

# Literacy and Life Skills for Pasifika Adults — Further Investigation

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

By Elliot Lawes



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# Executive Summary

Talofa lava, Kia orana, Fakaalofa atu, Taloha ni, Ni sa bula vinaka, Malo e lelei, Tēnā koe, and warm Pasifika greetings.

This report — which complements *Literacy and Life Skills for Pasifika Adults*<sup>1</sup> — investigates the extent to which the distribution of English literacy among Pasifika adults is associated with changes in the distribution of their educational attainment and familiarity with English.

The ALL survey (conducted, in New Zealand, in 2006) was designed to measure the distribution of literacy and numeracy skills among the adult population of New Zealand. It was the sequel to a similar survey, the International Adult Literacy Survey (IALS), conducted in 1996.

The ALL survey included an oversample of Pasifika adults. This design feature has allowed meaningful analyses of the distribution of literacy and numeracy skills among the adult Pasifika population of New Zealand. In particular, it has permitted the current investigation.

For more information about the ALL survey, see *The Adult Literacy and Life Skills (ALL) Survey: An Introduction*<sup>1</sup>.

## Key Findings

This report describes, for the adult Pasifika population of New Zealand, a statistical relationship between each of prose literacy and document literacy<sup>2</sup>, and a number of background factors including educational attainment and familiarity with English.

In particular, this report describes the relationship between distributions of these English literacy skills and each of the factors: age; gender; labour force status; educational attainment (in the form of time spent in formal education); language most frequently spoken when at home (representing familiarity with English); first language; place of birth; and income:

- Of all of these factors, educational attainment (in the form of time spent in formal education) was most closely associated with English prose and document literacy. Pasifika adults who had spent more time in formal education tended to have higher prose and document literacy skills.
- If educational attainment of Pasifika adults is not taken into consideration, then the language spoken in the home was most closely associated with English prose and document literacy.

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<sup>1</sup> Available from [www.educationcounts.govt.nz/goto/all](http://www.educationcounts.govt.nz/goto/all).

<sup>2</sup> Briefly, prose literacy is the ability to read continuous text such as that found in books, document literacy is the ability to read discontinuous text such as that found in graphs or charts. For more details, please see *The Adult Literacy and Life Skills (ALL) Survey: An Introduction* – available from [www.educationcounts.govt.nz/goto/all](http://www.educationcounts.govt.nz/goto/all).

Pasifika adults who spoke English infrequently in the home tended to have lower prose and document literacy skills.

- *Literacy and Life Skills for Pasifika Adults* noted that for Pasifika adults, the patterns of change, between 1996 and 2006, in document literacy differ from the patterns of change in prose literacy over the same period. This paper finds that these differences are not attributable to the relationships between educational attainment, familiarity with English and each of these two forms of English literacy.

# Introduction

*Literacy and Life Skills for Pasifika Adults* presents a number of findings on the distribution of English literacy skills among Pasifika adults. Many of the findings bear further investigation. In particular, the relationships between these findings may shed some light on the changing distribution of English literacy skills among Pasifika adults. The purpose of the current work is to begin this investigation. We will first describe the relevant findings and the questions they raise, and then describe our investigation.

The findings are concerned with:

- Changes between 1996 and 2006 among some Pasifika population subgroups in English literacy skill-levels.
- Differences in patterns of change in prose and document literacy.
- Marked changes between 1996 and 2006 in the distribution of educational attainment among Pasifika adults.
- Marked changes between 1996 and 2006 in the distribution of language most frequently spoken when at home among Pasifika adults.

For example, between 1996 and 2006 the percentages of Pasifika adults with level 3, 4, or 5 prose literacy decreased (by around 9 percentage points for men and 6 percentage points for women)<sup>3</sup>. For document literacy, the pattern of change was somewhat different. The percentage of adult Pasifika men with level 3, 4, or 5 document literacy remained relatively stable (dropping by around 2 percentage points) whereas that for adult Pasifika women increased (by around 5 percentage points)<sup>4</sup>.

Over the same period, the percentages of Pasifika adults with an upper-secondary level education or a tertiary<sup>5</sup> education increased markedly (by 35 percentage points for upper secondary and 5 percentage points for tertiary)<sup>6</sup> and the percentage of Pasifika adults who most frequently spoke a language other than English when in the home also increased markedly (by around 14 percentage points)<sup>7</sup>.

These findings raise questions about the relationships between educational attainment, familiarity with the English language and English literacy among the adult Pasifika population. Certainly, individuals who are less familiar with

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<sup>3</sup> See Figure 2.2 of *Literacy and Life Skills for Pasifika Adults*

<sup>4</sup> See Figure 2.3 of *Literacy and Life Skills for Pasifika Adults*

<sup>5</sup> 'Lower secondary or less' means completed at most Year 10, 'higher secondary' means completed more than Year 10 but no more than Year 13, and 'tertiary' means participated in a tertiary education programme.

<sup>6</sup> See Figure 4.1 of: *Literacy and Life Skills for Pasifika Adults*

<sup>7</sup> See Figure 5.1 of *Literacy and Life Skills for Pasifika Adults*

English or who have low levels of education are more likely to have lower English literacy skills (and this is quantified in *Literacy and Life Skills for Pasifika Adults*). What is less certain is the extent to which each of educational attainment and familiarity with English is (statistically) associated with English literacy. In other words:

*For Pasifika adults, is educational attainment or is familiarity with English most closely associated with English literacy?*

To investigate this question comprehensively would require longitudinal data. Unfortunately, the IALS and ALL surveys were not designed to address this type of question — they are not longitudinal. Moreover, there were too few Pasifika respondents to the IALS survey to allow meaningful use of the IALS data in addressing the above question. However, the oversample of Pasifika adults in the ALL survey *does* allow meaningful use of the ALL data and we can attempt to answer the above question in this context.

The IALS and ALL surveys measure two types of English literacy (prose literacy and document literacy), and some of the patterns of change in distribution of prose literacy skill that occurred between 1996 (IALS) and 2006 (ALL) are different to those for document literacy skill over the same period.

One could *hypothesise* that because it is more text dependent, prose literacy would be more closely associated than document literacy with familiarity with English but that both forms of literacy could be roughly equally closely associated with educational attainment. Hence, according to this hypothesis, the increasing proportion of Pasifika adults with higher levels of educational attainment would explain increases in literacy skill levels. These increases would be offset by decreases (more marked for prose than for document literacy) in literacy skill levels explained by the increasing proportion of Pasifika adults who most frequently speak a language other than English in the home. The net changes would be roughly those reported in *Literacy and Life Skills for Pasifika Adults*. The extent to which this rather tidy hypothesis matches reality leads to the following question:

*For Pasifika adults, are the different patterns of change in prose and document literacy between 1996 and 2006 attributable to different relationships between educational attainment, familiarity with English and each of these two forms of English literacy evident in the ALL data?*

To address these questions, a statistical regression model of each of prose literacy and document literacy among Pasifika adults was constructed using the ALL data. The various factors associated with English literacy described in *The Adult Literacy and Life Skills (ALL) Survey: Literacy and Life Skills for Pasifika Adults* were also included in the models to give them further validity. These factors are age, gender, labour force status, educational attainment, language most frequently spoken when at home, first language, place of birth and income. The models were constructed in three stages:

1. excluding time spent in formal education and income as potential explanatory factors;
2. including income but excluding time spent in formal education as a potential explanatory factor;
3. including both income and time spent in formal education.

This staggered inclusion of factors allows some insight into the relationships between the explanatory factors (notably income), as well as their relationships with prose and document literacy. Income was chosen as part of this staggered inclusion of factors because it is a widely used indicator of social well-being.

# 1. A model of prose literacy

We constructed a statistical regression model, that sought to explain variation in prose literacy of Pasifika adults in terms of variation in each of age, gender, labour force status, educational attainment, language most frequently spoken when at home, first language, place of birth and income. The model was constructed in three stages: firstly, excluding time spent in formal education and income as potential explanatory factors; secondly, including income but excluding time spent in formal education as a potential explanatory factor; thirdly, including both income and time spent in formal education.

Appendix Table 1 contains the standardised regression coefficients (and their errors) which form the model of prose literacy. The following paragraphs describe the results of the model. We look in detail at the first stage of the model and then examine changes in the subsequent stages of the model. We finish with a brief summary.

## Stage 1 of the model of prose literacy

Stage 1 of the model of prose literacy included the factors age, age squared (to allow for a non-linear relationship with prose literacy), gender, labour force status (either employed or student or other), language most frequently spoken when at home, first language, and place of birth.

Of all of the factors in stage 1 of the model of prose literacy, language spoken in the home was most closely associated with English prose literacy. Pasifika adults who spoke English infrequently in the home tended to have lower prose literacy skills).

After we have accounted for all other factors in stage 1 of the model, we can also see that:

- When compared with those of middle age, both younger and older Pasifika adults tended to have lower prose literacy skills.
- Pasifika adults who spoke English as an additional language and especially, those who spoke English infrequently in the home, tended to have lower prose literacy skills.
- Pasifika men and those Pasifika adults born outside of New Zealand tended to have lower prose literacy skills.
- Pasifika adults who were employed tended to have higher prose literacy skills.
- Pasifika adults who were students tended to have higher prose literacy skills.



## Stage 2 of the model of prose literacy

In addition to the factors included in stage 1 of the model of prose literacy, stage 2 also included income.

Of all of the factors in stage 2 of the model of prose literacy, language spoken in the home was still most closely associated with English prose literacy. Again, Pasifika adults who spoke English infrequently in the home tended to have lower prose literacy skills.

The findings for stage 1 of the model for prose literacy still held in the stage 2 model (that is, regardless of level of income) except that, after accounting for all other factors in stage 2 of the model:

- Pasifika adults with higher incomes tended to have higher prose literacy skills.
- As might be expected, those Pasifika adults who were employed tended to have higher incomes than others and income was more strongly associated with higher prose literacy skills than being employed.

## Stage 3 of the model of prose literacy

In addition to the factors included in stage 2 of the model of prose literacy, stage 3 also included educational attainment (in the form of time spent in formal education).

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

The findings for stage 2 of the model for prose literacy still held in the stage 3 model (that is regardless of time spent in formal education) except that, after accounting for all other factors in stage 3 of the model:

- Those Pasifika adults who were students tended to have spent more time in formal education than others, and time in formal education was more strongly associated with higher prose literacy skills than student status.

## Summary of the model of prose literacy

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

If educational attainment of Pasifika adults is not taken into consideration, language spoken in the home was most closely associated with English prose literacy. Pasifika adults who spoke English infrequently in the home tended to have lower prose literacy skills.

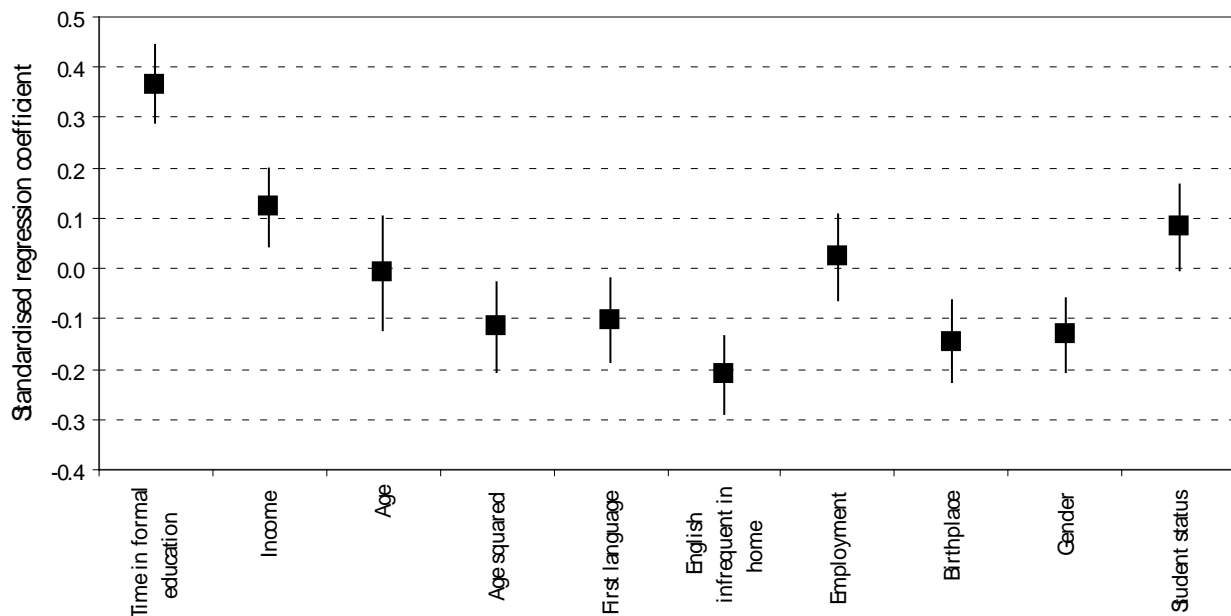
After we have accounted for all other factors in the model we can also see that:

- When compared with those of middle age, both younger and older Pasifika adults tended to have lower prose literacy skills.

- Pasifika adults who spoke English as an additional language and those who spoke English infrequently in the home tended to have lower prose literacy skills.
- Pasifika men and those Pasifika adults born outside of New Zealand tended to have lower prose literacy skills.
- Pasifika adults who were employed tended to have higher prose literacy skills. However, as might be expected, those who were employed tended to have higher incomes than others and income was more strongly associated with higher prose literacy skills than employment.
- Pasifika adults who were students tended to have higher prose literacy skills. However, those Pasifika adults who were students tended to have spent more time in formal education than others, and time in formal education was more strongly associated with higher prose literacy skills than student status.
- The above statements are valid regardless of the amount of time Pasifika adults spent in formal education. However, those Pasifika adults who had spent longer in formal education tended to have higher prose literacy skills.

Figure 1 below shows the relative impacts of the explanatory variables in the stage 3 model of prose literacy. For each explanatory variable, an estimate of the standardised regression coefficient is presented together with a 95 percent confidence interval. The confidence interval straddles zero exactly when the explanatory variable is not significantly associated with prose literacy (after controlling for the other variables in the model).

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



The strength of association of educational attainment (“time in formal education”) and familiarity with English (“English infrequent in home”) with prose literacy is clear in Figure 1.

## 2. A model of document literacy

As was the case for prose literacy, we constructed a statistical regression model, that aimed to explain variation in document literacy of Pasifika adults in terms of variation in each of age, gender, labour force status, educational attainment, language most frequently spoken when at home, first language, place of birth and income. The model was constructed in three stages: firstly, excluding time spent in formal education and income as potential explanatory factors; secondly, including income but excluding time spent in formal education as a potential explanatory factor; thirdly, including both income and time spent in formal education.

Appendix Table 2 contains the standardised regression coefficients (and their errors) which form the model of document literacy. The following paragraphs set out the findings of the model. We look in some detail at the first stage of the model and then examine changes in the subsequent stages of the model. We finish with a brief summary.

### Stage 1 of the model of document literacy

Stage 1 of the model of document literacy included the factors age, age squared (to allow for a non-linear relationship with document literacy), gender, labour force status (either employed or student or other), language most frequently spoken when at home, first language, and place of birth.

Of all of the factors in stage 1 of the model of document literacy, language spoken in the home was most closely associated with English document literacy. Pasifika adults who spoke English infrequently in the home tended to have lower document literacy skills.

After we have accounted for all other factors in stage 1 of the model we can also see that:

- When compared with those of middle age, both younger and older Pasifika adults tended to have lower document literacy skills.
- Pasifika adults who spoke English as an additional language and especially, those who spoke English infrequently in the home tended, to have lower document literacy skills.
- Pasifika men and those Pasifika adults born outside of New Zealand tended to have lower document literacy skills.
- Pasifika adults who were employed tended to have higher document literacy skills.
- Pasifika adults who were students tended to have higher document literacy skills.

These findings match the findings of the stage 1 model of prose literacy.

## 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.

Of all of the factors in stage 2 of the model of document literacy, language spoken in the home was still most closely associated with English document literacy. Again, Pasifika adults who spoke English infrequently in the home tended to have lower document literacy skills.

The findings for stage 1 of the model for document literacy still held in the stage 2 model (that is, regardless of level of income) except that, after accounting for all other factors in stage 2 of the model:

- Pasifika adults with higher incomes tended to have higher document literacy skills.
- As might be expected, those Pasifika adults who were employed tended to have higher incomes than others and income was more strongly associated with higher document literacy skills than being employed.

These findings again, were consistent with the findings of the stage 2 model of prose literacy. However, in the stage 2 model of document literacy, we also found:

- Pasifika adults who spoke English as an additional language tended to have lower incomes and lower income was more strongly associated with lower document literacy skills.

## 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 also included educational attainment (in the form of time spent in formal education).

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

The findings for stage 2 of the model for document literacy still held in the stage 3 model (that is, regardless of time spent in formal education).

## Summary of the model of document literacy

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

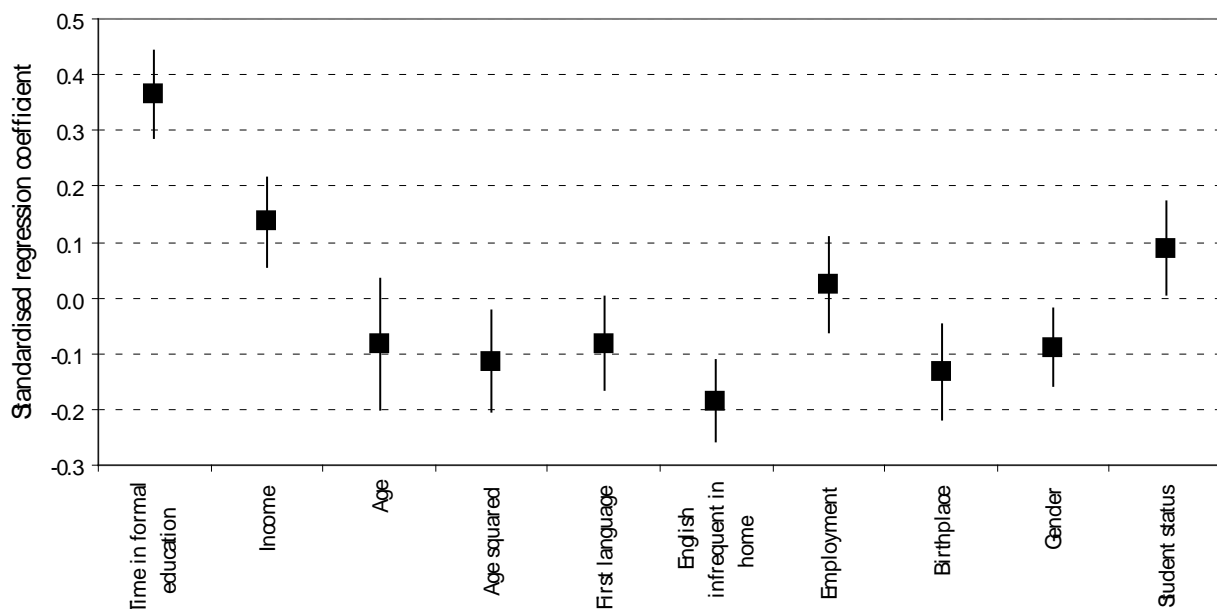
In the absence of time spent in formal education, language spoken in the home was most closely associated with English document literacy. Pasifika adults who spoke English infrequently in the home tended to have lower document literacy skills.

After we have accounted for all other factors in the model we can also see that:

- When compared with those of middle age, both younger and older Pasifika adults tended to have lower document literacy skills.
- Pasifika adults who spoke English as an additional language tended to have lower document literacy skills. However, Pasifika adults who spoke English as an additional language tended to have lower incomes and lower income was more strongly associated with lower document literacy skills.
- Pasifika men, Pasifika adults who spoke English infrequently in the home and those born outside of New Zealand tended to have lower document literacy skills.
- Pasifika adults who were employed tended to have higher document literacy skills. However, as might be expected, those who were employed tended to have higher incomes and this was strongly associated with higher document literacy skills.
- Pasifika adults who were students tended to have higher document literacy skills.
- The above statements are valid regardless of the amount of time Pasifika adults spent in formal education. However, those Pasifika adults who had spent longer in formal education tended to have higher document literacy skills.

Figure 2 below, shows the relative impacts of the explanatory variables in the stage 3 model of document literacy. For each explanatory variable, an estimate of the standardised regression coefficient is presented together with a 95 percent confidence interval. The confidence interval straddles zero exactly when the explanatory variable is not significantly associated with document literacy (after controlling for the other variables in the model).

**Figure 2: Standardised regression coefficients for document literacy**



The strength of association of educational attainment (“time in formal education”) and familiarity with English (“English infrequent in home”) with document literacy is clear in Figure 2.

# 3. Discussion

In this report we looked at the following two questions:

- In the ALL data, for Pasifika adults, is educational attainment or is familiarity with English most closely associated with English literacy?
- For Pasifika adults, are the different patterns of change in prose and document literacy between 1996 and 2006 attributable to different relationships between educational attainment, familiarity with English and each of these two forms of English literacy evident in the ALL data?

The answer to the first question is that educational attainment (in the form of time spent in formal education) is statistically significantly more closely related to both prose and document literacy skills than is familiarity with English. However familiarity with English is more closely related to both prose and document literacy than any of age, gender, labour force status, educational attainment, language most frequently spoken when at home, first language, place of birth, and income (and for most of these factors the difference is statistically significant).

The answer to the second question hinges on the existence of differences in the relationship between prose literacy, familiarity with English and educational attainment and that between document literacy, familiarity with English and educational attainment. Looking at the Stage 3 estimates in Appendix Tables 1 and 2, we can see that there are differences in the magnitudes of the coefficients, but that these differences are small. Although the models in this document don't account for all factors that could potentially influence these relationships, they do account for many of the important ones. Consequently, for Pasifika adults, we can reasonably conclude that there is no strong evidence in the ALL data to suggest that *any* differences between performance in prose and document literacy are attributable to different relationships between educational attainment, familiarity with English and each of these two forms of English literacy.

So what can we conclude about the relationship between changes in the distributions of educational attainment and familiarity with English between 1996 and 2006 and changes in the distributions of prose literacy and document literacy over the same period?

There are two possible conclusions we could draw. The first is that the relationships between each of prose and document literacy and educational attainment and familiarity with English remained relatively stable from 1996 to 2006. The second is that these relationships changed between 1996 and 2006.

Suppose we were to hypothesise the first of these possible conclusions. In that case, there are relatively large changes in the distributions of educational attainment and familiarity with English. But there are only small differences in the relationships between each of these and prose and document literacy. Presumably there would have been a trade-off between increases in average literacy skill due to increases in average educational attainment offset by decreases in average literacy skill due to increases in the proportion of Pasifika adults who are unfamiliar with English.

Suppose now, we were to hypothesise the second, and more complex, of these possible conclusions. In that case, the changing relationships between educational attainment and familiarity with English and each of prose and document literacy would *also* contribute to the changes and differences in the distributions of each of these literacy skills.

In the absence of other data, these two conclusions might have quite different policy implications. For example, if the relationships between English literacy and other factors were relatively stable (case 1), then this stability might be expected to continue in the medium term. Consequently, policy might encourage shifts in the distribution of background factors among Pasifika adults toward conditions associated with higher English literacy skill. If instead the relationships between English literacy and other factors were changing (case 2), then close analysis of the direction of those changes together with information about changes in distribution would be needed to inform well-directed policy.

In either case however, well-directed policy will be informed by the possibility of unintended outcomes and will have contingencies to ameliorate these. In the present setting, the potential socio-cultural costs of encouraging familiarity with English among Pasifika adults should not be ignored.

To determine which of these two cases held in future, the analyses in the current document would need to be repeated using data similar to that of the ALL survey collected some time in the future.

# 4. Publications

## 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

Appendix Table 1: Standardised regression coefficients for prose literacy model using the ALL data

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>0.365</b>	0.040
Income (log income in 000s)	*	*	<b>0.182</b>	0.041	<b>0.123</b>	0.039
Age	0.043	0.052	-0.014	0.063	-0.009	0.058
Age squared (centred at 33.6 years)	<b>-0.218</b>	0.040	<b>-0.147</b>	0.046	<b>-0.116</b>	0.046
First language (0 = English, 1 = other)	<b>-0.107</b>	0.041	<b>-0.098</b>	0.048	<b>-0.103</b>	0.042
English infrequent in home (0 = no, 1 = yes)	<b>-0.275</b>	0.044	<b>-0.245</b>	0.043	<b>-0.211</b>	0.039
Employment (0 = not employed, 1 = employed)	<b>0.124</b>	0.043	0.075	0.047	0.023	0.044
Place of birth (0 = New Zealand, 1 = elsewhere)	<b>-0.163</b>	0.047	<b>-0.161</b>	0.045	<b>-0.146</b>	0.041
Gender (0 = female, 1 = male)	<b>-0.122</b>	0.037	<b>-0.153</b>	0.042	<b>-0.131</b>	0.038
Student status (0 = not student, 1 = student)	<b>0.135</b>	0.045	<b>0.143</b>	0.049	0.082	0.043

Notes:

1. Figures in bold represent estimates significant at the 5% 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.

The stage 1 model accounted for approximately 31 percent of the variance in document literacy scores, the stage 2 model approximately 32 percent and the stage 3 model approximately 44 percent.

Appendix Table 2: Standardised regression coefficients for document literacy model using the ALL data

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>0.366</b>	0.040
Income (log income in 000s)	*	*	<b>0.195</b>	0.042	<b>0.136</b>	0.040
Age	-0.021	0.056	-0.088	0.066	-0.083	0.061
Age squared (centred at 33.6 years)	<b>-0.223</b>	0.042	<b>-0.145</b>	0.046	<b>-0.114</b>	0.046
First language (0 = English, 1 = other)	<b>-0.095</b>	0.043	-0.077	0.050	-0.082	0.043
English infrequent in home (0 = no, 1 = yes)	<b>-0.252</b>	0.044	<b>-0.219</b>	0.043	<b>-0.185</b>	0.038
Employment (0 = not employed, 1 = employed)	<b>0.131</b>	0.043	0.077	0.050	0.025	0.044
Place of birth (0 = New Zealand, 1 = elsewhere)	<b>-0.145</b>	0.047	<b>-0.147</b>	0.046	<b>-0.133</b>	0.043
Gender (0 = female, 1 = male)	<b>-0.083</b>	0.036	<b>-0.110</b>	0.041	<b>-0.089</b>	0.035
Student status (0 = not student, 1 = student)	<b>0.144</b>	0.047	<b>0.150</b>	0.047	<b>0.089</b>	0.043

Notes:

1. Figures in bold represent estimates significant at the 5% 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.

The stage 1 model accounted for approximately 30 percent of the variance in document literacy scores, the stage 2 model approximately 32 percent and the stage 3 model approximately 44 percent.