the Survey of Adult Skills. The main reason for the difference will be that the Survey of Adult Skills provides for recording two first learned languages.

Other reasons may include:

- the different contexts and purposes of the two collections influencing differential responses from people in the same situations
- sampling errors.

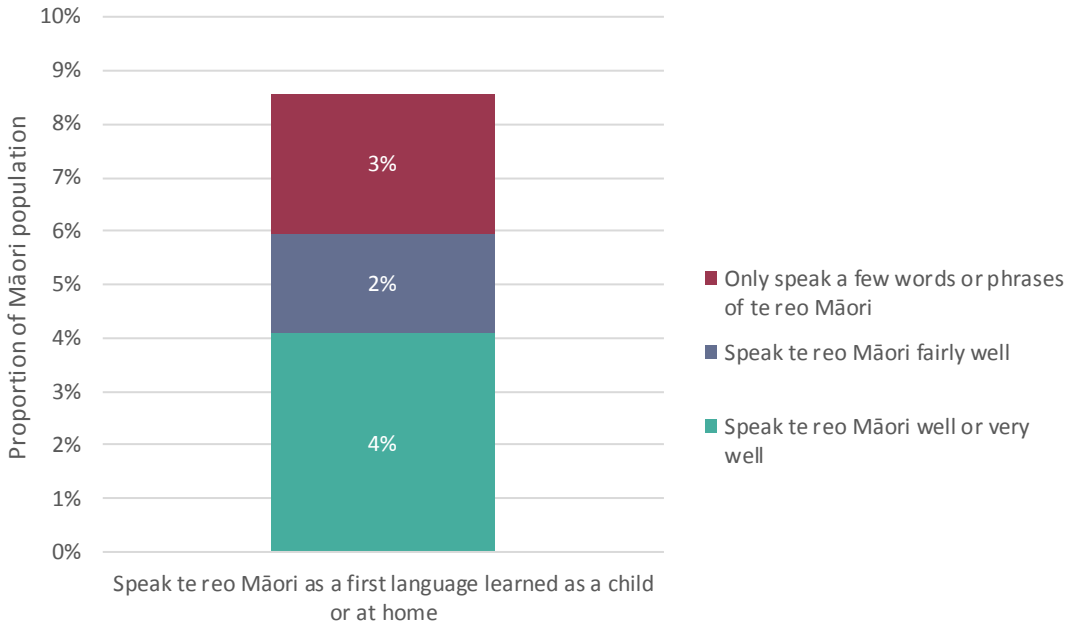
Te Kupenga asked Māori to self-assess their proficiency in te reo Māori. Figure 30 uses Te Kupenga to analyse the 8.5% of Māori who spoke te reo Māori as a first language or te reo was the language they spoke most often at home.

In addition, Te Kupenga found that 16% of Māori spoke te reo Māori at least fairly well, but did not learn te reo Māori as their first language nor was te reo Māori the most frequent language they spoke at home.

Te Kupenga also found that 43% of those who speak te reo Māori at least fairly well had attended a kōhanga reo or kura, and that 50% of those whose first language was te reo Māori or speak it most often at home had attended a kōhanga reo or kura.

This suggests that the measure of te reo Māori background in the Survey of Adult Skills is limited and is a poor proxy for te reo Māori proficiency. In addition, an English-based measurement may not adequately represent the skills of those who have any non-English background. Further research would be needed on patterns of te reo Māori proficiency and English language proficiency in the Māori population.

Figure 30: Fluency in te reo Māori for Māori with a reo Māori background



Source: Te Kupenga survey
The labels for the three components show rounded figures.

References

Biddulph, F., Biddulph, J., & Biddulph, C. (2003). The Complexity of Community and Family Influences on Children's Achievement in New Zealand: Best Evidence Synthesis. Wellington: Ministry of Education. Retrieved from http://www.educationcounts.govt.nz/publications/series/2515/5947

Chamberlain, M. (2014), PIRLS 2010/11 in New Zealand: An overview of findings from the third cycle of-the Progress in International Reading Literacy Study (PIRLS). Wellington: Ministry of Education. Retrieved from http://www.educationcounts.govt.nz/__data/assets/pdf_file/0020/125057/PIRLS-2010-11-in-NZ-An-overview-of-findings-from-the-3rd-cycle-of-PIRLS.pdf

Evans, M. D. R., Kelley, J., Sikora, J., & Treiman, D. J. (2010). Family scholarly culture and educational success: Books and schooling in 27 nations. Research in Social Stratification and Mobility, 171–197. Retrieved from https://doi.org/10.1016/j.rssm.2010.01.002

Ministry of Education (2016a). Profile & Trends: New Zealand's annual tertiary education enrolments: 2015. Wellington: Ministry of Education. Retrieved from http://www.educationcounts.govt.nz/publications/series/2531/profile-and-trends-2015-new-zealands-annual-tertiary-education-enrolments-part-1-of-6

Ministry of Education (2016b). Profile & Trends: Tertiary education outcomes and qualification completions: 2015. Wellington: Ministry of Education. Retrieved from http://www.educationcounts.govt.nz/publications/series/2531/profile-and-trends-2015-tertiary-education-outcomes-and-qualification-completions-2015

Ministry of Education (2016c). 18-year-olds with a minimum of NCEA Level 2 or equivalent. Retrieved from http://www.educationcounts.govt.nz/statistics/indicators/main/education-and-learning-outcomes/114325

Ministry of Education (2017). Highest Attainment Numbers (2009-2016). Retrieved from http://www.educationcounts.govt.nz/statistics/schooling/senior-student-attainment/school-leavers2/highest-attainment-numbers

OECD (2013). OECD Skills Outlook 2013: First Results from the Survey of Adult Skills. Paris: OECD. Retrieved from http://www.oecd.org/skills/piaac/publications.htm

OECD (2016). OECD Skills Studies: Skills Matter: Further Results from the Survey of Adult Skills. Paris: OECD. Retrieved from http://www.oecd.org/skills/piaac/publications.htm

Samoilenko, A., & Carter, K. (2015). Economic Outcomes of Youth not in Education, Employment or Training (NEET): New Zealand Treasury Working Paper 15/01. Wellington: The Treasury. Retrieved from http://www.treasury.govt.nz/publications/research-policy/wp/2015/15-01/twp15-01.pdf

Statistics New Zealand (n. d.), Births Tables. Retrieved from http://www.stats.govt.nz/browse_for_stats/population/births/births-tables.aspx

Appendix

Literacy skills and their meaning

Literacy level	Type of tasks someone can perform
Below level 1	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.
Level 1	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.
Level 2	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.
Level 3	At this level, people can understand dense and lengthy texts to find relevant information among irrelevant or competing information.
Level 4	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.
Level 5	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.

Numeracy levels and their meaning

Numeracy level	Type of tasks someone can perform
Below level 1	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.
Level 1	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%.
Level 2	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.
Level 3	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.
Level 4	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.
Level 5	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.

Problem solving levels and their meaning

Problem solving level	Type of tasks someone can perform
Did not undertake computer-based test	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.
Below level 1	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.
Level 1	At this level, people can complete tasks where the goal is stated and there is only a small number of steps.
Level 2	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.
Level 3	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.

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