

# Literacy and Life Skills for Māori Adults — Further Investigation

*Results from the Adult Literacy and Life Skills (ALL) Survey*

By Paul Satherley and Elliot Lawes



# Acknowledgements

The authors gratefully acknowledge the assistance of Jit Cheung, Christabel Dillon, David Earle, Roger Smyth, Lynne Whitney, Paula Mato, Trevor Landers, Eileen Paulin, Darin Bishop and Phil Evans. The authors also gratefully acknowledge the time and effort invested by the respondents to the ALL and IALS surveys.

Published by  
Comparative Education Research Unit  
Research Division  
Ministry of Education  
PO Box 1666  
Wellington 6140  
New Zealand

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Enquiries should be made to the publisher

August 2009  
ISBN: 978-0-478-34163-8  
ISBN Web: 978-0-478-34164-5  
RMR-925b

This report is available from the Education Counts website:  
[www.educationcounts.govt.nz/goto/all](http://www.educationcounts.govt.nz/goto/all)

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# Executive Summary

*Literacy and Life Skills for Māori Adults – Further Investigation* takes a first step in deeper analysis of the data on the Māori adult population of the Adult Literacy and Life Skills (ALL) Survey. It describes a model that treats document literacy skill as the outcome of a range of potential explanatory factors. This enables us to understand more about the nature and strength of associations with Māori adults' document literacy skills when several different factors are taken into account.

A stepwise process of progressively adding further variables is able to generate findings that illuminate the interactions between explanatory factors and document literacy skills.

The following points summarise the findings from the regression model. The analysis behind the message of each of the points below controls for all other variables in the model. This contrasts with the findings of *Literacy and Life Skills for Māori Adults* and the graphs of Appendix 2 which display single factor analysis and do not control for other variables:

- Māori adults who had spent more time in formal education on average had higher document literacy skills when taking all other factors considered into account.
- When compared with those of middle age, both younger and older Māori adults tended to have lower document literacy skills. However, when also controlling for time spent in formal education this age effect became non-significant. However, older Māori beneficiaries tended to have lower document literacy skills than younger Māori beneficiaries.
- Māori men had similar document literacy skills to Māori women. However, when compared with Māori women who had similar income, Māori men tended to have lower document literacy skills. Māori men tended to have spent less time in formal education than Māori women of comparable income and this was strongly associated with their lower document literacy skills.
- Document literacy skills were not significantly associated with being employed. But those whose main income source was wages and those whose main income source was “other” (not wages or benefits) tended to have higher document literacy skills. However, having wages as the main income source was associated with greater time spent in formal education and this was strongly associated with higher document literacy skills.
- Adult Māori students tended to have higher document literacy skills. However, being a student was associated with greater time spent in formal education and this was strongly associated with higher document literacy skills.

# Introduction

*Literacy and Life Skills for Māori Adults – Further Investigation* takes a first step in deeper analysis of the data on the Māori adult population of the Adult Literacy and Life Skills (ALL) Survey. It describes a model that treats document literacy skill as the outcome of a range of potential explanatory factors. This enables us to understand more about the nature and strength of associations with Māori adults' document literacy skills when several different factors are taken into account.

The companion report, *Literacy and Life Skills for Māori Adults*, shows that strong associations exist between the Māori population's literacy skills and variables including educational qualifications, labour force status and income. However, these variables are themselves closely associated with each other. *Further Investigation* describes the findings where these and other variables are grouped together for analysis.

The purpose of *Further Investigation* is to provide a level of analysis beyond what is offered by descriptive statistics.. This will be useful within the skills policy arena for helping us to understand the factors that are most associated with higher document literacy skills for Māori. It also illustrates potential for further analysis – for example exploring relationships with other skills or other associated factors.

# 1. Background

Document literacy is the skill of understanding and using discontinuous text forms such as graphs, charts, tables or diagrams. Document literacy was selected for this report because of its particular importance as a work-related skill in many different types of jobs and workplaces.

Document literacy skills for Māori adults are positively associated with factors including:

- higher educational attainment
- being employed
- having high income and
- having income from wages or salaries.

In addition, document literacy skills are also associated with age (those in the middle age groups – 25-44-years-olds – have higher skills), and with gender (women have slightly higher skills on average). A selection of graphs that illustrate these relationships, taking factors one at a time, is located in Appendix 2. They are similar to graphs included in *Literacy and Life Skills for Māori Adults* where this is discussed in more detail from a single-factor point of view.

Obviously, these factors are themselves linked. For example, on average, people with higher education are more likely to be employed and have higher wages. In addition, people in the 25-60-year age range have a higher labour force participation rate than those younger or older<sup>1</sup>. A question therefore arises about understanding the nature of relationships between skills and these other factors taking different mixes of factors into account together, rather than analysing each one separately.

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<sup>1</sup> See Household Labour Force Survey statistics on Statistics New Zealand's website: [www.stats.govt.nz/browse\\_for\\_stats/work\\_income\\_and\\_spending/Employment/HouseholdLabourForceSurvey\\_HOTPJun09qtr/Comimentary.aspx](http://www.stats.govt.nz/browse_for_stats/work_income_and_spending/Employment/HouseholdLabourForceSurvey_HOTPJun09qtr/Comimentary.aspx)

## 2. A model of document literacy

A statistical regression model of document literacy among Māori adults was constructed in three stages. The key feature of this process is successively adding in further potential explanatory factors. The purpose of this approach is to progressively build a picture of the way that different mixes of factors are associated with document literacy skills of the adult Māori population. In other words it seeks to explain variation in document skills of the adult Māori population in terms of concurrent variation in these other variables.

The first stage of the model includes the following variables as potential explanatory factors:

- age
- interaction between age and having benefit income
- whether the respondent has wage income
- whether the respondent has other income sources than benefit or wages
- whether the respondent is employed
- gender
- whether the respondent is a student.

The second stage adds in the value of the respondent's income to the factors of the first stage. The third and final stage of the model then adds in the further factor – time spent in formal education.

These variables were chosen for inclusion in the model because of their associations with document literacy skills for the adult Māori population evident from the univariate analysis of *Literacy and Life Skills for Māori Adults* and also from separate analysis.

The following sections discuss the findings revealed by the model. We look in detail at the first stage of the model and then examine changes in the subsequent stages of the model. A brief discussion concludes.

### Stage 1 of the model of document literacy

Stage 1 of the model of document literacy included the factors: age (and age squared to allow for a non-linear relationship with document literacy); the interaction between age and benefits (to allow for different age cohorts who have benefit income having different document literacy skills on average); whether the respondent has wage income; whether the respondent has another income source than wages or benefits; whether the respondent is employed; gender; whether a student.

Appendix Table 1.1 contains the standardised regression coefficients (and their errors) which form the model of document literacy. The coefficients provide a numerical measure of the strength of association between document literacy skill and the variable, whilst taking into account the other variables in the model. The estimates for the first stage of the model appear in the column headed *Stage 1 estimate*. They show that after accounting for all other factors in stage 1 of the model:

- Students had higher document literacy skills than Māori adults who were not students.
- Māori adults whose income was higher had higher document literacy skills.
- Māori adults who had income from sources other than wages or benefits had higher document literacy skills than waged Māori adults or those who were beneficiaries.
- When compared with those of middle age, both younger and older Māori adults tended to have lower document literacy skills.

## Stage 2 of the model of document literacy

In addition to the factors included in stage 1 of the model of document literacy, stage 2 also included income. The estimates for the second stage of the model appear in the column headed *Stage 2 estimate* of Table 1.1. The findings for stage 1 of the model still held in the stage 2 model – that is regardless of level of income. The following two additional findings emerge:

- Māori adults with higher incomes tended to have higher document literacy skills.
- Māori men on average have lower document literacy skills than Māori women. This particular finding illustrates a progressive understanding of associations between factors.
  - When no other variables are considered, Māori women on average perform better in document literacy than Māori men. When the variables of the first stage of the model are taken into account this gender difference becomes non-significant. However, once income is added into the model at the second stage, the gender difference reappears. This seems to reflect that, on average, Māori women have higher document literacy skills than Māori men with the same income.

## Stage 3 of the model of document literacy

In addition to the factors included in stage 2 of the model of document literacy, stage 3 adds in educational attainment (in the form of time spent in formal education). The estimates for the third stage of the model appear in the column headed *Stage 3 estimate* of Table 1.1.

Of all of the factors in stage 3 of the model, time spent in formal education was most closely associated with document literacy. Māori adults who had spent more time in formal education tended to have higher document literacy skills.

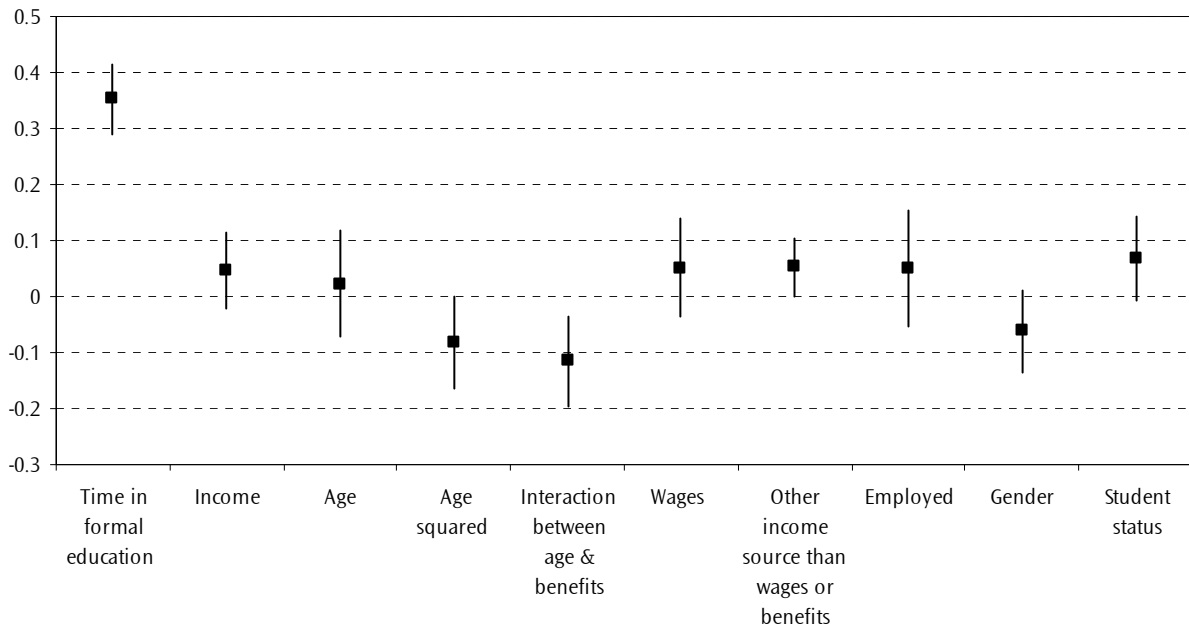
Adding time spent in formal education into the model results in only two of the factors remaining that previously were significant. These are:

- the respondent having had income other than wages or benefits is positively associated with document literacy skill.

- the interaction between age and benefits is negatively associated with document literacy skill. This reflects older Māori beneficiaries tending to have lower document literacy skills than younger Māori beneficiaries.

Figure 1 below depicts the relative impacts of the explanatory variables in the stage 3 model of document literacy for Māori adults. For each explanatory variable, an estimate of the standardised regression coefficient is presented together with a 95% confidence interval. The confidence interval straddles zero if and only if the explanatory variable is not significantly associated with document literacy (after controlling for the other variables in the model).

**Figure 1: Standardised regression coefficients for document literacy**



Note:

1. The data that this graph draws on is displayed in the Stage 3 estimate column of Appendix 1.

The only factors that are significantly associated with document literacy skill – as indicated by the 95 percent error margins of the estimates of the regression coefficients not overlapping with 0 in Figure 1 – are:

- time spent in formal education
- the interaction between age and benefits
- whether another income source than wages or benefits.

# 3. Discussion

The key overall finding of the regression model analysis is that, for Māori adults, time spent in education is the main explanatory factor for document literacy skill. Time spent in education is associated with being in work, having higher income, and having income from wages or salaries. The analysis indicates that the relationship between document literacy skills and these latter variables is likely due to their relationship with time spent in education. The general New Zealand population shows a similar pattern.

While the finding that time spent in education is the key factor associated with document literacy skills for Māori is perhaps unsurprising, it provides a direction for further research. For example, what specific aspects of teaching and learning, and at what education levels, make the most difference, for Māori, in skill acquisition? What barriers to staying engaged in education exist for Māori? What kinds of mismatch exist for Māori adults between skills they have and skills that are needed across economic, work and social contexts.

Some information collected in the ALL survey could be investigated in more depth to throw some light on these questions. Some examples are:

- whether received remedial help with reading at school
- the highest level of education reached
- recent participation in education and learning
- parental education level and occupation
- literacy practice at work including attitude questions on whether reading and writing skills are sufficient.

However, other research, including within the early childhood, schooling and tertiary sectors, is likely to be needed to fully address these questions.

# 4. References

## Adult Literacy and Life Skills Survey releases

September 2007	The Adult Literacy and Life Skills (ALL) Survey: An Introduction
December 2007	The Adult Literacy and Life Skills (ALL) Survey: Headline Results and Background
December 2007	The Adult Literacy and Life Skills (ALL) Survey: Further Investigation
March 2008	The Adult Literacy and Life Skills (ALL) Survey: Overview and International Comparisons
May 2008	The Adult Literacy and Life Skills (ALL) Survey: Education, Work and Literacy
July 2008	The Adult Literacy and Life Skills (ALL) Survey: Gender, Ethnicity and Literacy
July 2008	The Adult Literacy and Life Skills (ALL) Survey: Age and Literacy
November 2008	The educational inheritance of New Zealanders (in Profile & Trends 2007)
November 2008	Higher-level education is strongly associated with greater skills (in Profile & Trends 2007)
November 2008	Healthy and Wise – does education improve wellbeing? (in Profile & Trends 2007)
November 2008	Literacy and numeracy in New Zealand: findings from the Adult Literacy and Life Skills Survey (in Profile & Trends 2007)
March 2009	How well do qualifications predict literacy and numeracy?
March 2009	Well-being and education

These are available at [www.educationcounts.govt.nz](http://www.educationcounts.govt.nz).

# Appendix 1

**Appendix Table 1.1: Standardised regression coefficients for document literacy model, ALL only**

Variable	Stage 1 estimate	Stage 1 se	Stage 2 estimate	Stage 2 se	Stage 3 estimate	Stage 3 se
Time in formal education (years)	*	*	*	*	<b>0.353</b>	0.032
Income (log income in 000s)	*	*	<b>0.118</b>	0.037	0.046	0.035
Age	0.072	0.049	0.029	0.051	0.022	0.048
Age squared (centred at 36.1 years)	<b>-0.173</b>	0.041	<b>-0.125</b>	0.043	-0.083	0.042
Interaction between age and benefits	<b>-0.174</b>	0.042	<b>-0.142</b>	0.043	<b>-0.116</b>	0.041
Wages (0 = no wage, 1 = wage earner)	<b>0.126</b>	0.050	<b>0.103</b>	0.050	0.051	0.045
Other income source (0 = income source “standard”, 1 = income not wages or benefits)	<b>0.084</b>	0.032	<b>0.072</b>	0.029	<b>0.052</b>	0.026
Employment (0 = not employed, 1 = employed)	0.096	0.058	0.074	0.060	0.051	0.053
Gender (0 = female, 1 = male)	-0.071	0.038	<b>-0.108</b>	0.040	-0.062	0.037
Student status (0 = not student, 1 = student)	<b>0.134</b>	0.037	<b>0.143</b>	0.039	0.067	0.038

Notes:

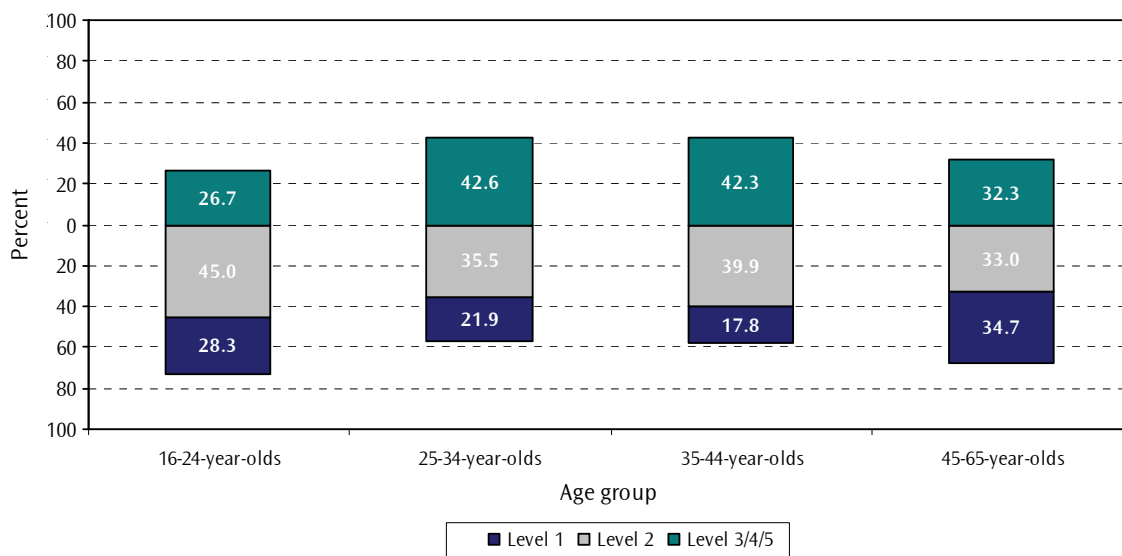
1. Figures in bold are estimates significant at the 5 percent level.
2. Stage 1 of the model excluded time spent in formal education and income, stage 2 included income but excluded time spent in formal education, and stage 3 included both time spent in formal education and income. This is indicated by asterisks in the appropriate cells.
3. se means standard error.

The stage 1 model accounted for approximately 10 percent of the variance in document literacy scores, the stage 2 model approximately 11 % and the stage 3 model approximately 21 percent.

# Appendix 2

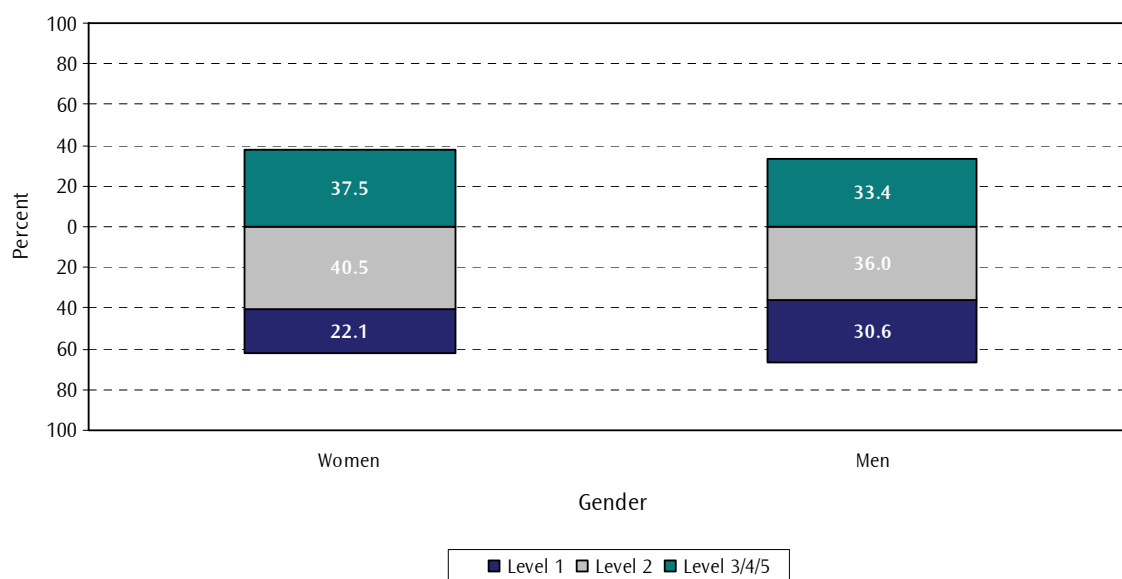
This appendix sets out graphs similar to those of *Literacy and Life Skills for Māori Adults* that illustrate a range of single factor relationships between document literacy and age, gender, labour force status, educational participation, income and income source. Levels 3, 4 and 5 are grouped together to allow statistically robust estimates.

**Figure 2.1: Document literacy by age for Māori adults, ALL**



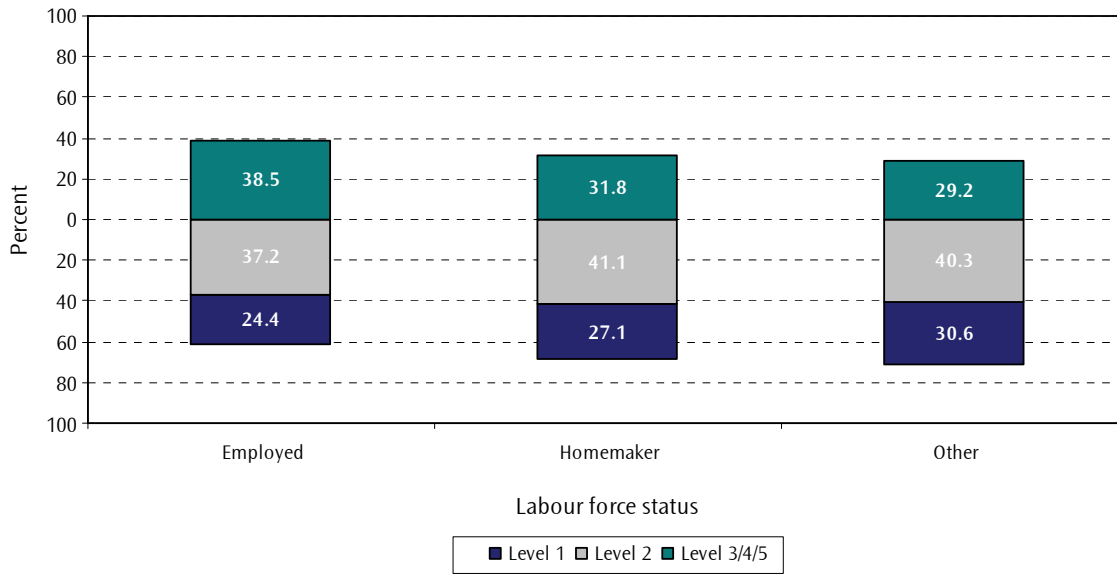
Māori adults aged 25-44 have on average higher document literacy skills than those either younger or older.

**Figure 2.2: Document literacy by gender for Māori adults, ALL**



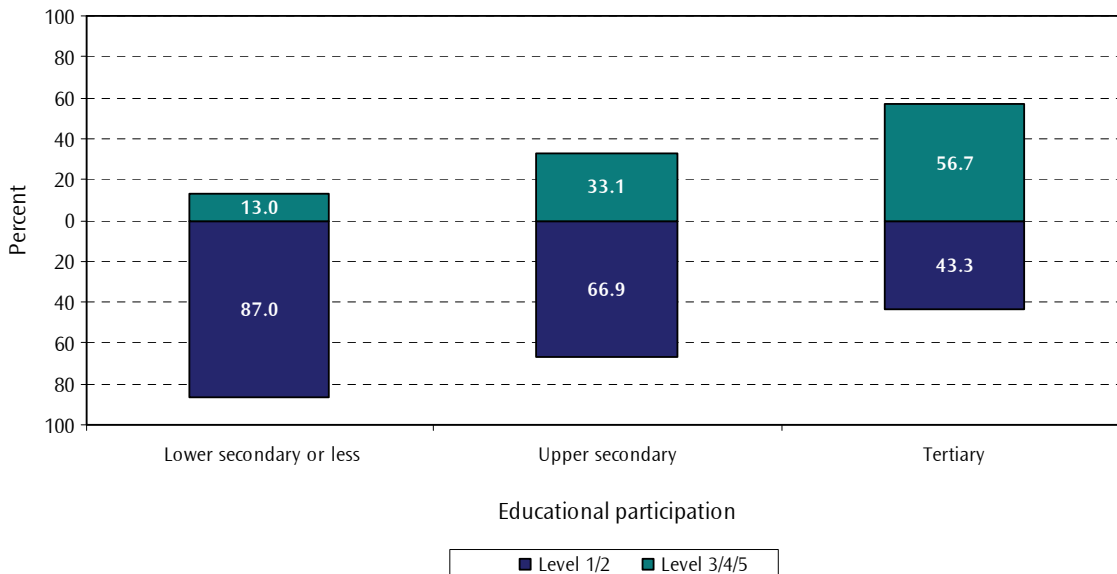
On average, Māori women have slightly higher document literacy skills than Māori men.

**Figure 2.3: Document literacy by labour force status for Māori adults, ALL**



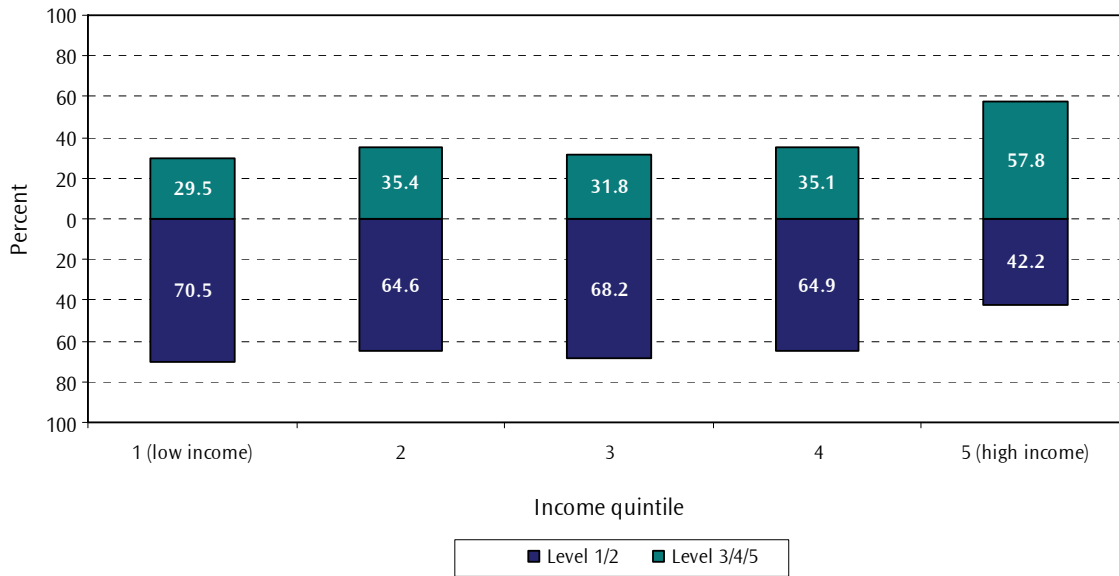
On average, employed Māori adults have higher skills than those of other labour force statuses.

**Figure 2.4: Document literacy by educational participation for Māori adults, ALL**



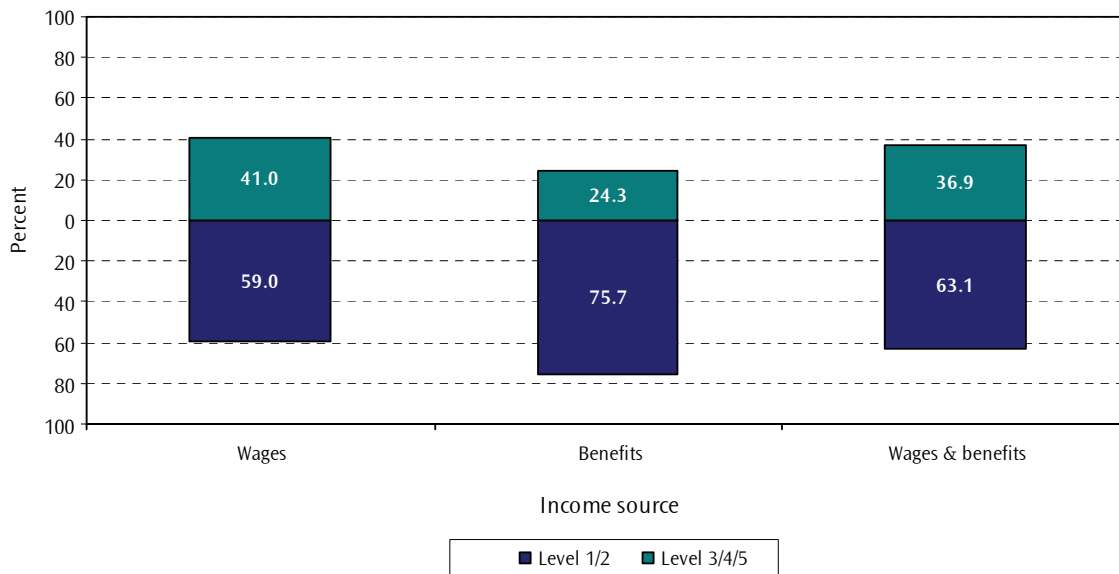
The document literacy skills of Māori adults are very strongly associated with higher levels of educational participation.

**Figure 2.5: Document literacy by income quintile for Māori adults, ALL**



Māori adults whose income is in the highest 20 percent of Māori incomes have substantially greater document literacy skills.

**Figure 2.6: Document literacy by income source for Māori adults**



Māori adults whose income is solely from wages or salaries – as opposed to benefits only or a mix of wages and benefits – have higher document literacy skills on average.