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Assessing skills of adult learners in 2011

Profiling skills and learning using the Literacy and Numeracy for Adults Assessment Tool

New Zealand Government

Literacy, language and numeracy research

This series covers research on teaching and learning in literacy, language and numeracy and analyses of international surveys on adult literacy and numeracy.

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FIGURES

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SUMMARY

This is an initial statistical report on the Literacy and Numeracy for Adults Assessment Tool in terms of:

- the extent of its use in 2011, the first full year of implementation,
- the reading and numeracy profiles of learners when first assessed, and
- the extent to which learners can be seen to have increased their reading and numeracy skills over the course of the 2011 year.

KEY POINTS

- In 2011, 77,000 learners were assessed using the Literacy and Numeracy for Adults Assessment Tool, and over 200,000 individual assessments were carried out, across the skills of reading, writing, vocabulary and numeracy.
- More than three quarters of assessments were for reading and numeracy.
- Some of the learners enrolled at each qualification level were assessed, but the focus was on New Zealand Qualification Framework Levels 1 to 4: the percentage of learners assessed in these levels ranged from 16 per cent at Level 4 to 31 per cent at Level 3 (in programmes funded by the Student Achievement Component or Youth Guarantee).
- Youth Guarantee learners were the most thoroughly assessed group, with over 70 per cent assessed at least once, and over 35 per cent assessed at least twice for one or more skills.
- Among learners enrolled in SAC- or YG-funded programmes at NZQF Levels 1 to 3, the rate of assessment was higher among learners enrolled at Institutes of Technology and Polytechnics (36 per cent) than at Private Training Establishments (20 per cent) or at wānanga (15 per cent).
- Assessed learners covered a wide age range, but there was a focus on young learners: 31 per cent of assessed learners were aged 16 to 19 on first assessment in 2011.
- Assessment Tool scores can be converted to Steps on the Tertiary Education Commission's Learning Progressions for Adult Literacy and Numeracy, which range from lowest skill at Step 1 to highest at Step 6, although there is not a direct correspondence between the Steps for literacy and for numeracy.
- The differences between the Learning Progressions for literacy and for numeracy were reflected in the fact that learners overall were assessed lower on the reading than on the general numeracy steps, with approximately half of learners assessed for reading scoring in the top **three** steps (Learning Progressions Steps 4, 5 and 6), while for general numeracy approximately half of learners scored in the top **two** steps (Steps 5 and 6).
- Although the groups of learners assessed using the Assessment Tool were clearly not representative of the adult population, the variations in Assessment Tool reading and general numeracy scores followed the same patterns as the total adult population

according to the Adult Literacy and Life Skills (ALL) Survey 2006, in terms of age, gender, ethnicity, first language, and educational participation.

- Among learners assessed at least twice for reading or general numeracy, more than half of those who scored at the bottom of the scale (Step 1) on their first assessment recorded statistically significant gains in skill during 2011. Among others, the rates of significant gain were progressively less the higher their first assessment scores. Learners whose first assessment scores were at the top of the scale (Step 6) had little scope to show significant gain.

Use of the Assessment Tool in 2011

The picture of use of the Assessment Tool in 2011 is highly dynamic, with education providers and other organisation beginning to use the Tool either during the pilot year of 2010, or some time during 2011. The Assessment Tool was still undergoing development, with a short 'Snapshot' version of the Tool becoming available in February 2011 for reading and numeracy. By November this had become the most common type of assessment for those skills. It remains to be seen whether the patterns of results reported here continue to be evident in the use of the Assessment Tool, or whether these patterns represent an initial phase before settling into a more stable state.

In 2011, 77,000 learners were assessed at least once using the Assessment Tool, and over 200,000 individual assessments were undertaken, with separate assessments for reading, vocabulary, writing, general numeracy and two specific sub-skills of numeracy. More than three-quarters of those assessments were either for reading or for general numeracy.

The Assessment Tool was used by 262 organisations in 2011. More than three-quarters of assessments were completed either by private training establishments (PTEs) or by institutes of technology or polytechnics (ITPs).

Learners assessed in 2011 covered a wide range of ages, but there was a concentration on young learners, with learners aged 16-19 accounting for about 31 per cent. Fifty-six per cent of learners assessed were male. The ethnic distribution of assessed learners largely followed that of learners enrolled in Level 1 to 3 qualifications, which meant that Māori and Pasifika were over-represented in comparison with the general population, together accounting for over 40 per cent of learners assessed, while people who identified as European or Asian were under-represented in comparison with the population. The proportion of assessed learners whose first language was not English was 17.5 per cent: this is close to the estimate for the population aged 16 to 65 from the Adult Literacy and Life Skills (ALL) Survey 2006.

Some of the learners enrolled at each qualification level were assessed, but the focus was on New Zealand Qualification Framework Levels 1 to 4: the proportion assessed at least once was between 16 per cent at Level 4 and 31 per cent at Level 3 (in programmes funded by the Student Achievement Component or Youth Guarantee). In contrast, less than 5 per cent of learners enrolled at Level 5 or above (in SAC- or YG-funded certificate, diploma or degree programmes) were assessed.

This focus is in line with the aims of the government's Tertiary Education Strategy for the development of learners' literacy and numeracy skills, and in line with the Tertiary Education Commission's guidelines for embedding literacy and numeracy learning across all fields of study. Both of these are directed in particular towards learners at Levels 1 to 3.

The greatest use of the Assessment Tool among NZQF Level 1 to 3 programmes was in Youth Guarantee fees-free tertiary places, in which 76 per cent of learners were assessed during 2011.

Of learners studying in SAC- or YG-funded programmes at NZQF Levels 1 to 3, 36 per cent of those enrolled at ITPs were assessed, and 20 per cent at PTEs were assessed, while 15 per cent of those enrolled at wānanga were assessed.

Learners' reading and numeracy profiles on first assessment in 2011

The differences between the Learning Progressions for literacy and for numeracy were reflected in the fact that learners overall were assessed higher on the general numeracy than on the reading Learning Progressions, with the distribution of learners' assessments for general numeracy bunching around a peak at Step 5, while Steps 3 and 4 were nearly equal as the peak steps for reading.

Consequently, approximately half of learners assessed for reading scored in the top **three** steps (Learning Progressions Steps 4, 5 and 6), while for general numeracy approximately half of learners scored in the top **two** steps (Steps 5 and 6).

Reading and numeracy profiles according to demographic characteristics of learners were in line with previous research based on the Adult Literacy and Life Skills Survey 2006. Specifically, both skills increased with age from relatively low at 16-17 up to a peak among those aged 25-34, and then declined somewhat for older age groups. Men tended to score higher for general numeracy, but there was little gender difference in reading. Learners identifying as European or Māori scored higher in reading than those identifying as Pasifika or Asian, while European and Asian learners scored higher in general numeracy than Māori and Pasifika. Learners whose first language was English scored higher than learners with other first languages in reading and in general numeracy.

For learners whose Assessment Tool results could be matched to enrolments in SAC- or YG-funded programmes, the proportion of learners scoring in the upper part of the scales (Steps 4, 5 and 6 for reading, and Steps 5 and 6 for general numeracy) rose steadily with each higher NZQF level.

Although the groups of learners assessed using the Assessment Tool were clearly not representative of the adult population, the variations in Assessment Tool reading and general numeracy scores followed the same patterns as the total adult population according to the Adult Literacy and Life Skills (ALL) Survey 2006, in terms of age, gender, ethnicity, first language, and educational participation. This study was not designed to test the validity of the Assessment Tool, but these correspondences between the Assessment Tool and ALL Survey results do tend to confirm that the Assessment Tool measures the same skill constructs as the assessments used for the ALL Survey.

For learners enrolled in programmes at NZQF Levels 1 to 3, those in Youth Guarantee tended to have lower skills than those enrolled in Student Achievement Component (SAC) funded programmes. The proportion of learners enrolled in SAC- or YG-funded programmes at NZQF Levels 1 to 3 scoring in the upper part of the scales (Steps 4, 5 and 6 for reading, and Steps 5 and 6 for general numeracy) was higher for learners enrolled at ITPs and wānanga than in PTEs.

The extent of learner gain in reading and numeracy skills in 2011

Approximately a third of those learners who had been initially assessed at some time during 2011 were assessed again for the same skill in the course of the year.

Approximately 22,000 learners were assessed two or more times in 2011 for reading, and about 16,000 for general numeracy, including about 14,000 learners who were assessed more than once for both skills.

The extent of learner gain was explored by comparing the first and last reading and the first and last general numeracy assessments in 2011 for these learners. This approach was adopted for the purpose of researching learners' experiences, and is different from the approach proposed by the Tertiary Education Commission for measuring the performance of tertiary education organisations in literacy and numeracy.

Learners whose scores were low on first assessment were more likely to be assessed again than those who scored high on first assessment.

The literacy and numeracy scales have maximum and minimum values; so learners who scored near the maximum on their first assessment were not likely to show significant gain because there was little scope for them to improve their score on the Assessment Tool (even though they may have in fact improved their skills). On the other hand, learners who scored near the minimum had plenty of scope to improve their scores and tended to do so.

The main finding concerning learner gain was that a large proportion of learners (over 50 per cent for reading and for general numeracy) who scored near the minimum (i.e. at Step 1 on the Learning Progressions for adult literacy and numeracy) showed statistically significant gain in scores between first and last assessments in 2011. For learners in the middle parts of the scale (i.e. whose first assessment score corresponded to Steps 2 to 5 on the Learning Progressions), the proportion who showed statistically significant gain was not as great as this and was smaller for learners at the higher steps.

The extent to which learners who scored low on their first assessments showed statistically significant gain in scores varied somewhat according to demographic characteristics of the learners and characteristics of educational provision.

For learners whose first assessment scores were the lowest (i.e. Step 1), the proportion showing statistically significant gain, in general, increased with age, with the greatest proportion among learners aged 55 and over. The proportion was higher for men than women for both skills. Learners who identified as Asian showed the greatest rate of significant gain for general numeracy, while for reading, Māori and European learners showed greater rates of significant gain. Learners whose first language was English showed greater rates of significant gain for reading, but lower rates of gain for general numeracy.

Among learners studying in SAC- or YG-funded programmes at NZQF Levels 1 to 3, over 35 per cent of those who were initially assessed for reading or general numeracy were reassessed within the year. Of learners who scored at Step 1 on first assessment, those studying at higher NZQF Levels tended to experience higher rates of significant gain.

Learners in Youth Guarantee programmes were most likely to be reassessed for reading and general numeracy: in fact, over 50 per cent of Youth Guarantee learners were reassessed. Given that Youth Guarantee learners were most likely to be assessed at least once, this group of learners was clearly the most thoroughly assessed and reassessed. For learners whose first assessment was at Step 1 for either skill, Youth Guarantee learners also showed a greater rate of significant gain than learners in SAC-funded programmes.

NZQF Level 1 to 3 learners enrolled in SAC- or YG-funded programmes at PTEs and wānanga, whose first assessment for reading or for general numeracy was at the bottom of the scale (Step 1), had a somewhat higher rate of significant gain than corresponding learners, initially assessed at Step 1, who were enrolled at ITPs.

1 INTRODUCTION

1.1 The Literacy and Numeracy for Adults Assessment Tool

The Literacy and Numeracy for Adults Assessment Tool (the Assessment Tool) is an online tool designed to provide robust and reliable information on the reading, writing, and numeracy skills of adults. The primary purpose of the Assessment Tool is to support educators and learners in their teaching and learning of reading, writing and numeracy. The Assessment Tool is designed to allow learners to track their progress over time and enables educators and organisations to report on the progress made by groups or cohorts of learners.

The Assessment Tool was developed by a three-party consortium, led by the New Zealand Council for Educational Research (NZCER) with the assistance of the Australian Council for Educational Research (ACER) and information technology company Fronde, under direction from the Tertiary Education Commission (TEC).

It was implemented on a voluntary basis in 2010, and has been mandatory for all TEC-funded literacy and numeracy provision from 2011, including courses with embedded literacy and numeracy[1]. It has also been adopted in other contexts, such as the delivery of literacy and numeracy programmes within prisons.

Assessment Tool scores can be related to the Learning Progressions for Adult Literacy and Numeracy (Tertiary Education Commission 2008a, b, c), which were devised to represent competencies in reading, writing, listening, speaking and numeracy. The Learning Progressions represent the development of literacy and numeracy as movement (or progression) along a set of related continuums. These continuums can then be divided into a sequence of stages known as Steps. See Appendix A for further explanation.

The Learning Progressions allow that there will be some learners who lack "basic, essential skill, knowledge and attitudes" needed for literacy development. For such learners the Tertiary Education Commission (2008d) has provided guidance to educators in the form of the *Starting Points* resources, along with a Starting Points Assessment Guide (Tertiary Education Commission, 2010).

The Assessment Tool produces numerical scores on a range from zero to 1,000. The zero does not represent a complete lack of skill, but rather indicates the starting point of the particular progression, which is different for literacy and numeracy, as indicated above. Similarly, a score of 1,000 does not represent some maximum possible literacy or numeracy skill which could not be exceeded, but rather a very high level of competency in dealing with the literacy or numeracy demands of everyday life.

The numerical score produced by the Assessment Tool can be translated into Learning Progression Steps, though the number-to-Step translation is different for each of the skills assessed (see Chapter 6 for details).

The Assessment Tool scores are based on each learner's responses to a limited number of questions. Accordingly the scores are subject to some uncertainty, and this is represented by the standard error estimate which is provided along with the numerical score: the larger the standard error, the less precise the score is as a measure of skill.

[1] 'Embedded' literacy and numeracy refers to instruction which is incorporated into courses focused on particular subject matter and/or a vocational skill, and which is aimed at developing literacy and numeracy skills relevant to that subject matter or vocational skill.

This means that a score from any one assessment should be seen as falling within a range rather than being a defined single point. This also means that there is some uncertainty in translating the score into a particular Learning Progression Step.

Skills assessed

The Literacy and Numeracy for Adults Assessment Tool provides assessments for four skill areas:

- Numeracy
- Reading
- Vocabulary
- Writing

The Vocabulary area is included in order to support learning in the other areas, especially as a diagnostic aid where learners have low literacy or numeracy skills.

Within the numeracy area the Assessment Tool provides assessments for three skills, namely General Numeracy, Number Knowledge, and Number Strategies and Measurement.

Taking into account these three numeracy skills, there are six skill modules to choose from when using the Assessment Tool:

- General Numeracy
- Number Knowledge
- Number Strategies and Measurement
- Read with Understanding
- Vocabulary
- Write to Communicate

Types of assessment

Assessments can be adaptive (where the Assessment Tool software alters the difficulty of subsequent questions in light of the learner's earlier answers) or non-adaptive (at a fixed level of difficulty). Non-adaptive assessments can be undertaken by learners online, or printed out (usually by educators) for offline use ('Non-adaptive for printing').

The levels of difficulty of non-adaptive assessments are expressed as ranges of Learning Progression Steps within which the assessments are designed to work. There are three levels of difficulty at which non-adaptive assessments can be set: Steps 1-3, Steps 2-5, and Steps 4-6.

The standard or full-length adaptive assessments require 30 or more items to reach a definitive score for a learner. From February 2011, shorter length adaptive assessments for reading and numeracy also became available. Called "Snapshot" assessments, these recognise that in *some* circumstances a shorter assessment will provide enough information for an educator's purposes, while minimising the amount of time needed for administration.

The Snapshot assessment was only available in 2011 as an adaptive online assessment.[2] As each Snapshot assessment includes about half as many items as a full-length adaptive assessment, it takes less time to administer. The Snapshot assessments use items from the same

[2] A non-adaptive for print version of the Snapshot assessment was introduced in October 2012.

item banks as the other reading and numeracy assessments available in the Assessment Tool. There are two types of Snapshot assessment:

> **with a threshold:** this assessment is designed to identify whether a learner is clearly achieving above (or below) a specified Learning Progression Step. In some cases the learner's result will be "undecided" indicating that they are close to the threshold Step. The report also indicates a best-fit Step and scale score.
>
> **without a threshold:** this type of assessment reports a best-fit Step and scale score.

As fewer items are included in a Snapshot assessment the scale score tends to have a larger margin of error. The Snapshot assessment meets the requirements for TEC funding, at least for progress assessments.

The types of assessment available in 2011 varied according to the skill being assessed. For reading and numeracy assessments, all assessment types were available (adaptive online, both full-length and snapshot; non-adaptive online; and non-adaptive for printing). For writing assessments, non-adaptive for printing was the only type available, while for vocabulary the only option was full-length adaptive online.

While scoring of numeracy, reading and vocabulary assessments is automated, writing assessments currently need to be marked by human assessors before a score can be assigned.

The Tertiary Education Commission provides guidance to organisations on using the Assessment Tool: this guidance is outlined in Appendix B.

1.2 Data for analysis

Two sets of data provide the basis for the analyses in this report:

- Literacy and Numeracy for Adults Assessment Tool data for all of 2010 and 2011, extracted by the Tertiary Education Commission on 27 February 2012.[3] The data set contains one record for each assessment for each learner. Each learner is identified by a National Student Number (NSN). An Assessment ID identifies a batch of assessments of a particular skill and assessment type, set up by an organisation at a particular time for a particular group of learners, typically members of a class or programme. The date of assessment is taken as the setup date in the case of non-adaptive for printing assessments, or otherwise as the date on which the assessment is completed online and submitted to the Assessment Tool database. Each assessment is identified by the learner's NSN, the Assessment ID number and assessment date.

- Tertiary Sector Enrolment and Completions (TSEC) data for 2010 and 2011. This is compiled by the Ministry of Education from the Single Data Return (SDR) for December 2010 and for December 2011. Tertiary education organisations which receive Student Achievement Component (SAC) funding from the Tertiary Education Commission are required to submit Single Data Returns. For matching with the Assessment Tool data, only a subset of the TSEC data was used, relating to learners in programmes funded by SAC or the Youth Guarantee fees-free tertiary places scheme (YG). These were the only funding groups in TSEC for which data was complete at the time of writing.

[3] Data from non-adaptive for printing assessments are required to be submitted to the Assessment Tool database within eight weeks of the assessment being set up. All data from 2011 non-adaptive for printing assessments should have been submitted by this date, but there may be a small number of 2011 assessments which were submitted late, after this date, and which are therefore not included in the analysis data set.

For a more detailed description of the data sets, see Chapter 6, Data and Definitions.

1.3 Limitations

Data limitations

The Single Data Return provides data on only a subset of tertiary enrolments. Other reporting mechanisms are used to compile data on the following funds:

- Targeted Training (Foundation-Focused Training Opportunities, Youth Training, Skill Enhancement)
- Industry Training
- Trades Academies
- Workplace Literacy Fund
- Intensive Literacy and Numeracy Fund

Examination of partial and/or preliminary enrolment data for 2010 and 2011 indicates that the Assessment Tool was used to assess a large number of learners enrolled in programmes supported by these funds.

However, as indicated above, the enrolment data that was complete and verified at the time of writing was for learners enrolled in SAC- and YG-funded programmes, and only this enrolment data has been used for matching to the Assessment Tool data. Hence analyses of Assessment Tool use and results according to qualification level, funding group and type of education provider in this report only apply to SAC- and YG-funded programmes.

Analyses of Assessment Tool use and results according to demographic characteristics of learners (age, gender, ethnic group and first language) are based solely on Assessment Tool data, and this will include those learners enrolled in programmes other than those funded by the Student Achievement Component or Youth Guarantee fees-free tertiary places scheme. The main drawback of the data for these analyses is that approximately 5 per cent of learners in the Assessment Tool data for 2011 have unspecified ethnic group.

Limitations of analysis

This is a report on some trends in the use of the Assessment Tool and patterns of results related to some characteristics of learners (age, gender, ethnic group and first language) and of educational provision (qualification level, programme funding, type of education provider). Given that the Assessment Tool is relatively new, the emphasis here is on providing an initial set of empirical observations.

Analysis of Assessment Tool scores is limited to the two skills General Numeracy and Read with Understanding, because by far the greatest number of assessments were for these two skills, and so the assessments of these two skills provide the best data for detailed statistical analysis. All assessments for these two skills are pooled together and used regardless of which assessment type (adaptive or non-adaptive, online or offline, full-length or Snapshot) was involved.

Analysis of possible gains in these two skills is based on a simple comparison of first and last assessments in 2011 for the same skill, for the relatively small subset of learners who were assessed more than once in 2011. This approach does not take account of the nature, length or intensity of the educational programmes that learners were enrolled in, and is thus only a first step towards understanding the extent to which programmes may enhance learners' skills.

At this stage it is necessary to be very cautious about interpreting the statistical patterns reported here. One reason for caution is that the set of learners assessed using the Assessment Tool in 2011 was a relatively small subset of all tertiary learners enrolled in that year, and it is clear from the initial analyses reported here that it was not representative of all tertiary learners; that is, learners with certain characteristics, in certain types of educational provision, were more likely to be assessed than others.

Another reason for caution is that experience of the process of implementation of the Assessment Tool (see Haggland and Earle 2012) indicates that successful implementation requires understanding of the purposes of assessment and engagement with the Assessment Tool on the part of educators and especially learners. The assessment scores for learners who lacked understanding and engagement were likely to understate their skills. Changes in scores between initial and progress assessments could reflect changes in level of engagement as well as actual changes in skills.

A further reason for caution is that there are clearly relationships between different characteristics which are analysed separately in this report. For example, there are relationships between ethnic group and first language, and between age and level of study, and different types of provider differ in terms of the characteristics of learners enrolled in their programmes.

To develop sound interpretations of the data which take into account the non-random selection of which learners were assessed, as well as the relationships between different characteristics of learners and provision, would require careful multivariate statistical modelling. Such modelling might also be able to shed light on the effect of variable understanding and engagement by educators and learners. Such statistical modelling is beyond the intended scope of this report, but it is anticipated that it will be an important part of future research in the Ministry's work on literacy, language and numeracy.

1.4 Outline of this report

Chapter 2 provides some basic descriptive statistics on use of the Assessment Tool in 2011, in terms of the total numbers of assessments; the numbers of assessments of each skill and type; the numbers of assessments completed by different types of organisation; the number of assessments which were first assessments for each learner and each skill, and the number which were second or subsequent assessments ; the demographic characteristics (age, gender, ethnic group and first language) of learners assessed; and the numbers of learners assessed according to characteristics of provision (qualification level, funding group, type of education provider).

Chapter 3 is concerned with first assessments of learners in 2011 for the skills General Numeracy and Read with Understanding. It covers the skill profiles of learners on first assessment, in terms of Assessment Tool scores and Learning Progressions Steps, for all assessments of these two skills, and according to demographic characteristics of learners, qualification levels, funding groups and education provider types.

Chapter 4 is concerned with learner gains in skill, again for the skills General Numeracy and Read with Understanding. The measure of learner gain used is the proportion of learners recording statistically significant gain between their first and last assessments in 2011 for these two skills. Profiles of learner gain, according to the Assessment Tool score on first assessment and the Learning Progression Steps, are explored for all assessments for these two skills, and in terms of demographic characteristics of learners, qualification level of enrolment, funding group and education provider type.

Chapter 5 attempts to distil an overall picture of Assessment Tool use, of learners' initial skills and of learner gains as it began to emerge in the first full year of implementation, 2011.

Chapter 6 provides technical detail on the data used and definitions of variables which underlie the analyses presented in the body of the report.

The Appendices contain information and guidance from the Tertiary Education Commission on the Learning Progressions for Adult Literacy and Numeracy and the use of the Assessment Tool.

2 AN EMERGING PICTURE OF ASSESSMENT TOOL USE

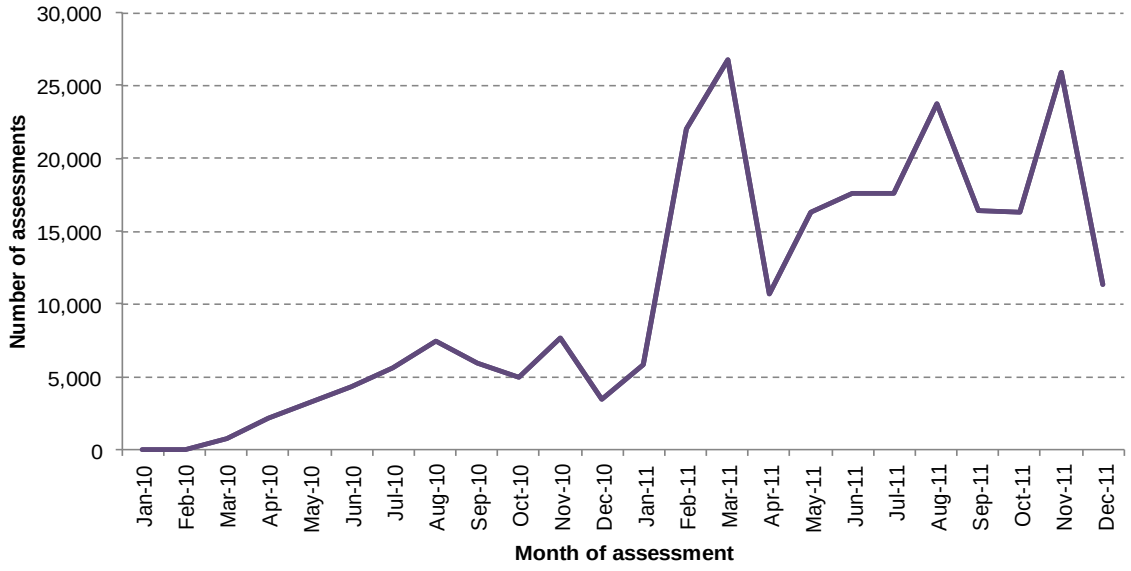
Patterns of Assessment Tool use changed rapidly through the period 2010-2011. This chapter provides a record of some of those changes, as well as an overview of Assessment Tool use for the year 2011.

2.1 Growth in Assessment Tool use 2010-2011

Figure 1 shows the total number of assessments administered each month across 2010 and 2011. Each assessment is an assessment of one learner in one skill on one date.[4] The total number of assessments in 2010 was 45,594, while 210,713 were carried out in 2011.

The transition from the pilot year of 2010 to the first full year of implementation in 2011 can be clearly seen in the rapid increase in numbers of assessments in February 2011. There are also three clear monthly peaks of assessment activity in 2011, in March, August and November, which largely reflect the pattern of the academic year at Institutes of Technology and Polytechnics (see section 2.4).

Figure 1
Total number of assessments per month for 2010 and 2011



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 256,307 assessments in 2010 and 2011.

[4] Or more technically, as outlined in section 1.3, each assessment is identified by the learner's National Student Number (NSN), the Assessment ID number and assessment date.

2.2 Skills assessed

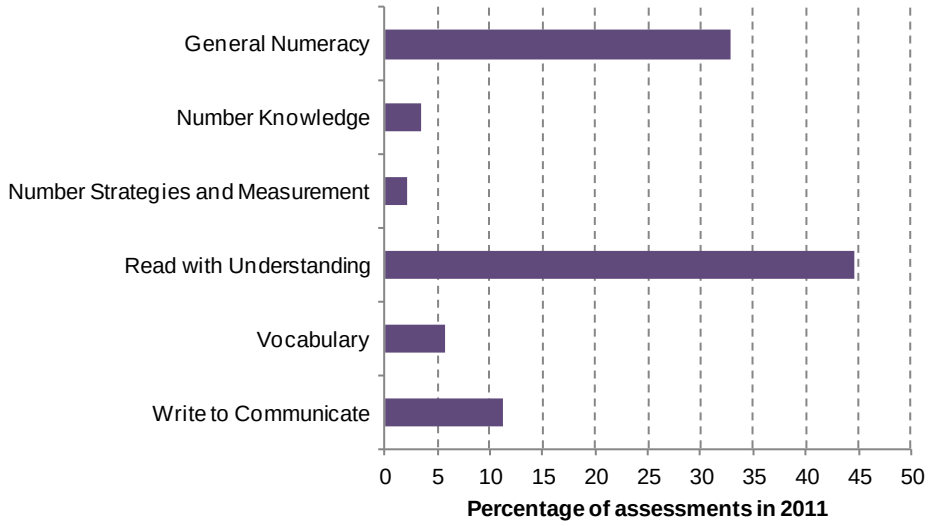
Figure 2 shows a breakdown of all assessments in 2011 according to the particular skill assessed. The greatest proportion of assessments (approximately 45 per cent) was for the skill Read with Understanding, followed by General Numeracy (approximately 33 per cent). This pattern at least partly reflects the priority accorded to the numeracy and reading areas in the Tertiary Education Commission's guidelines (see Appendix B).

However, there were relatively few assessments of learners in Number Knowledge and in Number Strategies and Measurement (approximately 6 per cent of assessments when taken together).

There were also relatively few Vocabulary assessments, reflecting its intended use as a diagnostic assessment to assist learners with low reading skills, especially those in the Starting Points range.

The Write to Communicate skill accounted for an intermediate proportion (approximately 11 per cent) of all assessments. Not only was this skill not prioritised in the Tertiary Education Commission guidelines, it was also logistically different, since this skill could only be assessed using a pen-and-paper assessment and needed to be marked by educators before a score could be assigned.

Figure 2
Percentage of all assessments in 2011 by skill assessed

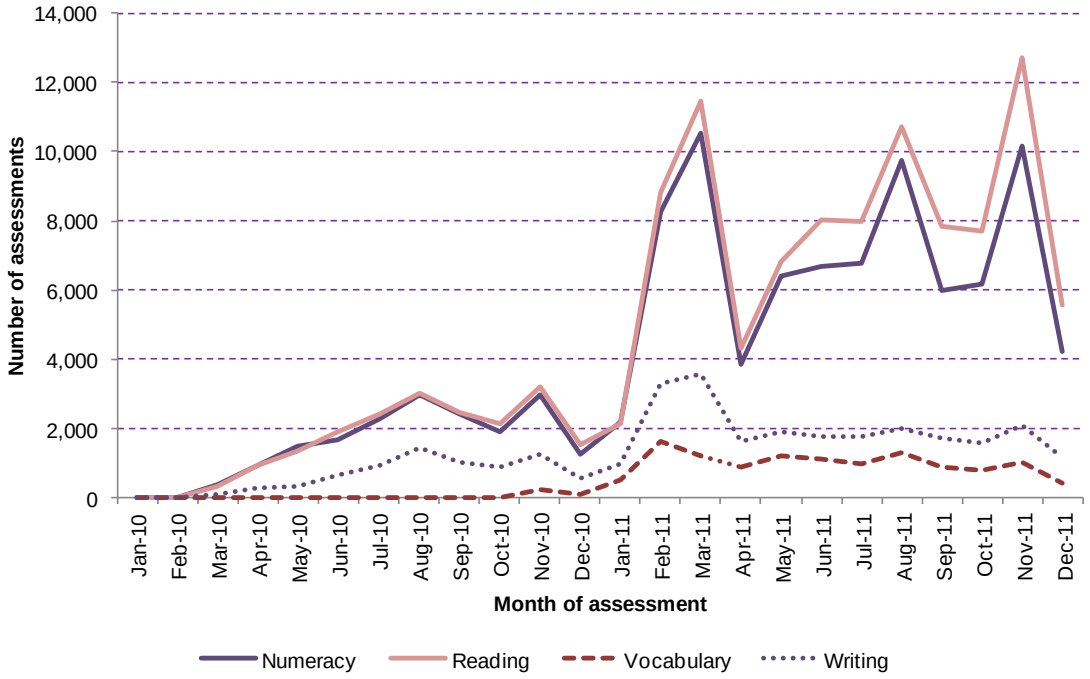


Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 210,713 assessments in 2011.

Figure 3 shows the number of assessments each month in 2010 and 2011, classified by assessment area. The assessments of the three numeracy skills are aggregated. Numeracy and reading predominate throughout the period, with distinct peaks in 2011 in March, August and November. The vocabulary component of the Assessment Tool became available from October 2010 and shows a small peak in February 2011. Writing similarly has one main peak in February-March 2011.

Figure 3

Number of assessments per month in 2010 and 2011, by area of skill assessed



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 256,307 assessments in 2010 and 2011.

2.3 Types of assessment

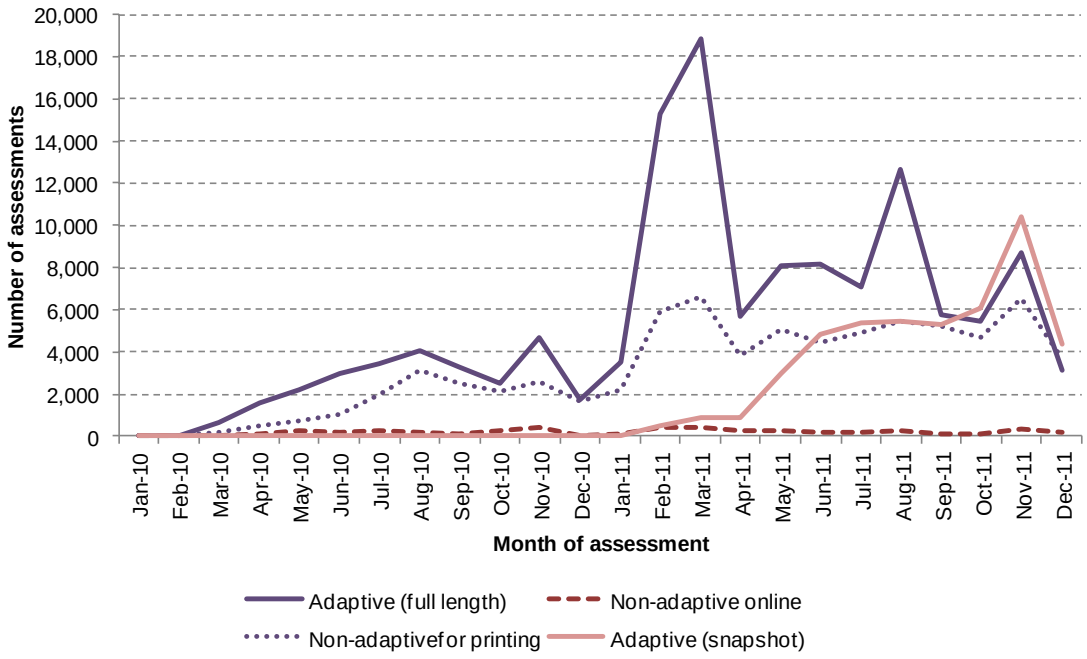
The frequency of use of the different types of assessment varied considerably during 2011, and so comparing the total numbers of each type of assessment for 2011 would not be very informative.

Figure 4 shows the number of assessments of each type which were carried out each month in 2010 and 2011. Most were adaptive online assessments, and the outstanding feature is the rise of the shorter Snapshot assessment from the time it was introduced in February 2011, to the point where it became the most commonly used assessment type in October 2011. There was an overall decline through 2011 in the use of the full adaptive online assessment, indicating that the Snapshot was at least partly displacing the full adaptive online assessment.

The number of non-adaptive for printing assessments (which included all writing assessments) was relatively steady through 2011, while non-adaptive online assessments were rarely used throughout the whole period.

Figure 4

Number of assessments per month in 2010 and 2011, by assessment type

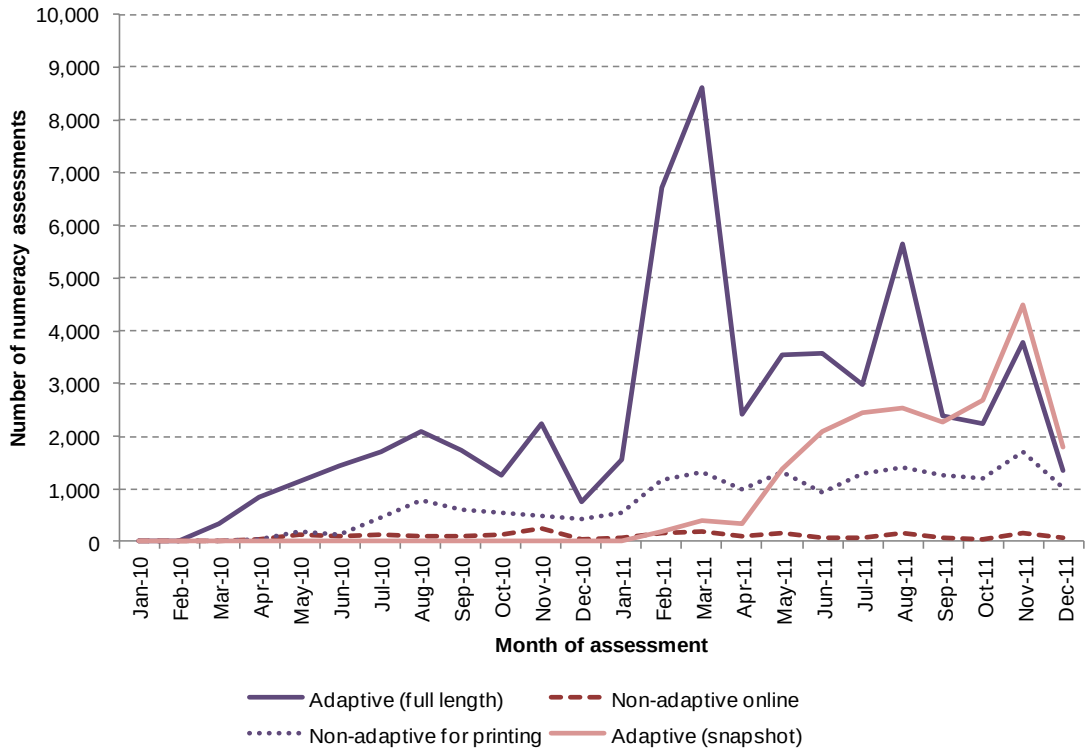


Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 256,307 assessments in 2010 and 2011.

The two assessment areas for which a range of different types of assessment were available were numeracy and reading. Both show patterns similar to the overall pattern illustrated in Figure 4 above. Figure 5 shows the number of assessments of each type for the numeracy area (including all three numeracy skills) carried out each month in 2010 and 2011, and Figure 6 provides the corresponding picture for reading. In both cases there is a slight gradual rise in the use of non-adaptive for printing assessments in 2011. This pattern cannot be seen in Figure 4 because it is offset by the declining pattern for writing assessments, which are all non-adaptive for printing.

Figure 5

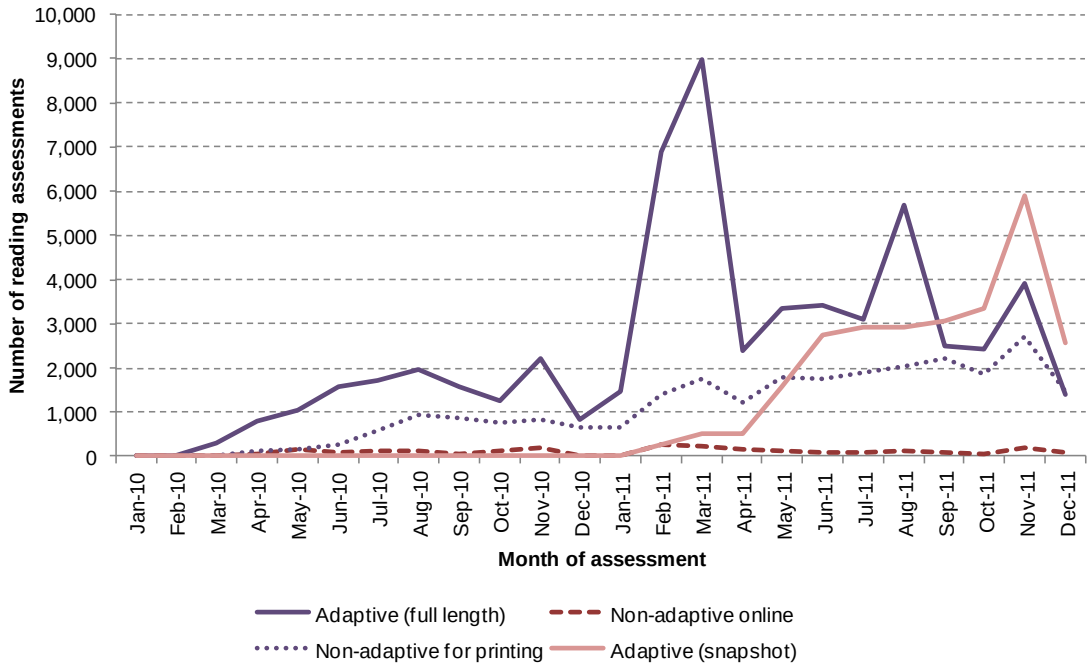
Number of numeracy assessments per month in 2010 and 2011, by assessment type



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 99,332 numeracy assessments in 2010 and 2011.

Figure 6

Number of reading assessments per month in 2010 and 2011, by assessment type



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 113,482 reading assessments in 2010 and 2011.

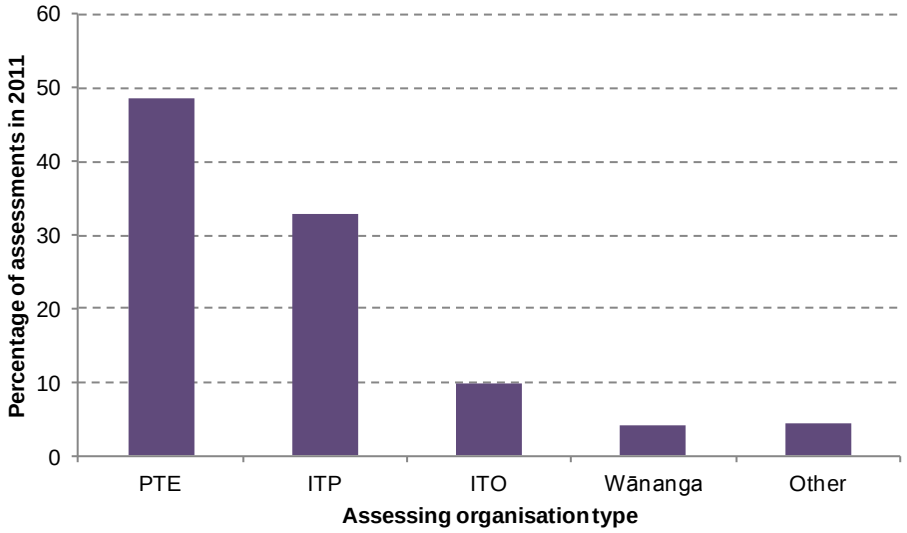
2.4 Assessments by different types of organisation

The Assessment Tool data[5] includes a code number (OrganisationNumber) for each organisation that sets up an assessment and submits the learner and assessment data. These code numbers can be used to identify the individual organisations, and the organisations can then be grouped into organisation types. A total of 262 organisations completed assessments during 2011.

The largest group (approximately 49 per cent) of assessments in 2011 were undertaken by private training establishments (PTEs)[6]. The second-largest group (33 per cent) of assessments were undertaken by institutes of technology and polytechnics (ITPs), and the third largest group (about 10 per cent) by industry training organisations (ITOs). Less than 5 per cent of assessments were completed by organisations in each of the two remaining categories of wānanga and 'Other' organisations. 'Other' organisations include universities, government training establishments, government agencies, secondary schools, and in relation to workplace-based training, employers.

Figure 7

Percentage of assessments in 2011 by type of assessing organisation



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 210,713 assessments in 2010 and 2011.

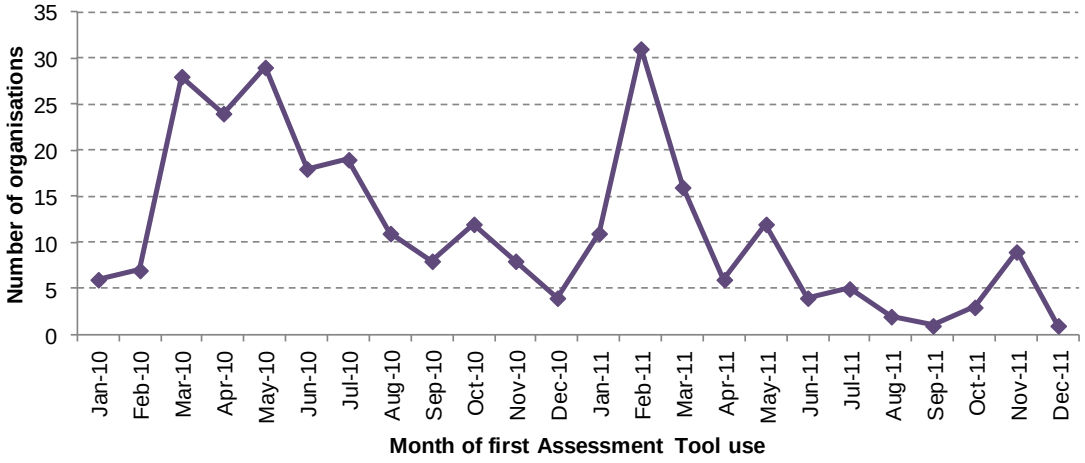
The proportion of assessments completed by industry training organisations is likely to somewhat under-represent the use of the Assessment Tool with industry trainees. While most other submitting organisations were education providers, ITOs are coordinating bodies rather than education providers, and in the 2010 data at least, a subset of the industry trainees who were assessed had their assessments undertaken directly by ITPs and PTEs.

[5] A grammatical note: while the conservative usage of the term 'data' is as a plural count or countable noun, in the same category as 'beans', this report follows the common innovative usage of 'data' as a singular mass or uncountable noun, in the same category as 'rice'.
[6] This category includes organisations formerly known as 'Other Tertiary Education Providers' (OTEPs).

Figure 8 shows the number of organisations beginning to use the Assessment Tool each month in 2010 and 2011. Most organisations using the Assessment Tool in 2011 had begun to use it by March 2011, but there were 43 organisations using it for the first time later on in 2011 (out of 275 organisations using the Assessment Tool in 2010 and/or 2011).

Figure 8

Numbers of assessing organisations using the Assessment Tool for the first time each month in 2010 and 2011



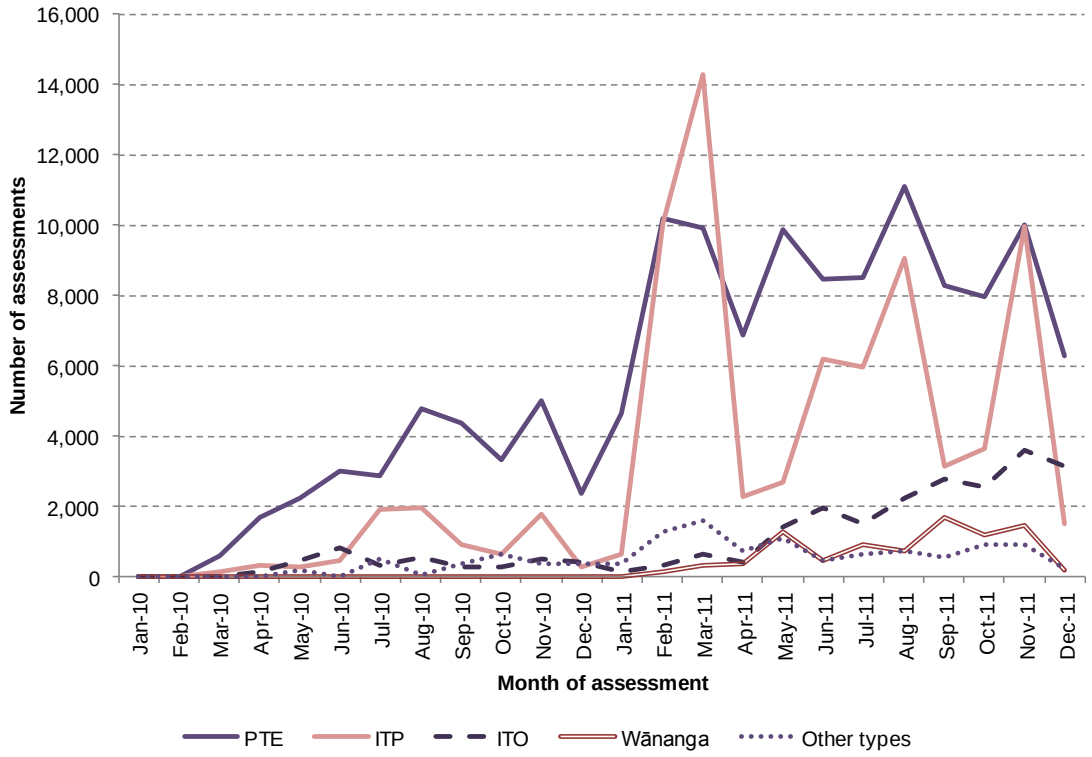
Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 275 organisations completing assessments in 2010 and 2011.

The number of assessments by each organisation type each month in 2010 and 2011 is represented in Figure 9. PTEs were the dominant subsector in piloting the Assessment Tool in 2010, while ITPs became major users of the Assessment Tool from the beginning of 2011. The use of the Assessment Tool by PTEs was relatively steady across 2011, while ITPs had very distinct peaks in March, August and November, which largely account for the peaks in the same months in the overall numbers of assessments, as shown above in Figure 1 in section 2.1.

The number of assessments completed by ITOs climbed steadily during 2011, while the number of assessments completed by wānanga increased slightly, and the number completed by other types of organisation peaked in March and then tailed off somewhat during 2011.

Figure 9

Number of assessments per month in 2010 and 2011, by assessing organisation type



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 256,307 assessments in 2010 and 2011.

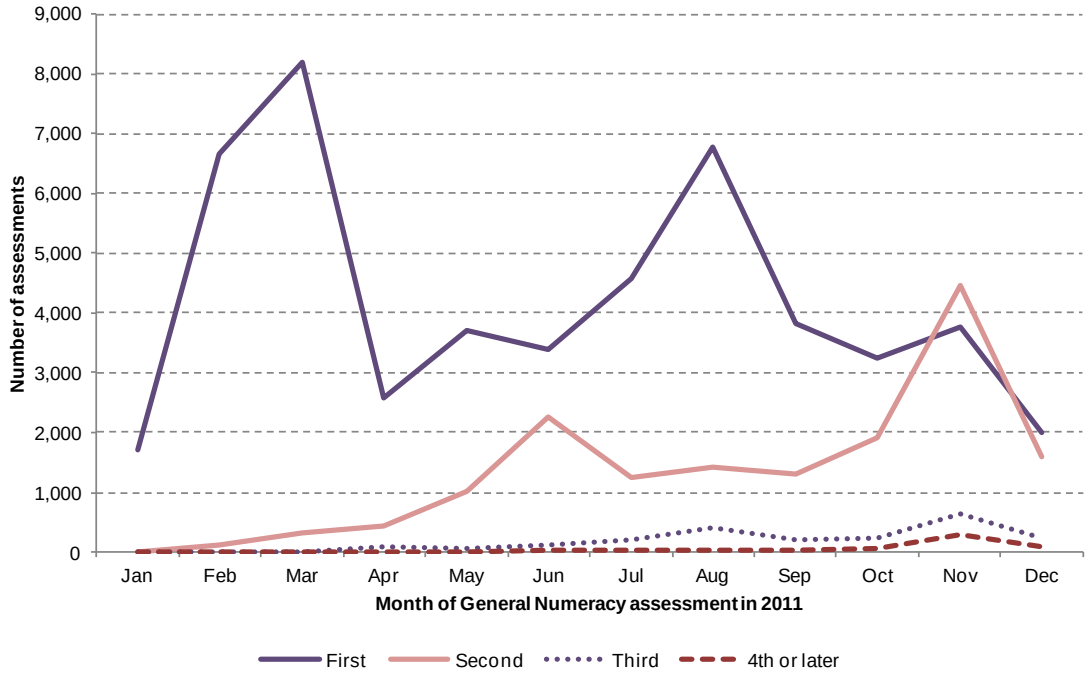
2.5 First assessments and re-assessments

Most of the assessments carried out in 2011 were the first assessments in 2011 of a particular learner in a particular skill (there were 151,821 such assessments). There were also a considerable number of second assessments (48,962), but relatively few assessments were third (7,558) or fourth or further repeat (2,169) assessments.

Figure 10 shows the number of General Numeracy assessments each month in 2011 according to whether they were the learners' first assessments or were second or other repeat assessments. Through the year the largest number of assessments each month were first assessments, except in November, when second assessments were the most common. First assessments peaked in March and August, while there were smaller peaks in second assessments in June and November.

In Figure 3 in section 2.2 we saw that there were peaks in the number of numeracy assessments in March, August and November. Given that most of the assessments in the numeracy area were General Numeracy assessments, we can see that the March and August peaks largely consisted of first assessments, while the November peak involved a combination of first and second assessments.

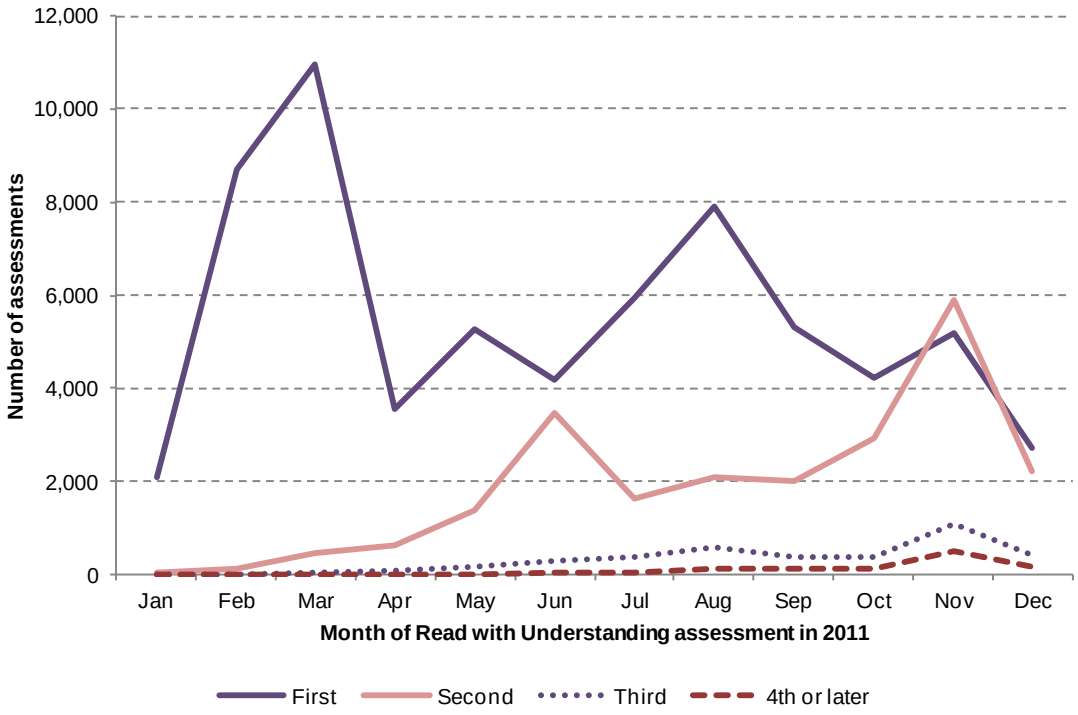
Figure 10
First and repeat General Numeracy assessments in 2011



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 69,270 General Numeracy assessments in 2011.

Figure 11 shows basically the same patterns for Read with Understanding assessments.

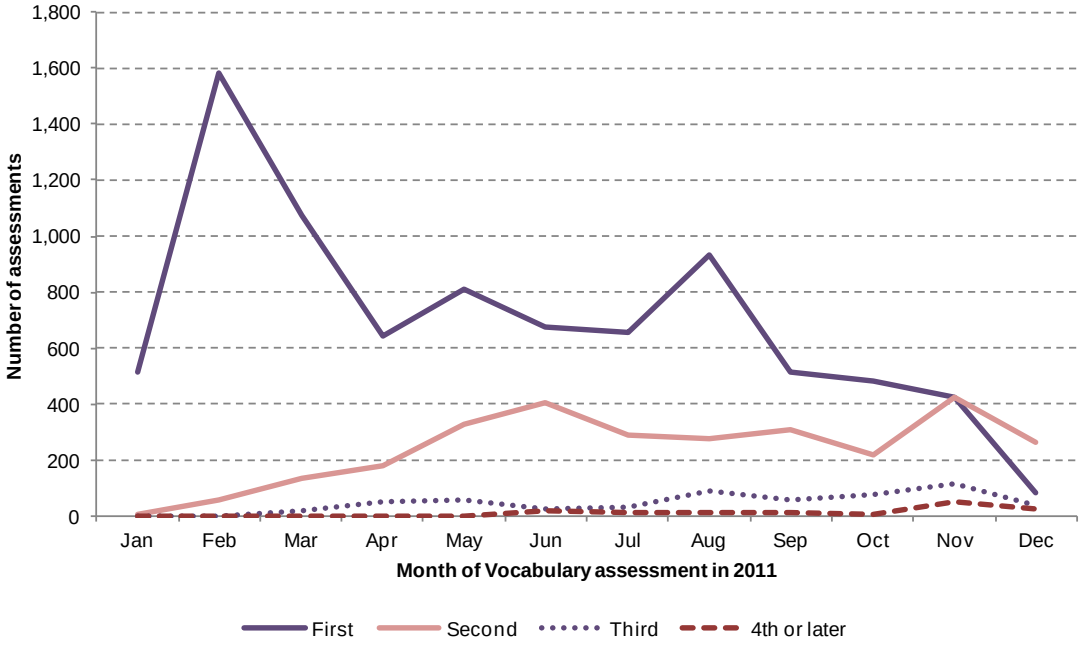
Figure 11
First and repeat Read with Understanding assessments in 2011



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 94,087 Read with Understanding assessments in 2011.

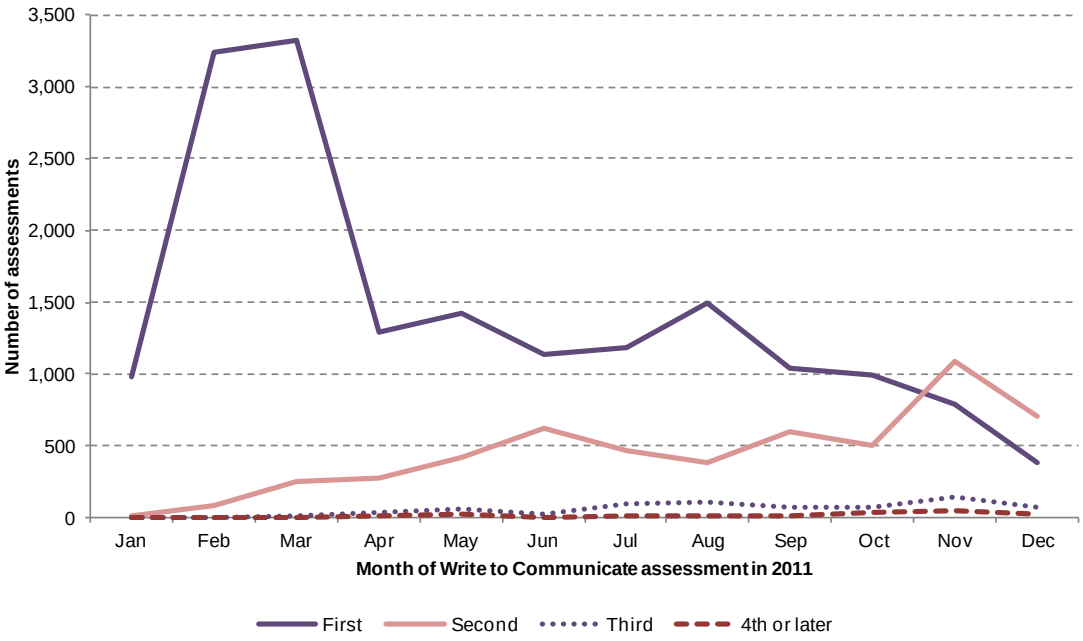
Figures 12 and 13 show the corresponding monthly numbers of first and repeat assessments in the skills Vocabulary and Write to Communicate. For these two areas, there was a major peak of first assessments in February-March, and a small peak of first assessments in August. The monthly numbers of second assessments were relatively low, with slight peaks in June and November, but the number of second assessments equalled or exceeded first assessments in November and December.

Figure 12
First and repeat Vocabulary assessments



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 12,024 Vocabulary assessments in 2011.

Figure 13
First and repeat Write to Communicate assessments in 2011



Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 23,424 Write to Communicate assessments in 2011.

2.6 Demographic characteristics of learners assessed in 2011

This subsection uses the demographic data (age, gender, ethnic group and first language) as collected in the Assessment Tool data, from the 77,362 learners assessed in 2011.

Age

The age distribution of assessed learners is shown in Figure 14. The Assessment Tool was used in 2011 particularly to assess younger learners, with approximately 31 per cent of the learners assessed aged 16 to 19 at the time of first assessment, and about 51 per cent in the age group 16 to 24. However, the number of learners aged over 35 (about 31 per cent) was not insignificant either. The relatively small number (847) of assessed learners aged 14-15 form a very specific group: for example, 27 per cent of this group could be identified as Alternative Education learners.[7]

Figure 14

Age distribution of all learners on first assessment in 2011

Source: Tertiary Education Commission data, and Ministry of Education calculations. Based on a total of 77,362 learners assessed in 2011.

Gender

Among the learners assessed in 2011, 56.1 per cent were male and 43.9 per cent female.

[7] Because of this distinctiveness, and because the data quality becomes marginal once this group is further subdivided, this age group is not included in the analyses in later chapters.

Ethnic identification

The distribution of ethnic identification among learners assessed in 2011 is shown in Table 1, along with population proportions estimated for 2011 by Statistics New Zealand. A learner may have more than one ethnic identification, in which case the learner is counted in each ethnic category. This is why the percentages total more than 100 per cent.

Compared with the ethnic proportions in the overall population (whether for the 15-64 age group, or perhaps more appropriately, the 15-39 age group), Māori and Pasifika learners were over-represented, while European and Asian learners were under-represented. Māori in particular were strongly over-represented, while Europeans were strongly under-represented. These patterns of assessment probably mainly reflect the ethnic compositions of the learners in the programmes in which the assessments were completed, rather than any tendency for ethnic groups to be assessed more or less than others.[8]

Table 1

Ethnic identifications of learners assessed in 2011 (total response), compared with population distributions

Ethnic identification	Percentage in Assessment Tool data	Estimated population percentage aged 15-64	Estimated population percentage aged 15-39
European	48.5	73	68
Māori	28.5	14	17
Pasifika	12.4	7	9
Asian	8.7	13	16
Other	3.3		
Unspecified	5.3		
TOTAL	106.6		

Source: Tertiary Education Commission data, Ministry of Education calculations, and Statistics New Zealand estimates [National Ethnic Population Projections 2006-base to 2026 (series 6), released April 2010, and National Population Projections 2009-based to 2061 (series 5), released October 2009. The two sets of projections are based on comparable assumptions.]

First language

The Assessment Tool data includes an indicator as to whether a learner's first language is English or not. Information on learners' first languages is not available in tertiary enrolment data. The information on learners' first languages, derived from the Assessment Tool data for 2011, is summarised in Table 2. The figure of 17.5 per cent of learners whose first language was not English is close to the estimates of the proportion of adults with non-English first language based on the Adult Literacy and Life Skills (ALL) Survey 2006 (for people aged 25-65, it was 16 per cent, while for people aged 16-24, it was 23 per cent: Lane 2011, p.76).

Table 2

Breakdown of learners assessed in 2011, by first language

First language	Percentage
English	81.0
Other language	17.5
Unspecified	1.5
TOTAL	100.0

Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 77,362 learners assessed in 2011.

[8] This is certainly true for learners in programmes with funding from the Student Achievement Component and from Youth Guarantee leading to qualifications at NZQF Levels 1 to 3: see section 2.7 and Table 4.

Ethnic identification and first language

There was a strong association between first language and ethnic identification of assessed learners, in that learners in the Pasifika, Asian and Other group were much less likely to have English as a first language than learners in the European and Māori groups, as shown in Table 3.

Table 3

Percentage of learners assessed in 2011 who had a first language other than English, by ethnic identification (total response)

Ethnic identification	Percentage with first language other than English
European	6.5
Māori	5.5
Pasifika	42.2
Asian	69.1
Other	48.3

2.7 Assessments matched to characteristics of provision

This section is based on matching data on learners' assessments to data on the same learners' enrolments. The approach used can be described as l**earner-based matching,** and is based on first identifying a group of learners enrolled in SAC- or YG-funded programmes at a particular qualification level, or in a particular funding group, or at a particular type of provider, and then seeing whether or not it is possible to find in the Assessment Tool data at least one assessment for each of those learners. For further detail and matching criteria, see Chapter 6.

Assessments at different levels of qualification

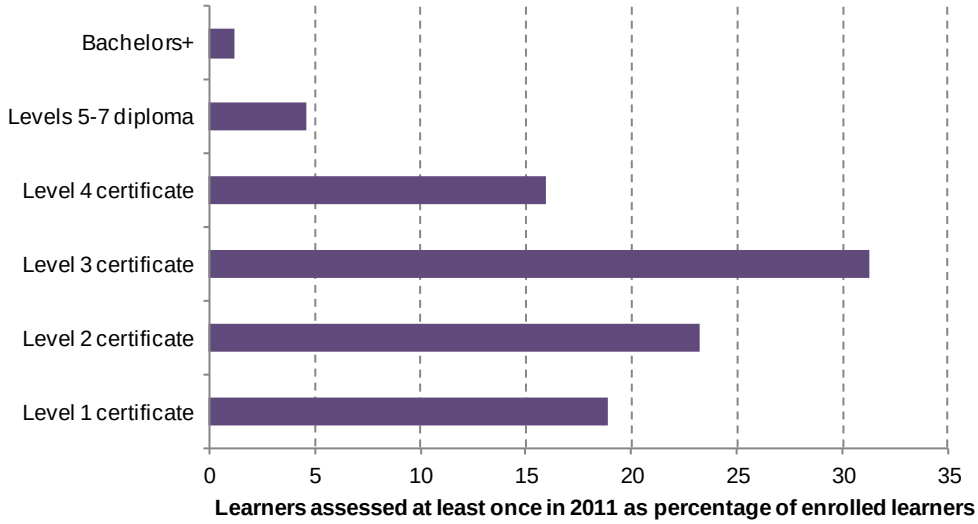
The percentage of learners at each qualification level who were assessed at least once for any skill is shown in Figure 15, on the basis of learner-based matching for each qualification level. Learners who were enrolled in qualifications at more than one level in 2011 are counted in each level.

For learners at Levels 1 to 4, the proportion assessed at least once was between 16 per cent and 31 per cent: specifically, 19 per cent at Level 1, 23 per cent at Level 2, 31 per cent at Level 3 and 16 per cent at Level 4. Only a small proportion (less than 5 per cent) of learners studying in Level 5 to 7 diplomas, and at bachelors or higher were assessed even once.

The concentration on use of the Assessment Tool particularly at Levels 1 to 3 is in line with the Tertiary Education Strategy priority of raising literacy, language and numeracy skills for learners at Levels 1 to 3.

Figure 15

Percentage of learners in SAC- or YG-funded programmes at each NZQF level who were assessed in 2011



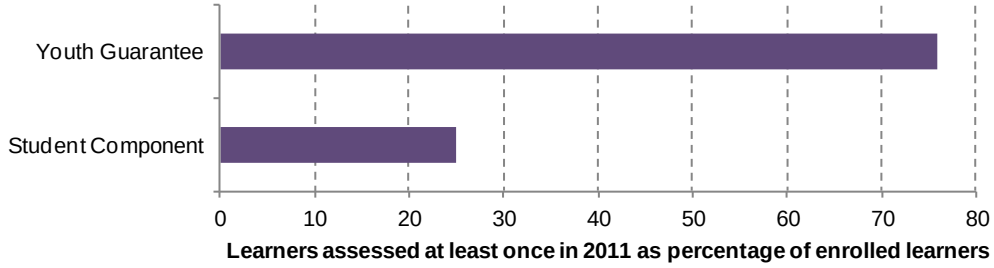
Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 363,060 learners in SAC- and YG-funded programmes in 2011. Learners enrolled in qualifications at more than one level in 2011 are counted in each enrolled level.

Assessments in different funding groups

Figure 16 focuses on learners in SAC- or YG-funded programmes leading to qualifications at NZQF Levels 1 to 3, identified by learner-based matching for each funding group (and note that learners enrolled in more than one qualification in 2011 may be counted in more than one funding group). From this point of view, the higher rate of use of the Assessment Tool is found in the funding group Youth Guarantee fees-free tertiary places (76 per cent): the rate was considerably lower in SAC-funded programmes (25 per cent).

Figure 16

Percentage of learners in SAC- or YG-funded programmes at NZQF levels 1 to 3 in each funding group who were assessed in 2011



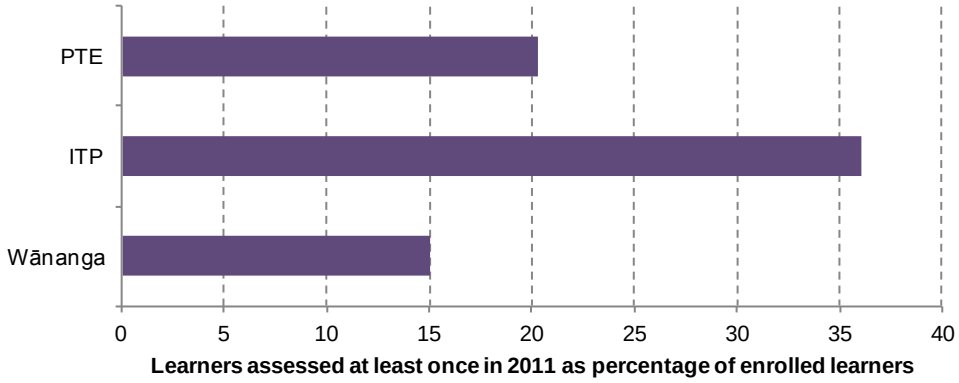
Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 93,162 learners enrolled in SAC- and YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 in 2011. Learners enrolled in qualifications in more than one funding group in 2011 are counted in each enrolled funding group.

Assessments by different types of provider

Focusing again on learners enrolled in SAC- or YG-funded qualifications at Levels 1 to 3, and using learner-based matching, Figure 17 shows the percentages of learners assessed at least once in 2011 according to the type of qualification provider. The highest rate of assessment was found in ITPs (36 per cent), with a lower overall rate at PTEs (20 per cent), and an even lower rate at wānanga (15 per cent).

Figure 17

Percentage of learners in SAC- or YG-funded programmes at NZQF levels 1 to 3 who were assessed, by provider type



Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 93,162 learners enrolled in SAC- and YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 in 2011. Learners enrolled in qualifications at more than one provider type in 2011 are counted in each enrolled type.

Assessments by ethnic identification of learner

In section 2.6 it was noted that the ethnic distribution of assessed learners differed from the ethnic distribution in the total population, with Māori and Pasifika over-represented relative to the population, and Asian and European groups under-represented.

Table 4 is based on an analysis of all people enrolled in SAC- and Youth Guarantee-funded programmes at NZQF Levels 1 to 3, and compares the ethnic distribution of assessed learners with that of all learners in this group: the two distributions are in fact very close. In this comparison, Māori were slightly under-represented among assessed learners relative to all learners (25 per cent of Māori learners were assessed), while Pasifika were somewhat over-represented (32 per cent assessed), and Europeans and Asians were assessed at the overall rate (27 per cent assessed).

Table 4

SAC and YG programmes at NZQF Levels 1 to 3: Ethnic distribution of learners, of assessed learners, and rates of assessment for ethnic groups

Ethnic identification	Percentage of all learners with given ethnic identification	Percentage of assessed learners with given ethnic identification	Percentage of learners in given ethnic group who were assessed
European	53	53	27
Māori	34	31	25
Pasifika	12	14	32
Asian	10	10	27
Other	3	4	32
Unspecified	0	0	-
TOTAL	112	112	27

Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 93,162 learners enrolled in SAC- and YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 in 2011. Learners with more than one ethnic identification are counted in each of their ethnic groups: this is why the percentages total more than 100. Ethnic identification is derived from enrolment data, in which there were very few learners with unspecified ethnic identification, not from Assessment Tool data.

2.8 Summary of Assessment Tool use

Analyses of Assessment Tool data for all assessments

Characteristics of assessments

The total number of assessments in the pilot year of 2010 was 45,594, while 210,713 individual assessments were carried out in 2011, the first full year of implementation.

The greatest proportion of assessments in 2011 (approximately 45 per cent) was for the skill Read with Understanding, followed by General Numeracy (approximately 33 per cent).

Most assessments in 2011 were adaptive online assessments, but within this category, the shorter Snapshot assessment was rapidly adopted, from the time it was introduced in February 2011, to the point where it became the most commonly used assessment type in October 2011. There was an overall decline through 2011 in the use of the full adaptive online assessment, indicating that the Snapshot was at least partly displacing the full adaptive online assessment.

The largest group (approximately 45 per cent) of assessments in 2011 were completed by private training establishments (PTEs). The second-largest group (33 per cent) of assessments were completed by institutes of technology and polytechnics (ITPs), and the third largest group (about 10 per cent) by industry training organisations (ITOs).

Most of the assessments carried out in 2011 were the first assessments in 2011 of a particular learner in a particular skill (there were 151,821 such assessments). There were also a considerable number of second assessments (48,962), but relatively few assessments were third (7,558) or fourth or further repeat (2,169) assessments.

For the four most commonly assessed skills (General Numeracy, Read with Understanding, Vocabulary and Write to Communicate), most assessments during the year were first assessments, until November, when the number of second assessments equalled or exceeded the number of first assessments.

Learner characteristics

The spread of assessed learners ages was wide, but there was a concentration on younger learners, with 31 per cent of learners assessed aged between 16 and 19.

Of assessed learners, more were male (56 per cent) than female.

Compared with the ethnic proportions in the overall population, Māori and Pasifika learners were over-represented among the assessed learners, while European and Asian learners were under-represented. Māori in particular were strongly over-represented, while Europeans were strongly under-represented. However, these patterns largely reflect the ethnic distribution of enrolled learners.

Of assessed learners, 17.5 per cent had a first language other than English. Learners in the Pasifika, Asian and Other ethnic groups were much less likely to have English as a first language than learners in the European and Māori ethnic groups.

In brief, the group of learners who had been assessed at least once in 2011 contained relatively high proportions of

- people aged 16-19
- males
- Māori and Pasifika

Analyses of Assessment Tool data matched to enrolments

For learners at Levels 1 to 3, the proportion assessed at least once was between 19 per cent at Level 1 and 31 per cent at Level 3. For learners at Level 4, the proportion was a little lower, at 16 per cent. Only a small proportion (less than 5 per cent) of learners studying in Level 5 to 7 diplomas, and at bachelors or higher were assessed even once.

A high rate of use of the Assessment Tool was found in the funding group Youth Guarantee (76 per cent), while the rate was considerably lower in SAC-funded programmes (25 per cent).

Focusing again on learners enrolled in SAC- and YG-funded programmes leading to qualifications at Levels 1 to 3, the highest rate of assessment was found in ITPs (36 per cent), with a lower overall rate at PTEs (20 per cent), and an even lower rate at wānanga (15 per cent).

In brief, learners were more likely to have been assessed at least once in 2011 if they were:

- studying in a SAC- or YG-funded programme at NZQF Level 1 to 4

and, if studying in SAC- or YG-funded programmes at Levels 1 to 3, enrolled in programmes:

- with funding from Youth Guarantee, or
- at an ITP

For learners enrolled in SAC- or YG-funded programmes at Levels 1 to 3, the ethnic distribution of assessed learners largely corresponded to the overall ethnic distribution of enrolled learners. This provides the basic explanation for the relatively high proportion of assessed learners who were Māori and the low proportion who were European, in comparison with the adult population. However, learners in SAC- or YG-funded programmes at Levels 1 to 3 were somewhat more likely to be assessed (in comparison to the ethnic distribution of enrolments) if they identified as

- Pasifika; or
- belonging to an ethnic group other than European, Māori, Asian or Pasifika

3 PROFILES OF LEARNER SKILLS AT FIRST ASSESSMENT IN 2011

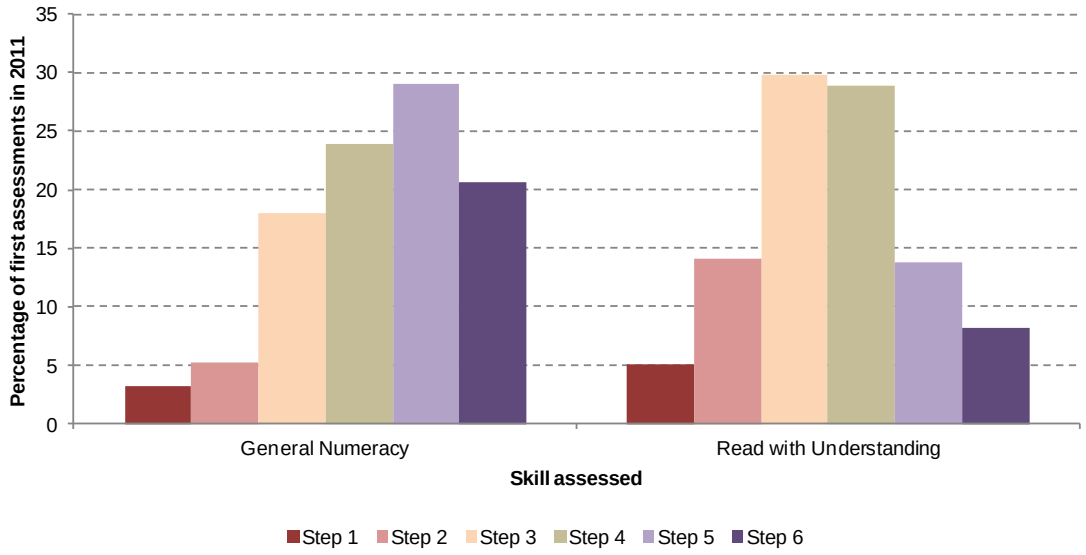
Analyses in this chapter use the first assessments of learners in 2011 for General Numeracy[9] and Read with Understanding, whenever in the year those assessments occurred. They are restricted to these two skills because numeracy and reading were the two areas prioritised in the Tertiary Education Commission guidelines (see Appendix B), and the largest numbers of learners were assessed for General Numeracy (50,418 learners) and Read with Understanding (66,101 learners), which means that assessments of these skills provide the most reliable statistics for analysis. The number of learners assessed for other skills was considerably lower (Write to Communicate: 17,263; Vocabulary: 8,401; Number Knowledge: 5,869; and Number Strategies and Measurement: 3,769) and hence the data for other skills is less reliable.

3.1 Skills assessed

The distributions of scores on first assessment, when converted to Learning Progressions Steps, were different for General Numeracy and Read with Understanding, as shown in Figure 18. The General Numeracy distribution peaked at Step 5, while the Read with Understanding distribution peaked at Steps 3 and 4, with the number of learners at Step 3 slightly higher. This reflects the design of the Learning Progressions, with the numeracy progressions effectively starting (at Step 1) at a more elementary level than the reading progressions (see section 1.1), and the reading progressions encompassing more advanced skills at Steps 5 and 6.

Figure 18

First assessments for General Numeracy and Read with Understanding in 2011: Distribution of Learning Progressions Steps



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on 50,418 first assessments for General Numeracy, and 66,101 first assessments for Read with Understanding. The total number of learners involved in these assessments was 74,062, with 42,457 learners assessed for both General Numeracy and Read with Understanding.

[9] Results for the specific skill General Numeracy have been used for analysis rather than the results for the Numeracy area, because there are differences in the distributions of scores for the three numeracy skills. For learners assessed for more than one numeracy skill, the correlations between the skill scores vary from 0.75 between General Numeracy and Number Strategies and Measurement, to 0.81 between General Numeracy and Number Knowledge, to 0.83 between Number Strategies and Measurement and Number Knowledge. These correlations are high, but not high enough to justify pooling the results for the three numeracy skills.

The differences between the Learning Progression for the two skills means that the proportion of learners at Steps 5 and 6 for General Numeracy (50 per cent) approximates the proportion of learners at Steps 4, 5 and 6 for Read with Understanding (51 per cent). In the more detailed analyses of the distribution of first assessment scores in the remainder of this chapter, these combinations of Steps will be referred to as a basis for making comparisons within each skill and for aligning the results for the two skills.

3.2 Skills and demographic characteristics of learners

This section reports learner profiles on first assessment in 2011 according to learners' ages, genders, ethnic identifications and first languages. The learners who were assessed were clearly not representative of the population, as was shown in section 2.6. Assessed learners also represent only a small proportion of the learners who could potentially have been assessed, as was shown in section 2.7, which also showed that the proportion of learners assessed varied according to qualification level, funding group and provider type.

Consequently, apparent differences in skills according to demographic factors should not be taken at face value, since they may reflect differences in the processes which have led to some learners but not others being assessed.

Age

Broadly speaking, the profiles of learner skills at first assessment showed a pattern of increasing skill with age up to the 25-34 age group, declining slightly for older age groups. Even though assessed learners were clearly not representative of the adult population, the Assessment Tool data showed similar age distributions of skills to those found for numeracy and document literacy in the adult population in the Adult Literacy and Life Skills (ALL) Survey 2006 (Satherley and Lawes, 2008a).

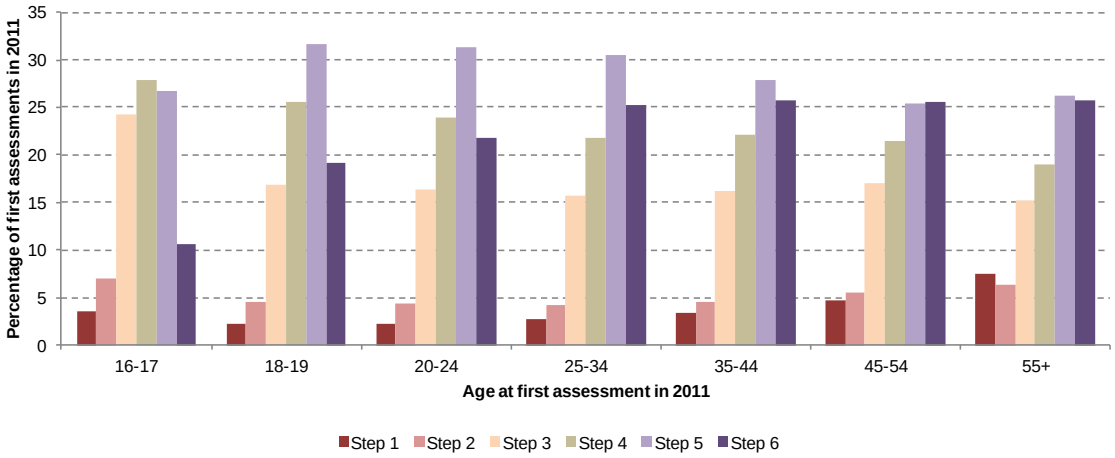
General Numeracy

The distribution of General Numeracy scores, represented as Learning Progressions Steps, is shown in Figure 19. The proportion of learners at Steps 5 and 6 increased from 37 per cent for the 16-17 age group, to over 50 per cent for those 18 and over, peaking at 56 per cent for the 25-34 age group.

The percentage of learners at Step 6 increased steadily with age up to the oldest age groups, while the percentages at Step 5 peaked in the 18-24 age range and the percentage at Step 4 decreased gradually with age. The proportions of learners at Steps 1 to 3 was high for the youngest age group (35 per cent for 16-17) but fell to a similar, lower level (23 to 24 per cent) for learners aged 18 to 44, and was slightly higher for those aged 45 and over (27 per cent for 45-54 and 29 per cent for 55+).

Figure 19

First General Numeracy assessment in 2011: Learning Progressions Steps, by age at assessment



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on the first General Numeracy assessments in 2011 of 49,773 learners aged 16 and over.

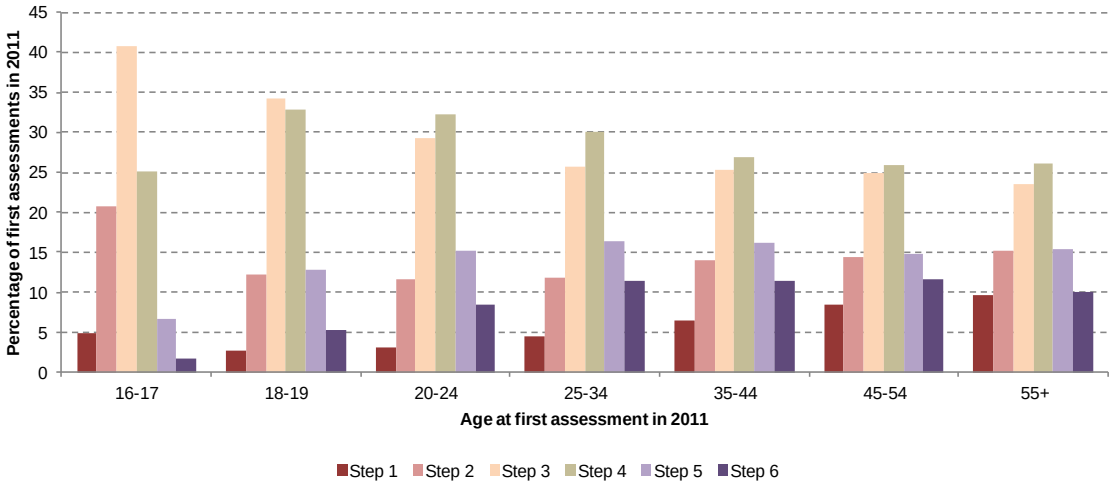
Read with Understanding

The patterns were similar for first reading assessments, as shown in Figure 20. The proportions of learners at Steps 4, 5 and 6 increased from 33 per cent for the 16-17 age group, to over 50 per cent for those 18 and over, peaking at 58 per cent for the 25-34 age group.

In more detail, the age groups 18-19, 20-24 and 25-34 had the lowest proportions at Steps 1 and 2 (with a combined percentage for Steps 1 and 2 of 15 to 16 per cent in these three age groups). In contrast, both younger and older age groups had higher combined percentages at Steps 1 and 2 (26 per cent for 16-17, 20 per cent for 35-44, 23 per cent for 45-54 and 25 per cent for 55+). The Step with the largest number of learners shifted from Step 3 at 16-19, to Step 4 for those 20 and over.

Figure 20

First Read with Understanding assessment in 2011: Learning Progressions Steps, by age at assessment



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on the first Read with Understanding assessments in 2011 of 65,612 learners aged 16 and over.

Gender

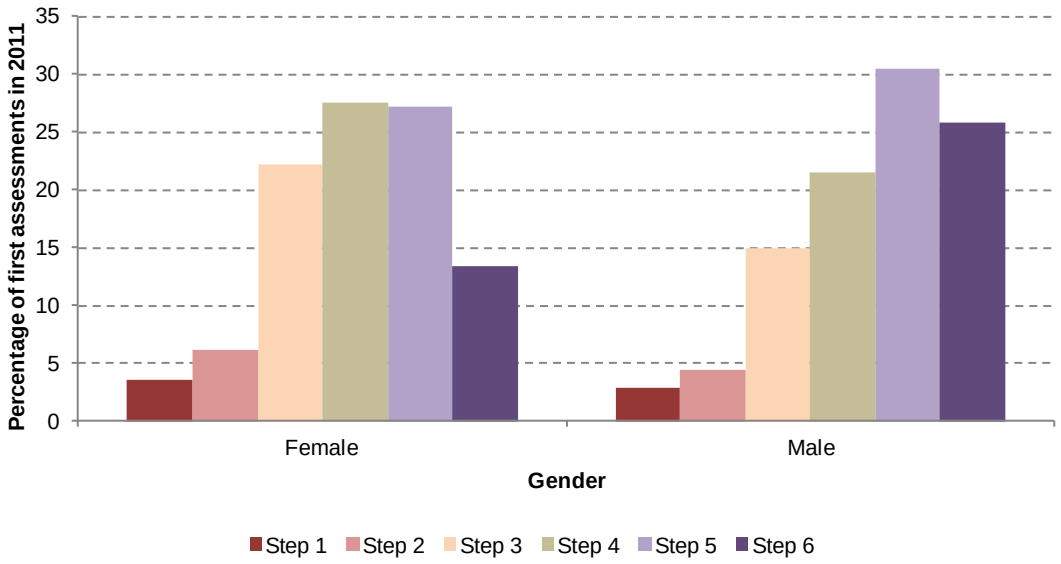
General Numeracy

Scores for General Numeracy on first assessment tended to be higher for men than for women, as shown in Figure 21. The proportion of women with scores corresponding to Steps 5 and 6 was approximately 41 per cent, while for men this proportion was approximately 56 per cent.

In more detail, the percentage of men at Step 5 was higher (30 per cent, compared with 27 per cent for women), and at Step 6 considerably higher (26 per cent for men, and 13 per cent for women), while there were higher proportions of women at Steps 1 to 4 (in aggregate, 44 per cent of men were in this range, but 59 per cent of women).

Figure 21

First General Numeracy assessment in 2011: Learning Progressions Steps, by gender



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on the first General Numeracy assessments in 2011 of 50,418 learners.

The large difference in General Numeracy profiles for men and women is an example of an apparent difference which may have more to do with the processes of selecting learners to be assessed than with real differences between learners with different demographic characteristics. They may, for instance, partly reflect gender differences in field of study and in qualification level: these possibilities are yet to be investigated. Nevertheless, similar numeracy differences between men and women in the adult population generally were found in the Adult Literacy and Life Skills (ALL) Survey 2006 (Satherley and Lawes, 2008b), and the Assessment Tool data may in fact be simply reflecting the population patterns.

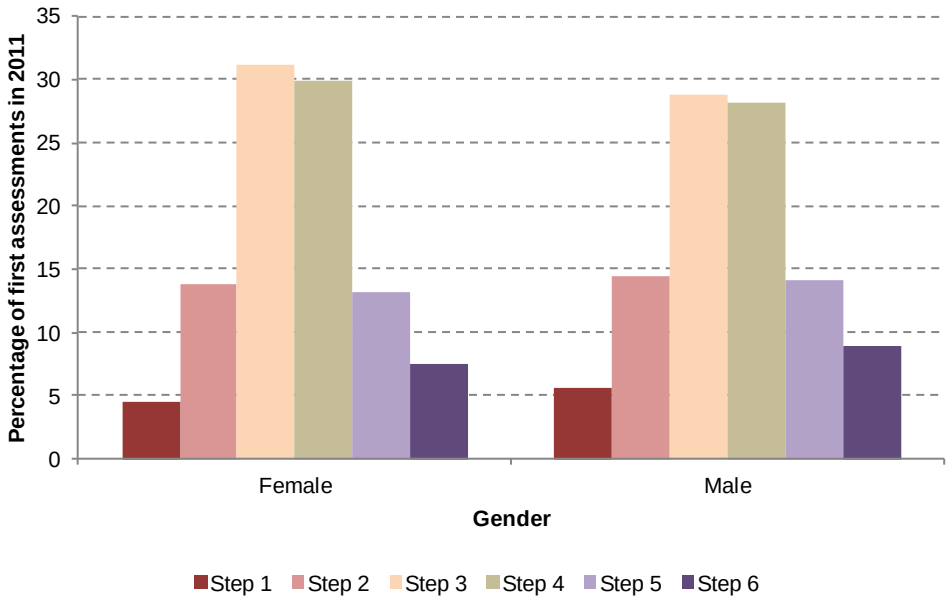
Read with Understanding

In contrast to General Numeracy, there were only small gender differences in the distribution of Read with Understanding scores on first assessment. The proportion of learners at Steps 4, 5 and 6 was the same (51 per cent) for men and women.

However, a slightly higher proportion of men than women were at the extremes of the distribution: Steps 1 to 2 (20 per cent of men compared with 18 per cent of women) and Steps 5 to 6 (23 per cent of men compared with 21 per cent of women), while slightly higher percentages of women were in the middle, in Steps 3 and 4 (57 per cent of men but 61 per cent of women).[10]

Figure 22

First Read with Understanding assessment in 2011: Learning Progressions Steps, by gender



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on the first Read with Understanding assessments in 2011 of 66,101 learners.

Ethnic identification

Ethnic identification in this analysis is a total response variable: that is, a learner may identify with more than one ethnic group, and if so, that learner is counted in each of the ethnic groups with which they identify. About 5 per cent of learners did not have a specified ethnic group in the Assessment Tool data for 2011, and these learners are not included in the following analyses.

[10] Comparison with the ALL Survey results is complicated by the fact the gender patterns are different for the two measures of literacy used in ALL.

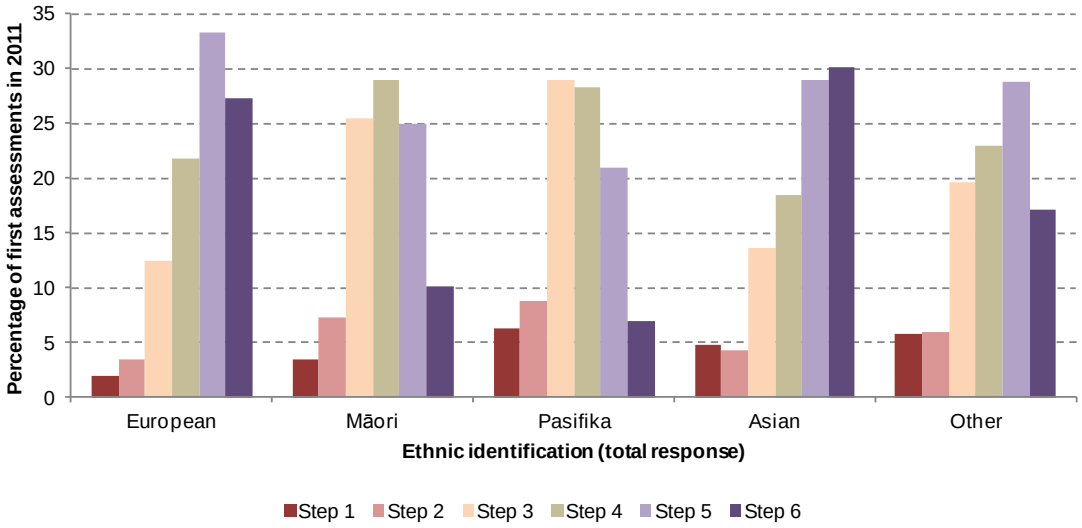
General Numeracy

The ethnic distributions of first assessment scores for General Numeracy, expressed as Learning Progressions Steps, can be seen in Figure 23. There was considerable variation in the combined proportion of learners at Steps 5 and 6 in each ethnic group: 60 per cent of European learners, 35 per cent of Māori, 28 per cent of Pasifika, 59 per cent of Asian and 46 per cent of Other ethnic group learners.

The European and Other ethnic groups had the largest percentage of learners at Step 5, and the Asian group had the largest percentage of learners at Step 6, while the Māori group had the largest percentage of learners at Step 4 and the Pasifika group had the largest percentage of learners at Step 3. The proportion of learners at Steps 1 and 2 was lowest for European (5 per cent), higher for Māori (11 per cent), Asian (9 per cent) and Other (12 per cent), and higher again for Pasifika (15 per cent).

Figure 23

First General Numeracy assessment in 2011: Learning Progressions Steps, by ethnic identification



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on the first General Numeracy assessments in 2011 of 47,180 learners with specified ethnic group.

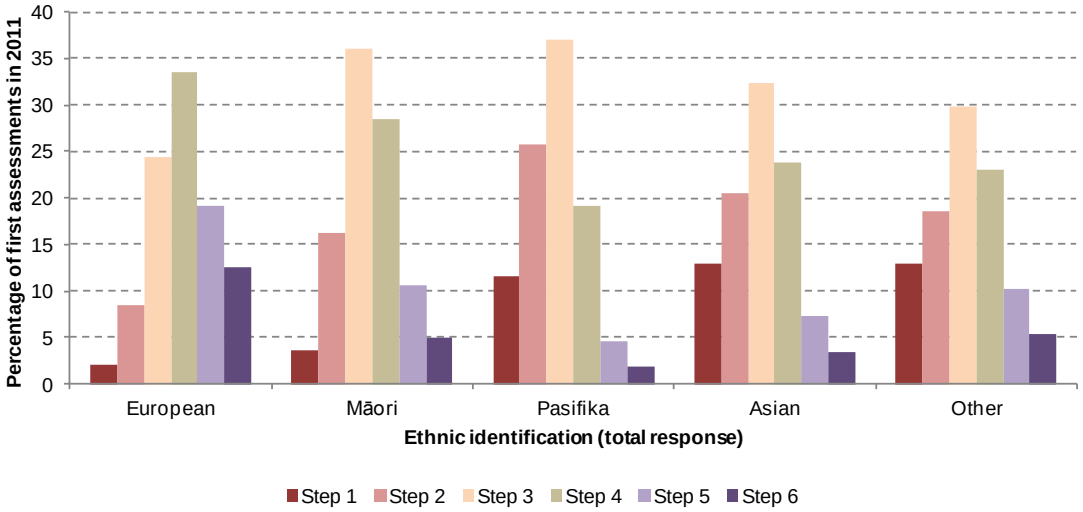
Read with Understanding

The ethnic distributions of first assessment scores for Read with Understanding are shown in Figure 24. These showed a pattern quite distinct from that for General Numeracy. The combined proportion of learners at Steps 4, 5 and 6 varied as follows: 65 per cent of European learners, 44 per cent of Māori, 26 per cent of Pasifika, 34 per cent of Asian and 39 per cent of Other ethnic group learners.

The European group had the largest percentage of learners at Step 4, while the other ethnic groups had their largest percentages of learners at Step 3. The proportion of learners at Steps 5 and 6 was lower for Māori (16 per cent) and Other (16 per cent) group than for European (32 per cent), and lower again for Asian (11 per cent) and Pasifika (7 per cent). Conversely, the proportion of learners at Steps 1 and 2 was lowest for European (10 per cent), higher for Māori (20 per cent), and higher again for the other three ethnic groups (Pasifika 37 per cent; Asian 33 per cent; Other 31 per cent).

Figure 24

First Read with Understanding assessment in 2011: Learning Progressions Steps, by ethnic identification



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on the first Read with Understanding assessments in 2011 of 62,397 learners with specified ethnic group.

The ethnic comparisons reported here are broadly similar to those found in analysis of data from the Adult Literacy and Life Skills (ALL) Survey 2006 (Satherley and Lawes 2008b; Lane 2011). The profiles for the Asian group, however, depart somewhat from the ALL Survey results, in that Asians in the Assessment Tool data score relatively better in numeracy and worse in reading/literacy.

There are a number of relevant factors here, which could be explored in a more in-depth analysis. One is that the ALL Survey was based on representative samples of the population aged 16-65, while the Assessment Tool results are quite selective, reflecting learners' choices to study or not, and whether or not to study at NZQF Levels 1 to 3, where they are more likely to be assessed, as well as education providers' choices about which learners to assess, on which skills. Within the Asian group, there was considerable diversity of skills in the ALL Survey data, particularly according to age (Lane 2011, p.83), probably reflecting the strong effect on the ALL measures of literacy of time spent in education in New Zealand (Earle 2009). Younger Asians were more likely to have spent several years in New Zealand education and tended to have higher English literacy than older Asians. First language and main language spoken in the

home were important factors: if either or both were English, literacy and numeracy tended to measure higher.

First language

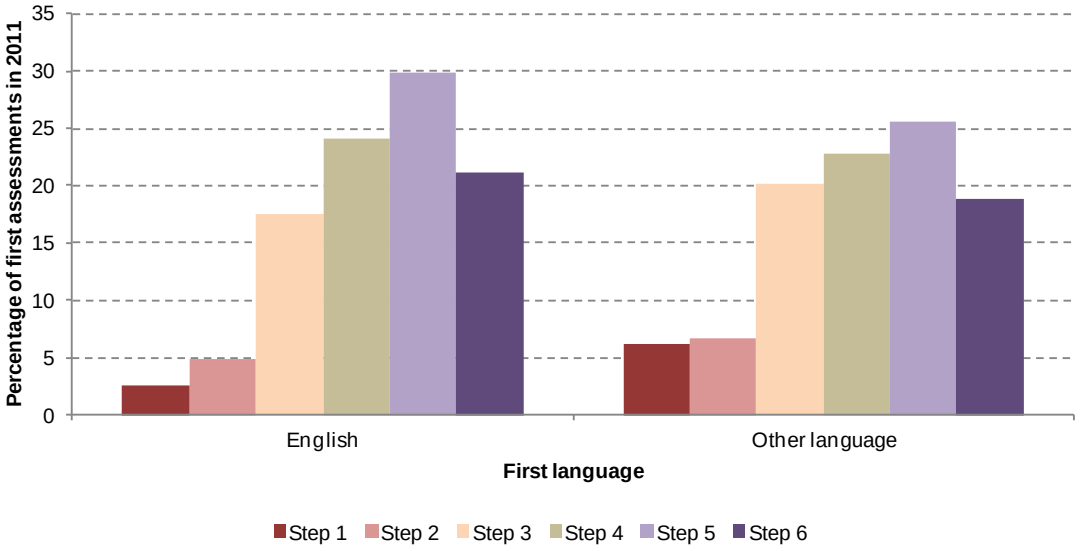
General Numeracy

On first assessment for General Numeracy in 2011, learners whose first language was English tended to have higher scores than learners with other first languages, as shown in Figure 25. The 1.5 per cent of learners whose first language was not specified are not included in the analyses that follow.

Greater proportions of learners with English as first language were at Steps 5 and 6 (51 per cent, compared with 44 per cent for those with other first languages), while greater proportions of learners with other first languages were at Steps 1 to 4 (49 per cent for learners with English first language, but 56 per cent for those with other first languages).

Figure 25

First General Numeracy assessment in 2011: Learning Progressions Steps, by first language



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on the first General Numeracy assessments in 2011 of 49,642 learners with specified first language.

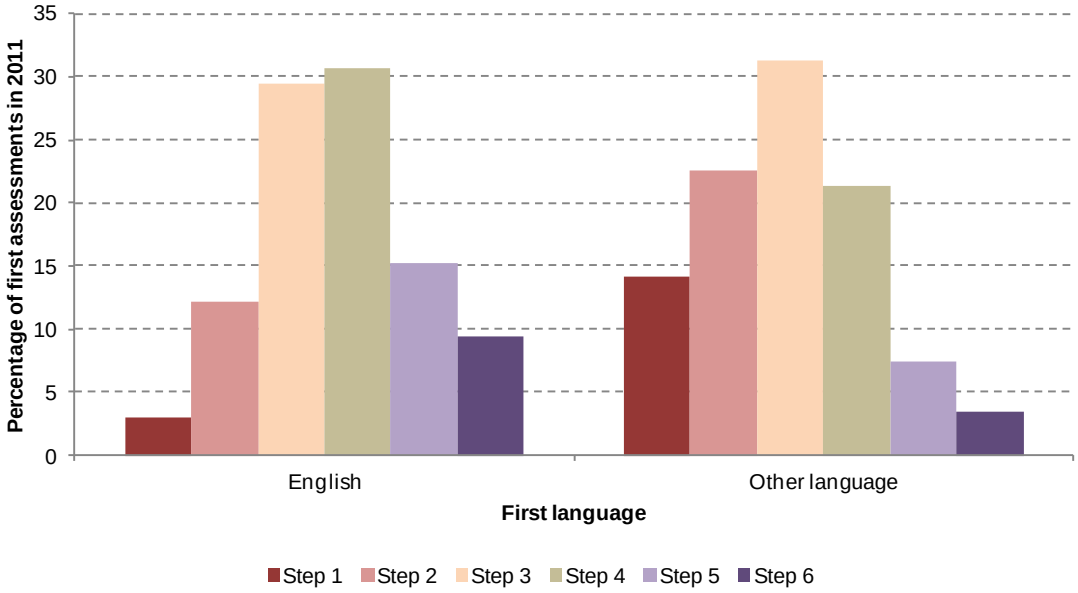
Read with Understanding

Figure 27 shows the distribution of scores on first assessment for Read with Understanding according to the learners' first languages. As for General Numeracy, learners with English as their first language tended to have higher scores, with 55 per cent of such learners at Steps 4, 5 and 6, while 32 per cent of learners with other first language were at any of those three Steps.

However, what is most noticeable here is the much greater proportions of learners with other first languages who had scores corresponding to Steps 1 and 2 (a combined proportion of 37 per cent, compared with 15 per cent of learners with English as their first language).

Figure 26

First Read with Understanding assessment in 2011: Learning Progressions Steps, by first language



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on the first Read with Understanding assessments in 2011 of 65,089 learners with specified first language.

As indicated in the previous subsection, these results are in line with findings based on the ALL Survey.

Among the 77,362 learners assessed at least once in 2011, the proportion whose first language was not English varied among ethnic groups (see also Table 3 in section 2.7): approximately 7 per cent for the European group, 6 per cent for Māori, 42 per cent for Pasifika, 69 per cent for Asian, and 48 per cent for Other ethnic groups. Given that first language makes a big difference to the distribution of initial Steps for Read with Understanding, this appears to largely account for the relatively high proportion of learners at initial Steps 1 and 2 in the Pasifika, Asian and Other ethnic groups, as shown in Figure 24 above, although further analysis is required to confirm this hypothesis.

3.3 Skills and qualification levels

The analyses in this section (and the following sections in this chapter) use data obtained by learner-based matching (see Chapter 6) between the Assessment Tool data and the enrolment data for learners in Student Achievement Component and Youth Guarantee-funded programmes. Learners who were enrolled in programmes leading to qualifications at more than one New Zealand Qualification Framework (NZQF) Level in 2011 are counted in each of those levels.

The analyses in these sections are not necessarily representative of learners in particular qualification levels, funding groups or provider types. The analyses in section 2.7 showed, for example, that only a minority of learners studying at Levels 1 to 4 were assessed (between 16 per cent at Level 4 and 31 per cent at Level 3), and only tiny proportions (under 5 per cent) of learners studying Level 5 to 7 diplomas or bachelors or higher degrees were assessed.

The overall pattern is of higher general numeracy and reading skills among learners at higher qualification levels. Given that learners studying at higher levels tend also to be older, it is not immediately apparent how much of the variation in skills can be attributed to age and how much to education level. Clarification of this issue will require further in-depth analysis beyond the scope of this report.

However, the pattern of higher skills at higher levels of study is parallel to the finding in the Adult Literacy and Life Skills (ALL) Survey that adults with higher levels of completed education tended to have higher skills (Lane 2010, 2011).

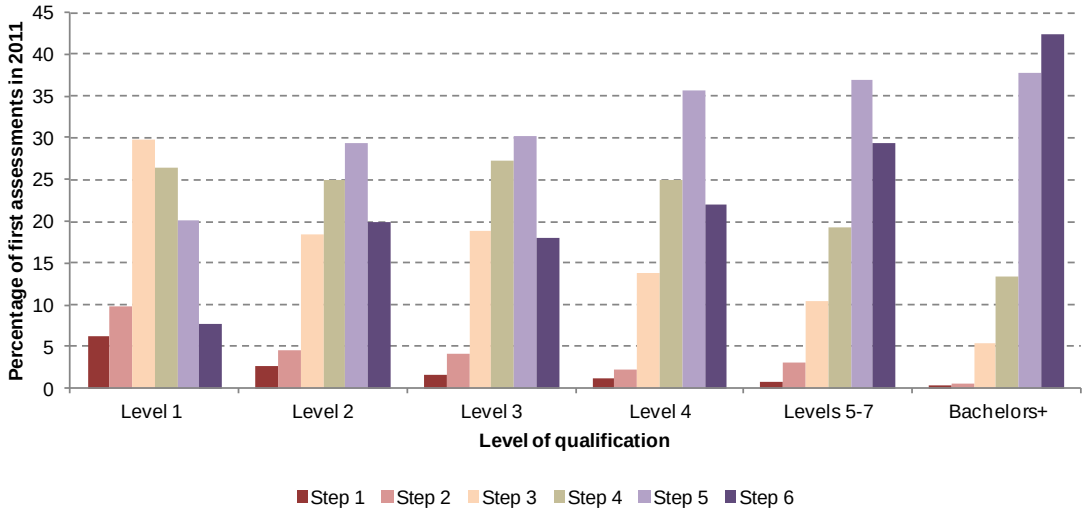
General Numeracy

For learners studying in SAC- and YG-funded programmes at different NZQF levels of qualification, the distributions of scores on first General Numeracy assessment were as shown in Figure 27. As might be expected, learners studying at higher levels tended to have higher scores. In fact, the differences were remarkably regular across levels, with the percentages of learners at Steps 5 and 6 increasing steadily from Level 1 (28 per cent) up to Bachelors and higher degrees (80 per cent), and the percentages at Steps 1 and 2 correspondingly decreasing (from 16 per cent at Level 1 to 1 per cent at Bachelors and higher), with the one exception that there was a slightly greater percentage at Step 2 among learners in Level 5 to 7 diplomas (4 per cent) than there was at Level 4 (3 per cent).

This pattern is fairly predictable for higher levels of study (Level 4 and above), because entry to these levels generally depends on having completed education at lower levels, but entry at Levels 1 to 3 is less dependent on prior achievement, and so it is noteworthy that there is a sequence in the numeracy profiles from Level 1 to Level 3, indicating that the selection and enrolment procedures for certificates at these levels are fairly efficient at placing learners at appropriate levels of study.

Figure 27

First General Numeracy assessment in 2011: Distribution of Learning Progressions Steps, by NZQF level of qualification for learners in SAC- or YG-funded programmes



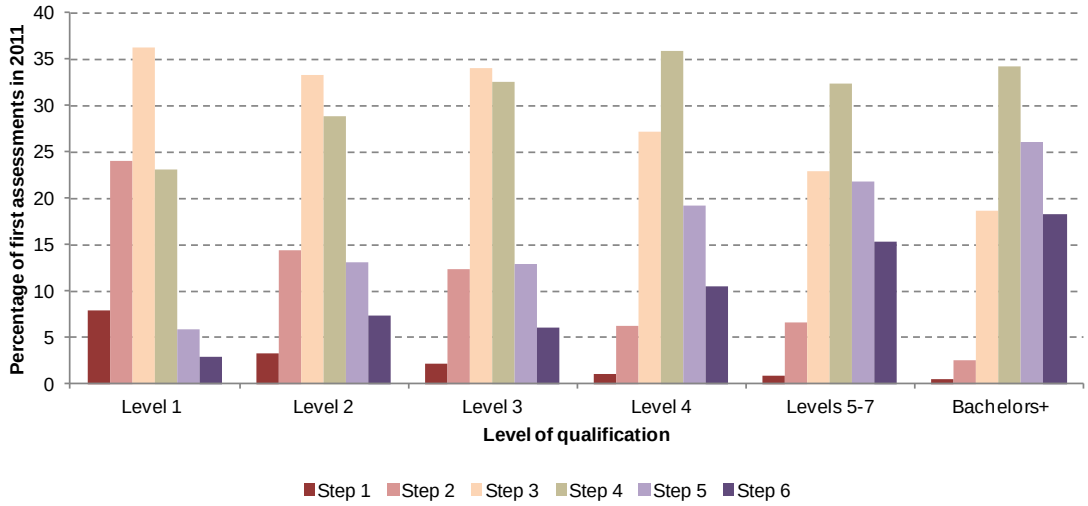
Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 23,479 learners enrolled in SAC- and YG-funded programmes who were assessed at least once in 2011 for General Numeracy.

Read with Understanding

For learners in SAC- or YG-funded programmes, the profiles on first Read with Understanding assessment in 2011 according to level of qualification are shown in Figure 28. The same trends are evident as in Figure 27 for General Numeracy. In this case, the percentage at Steps 4, 5 and 6 combined rose from 32 per cent at Level 1 to 78 per cent at Bachelors and higher; and the percentage at Steps 1 and 2 combined fell from 32 per cent at Level 1 to 3 per cent at Bachelors and higher. There was also a slightly greater percentage at Step 2 among learners studying for Level 5 to 7 diplomas (8 per cent) than among learners at Level 4 (7 per cent):

Figure 28

First Read with Understanding assessment in 2011: Learning Progressions Steps, by NZQF level of qualification for learners in SAC- or YG-funded programmes



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 30,963 learners enrolled in SAC- and YG-funded programmes who were assessed at least once in 2011 for Read with Understanding.

3.4 Skills and funding groups

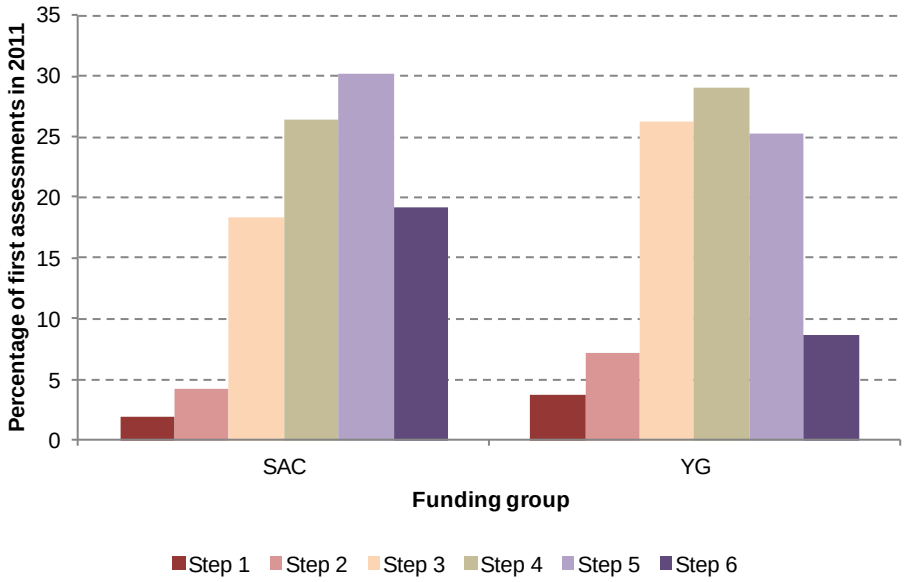
General Numeracy

Figure 29 shows the learner profiles on first General Numeracy assessment in 2011 for learners enrolled in programmes leading to NZQF Levels 1 to 3 qualifications, according to the funding of the learners' places: Student Achievement Component (SAC) or Youth Guarantee fees-free tertiary places (YG).

Assessed learners in SAC-funded programmes tended to have relatively high scores (with 49 per cent at Steps 5 and 6), while learners in Youth Guarantee programmes tended to have lower scores (34 per cent at Steps 5 and 6). Conversely, the proportion of learners at Steps 1 to 3 was relatively high among Youth Guarantee learners (37 per cent) and lower among learners in SAC-funded programmes (24 per cent).

Figure 29

First General Numeracy assessment in 2011 for learners in SAC- or YG-funded programmes at NZQF levels 1 to 3: Learning Progressions Steps, by funding group



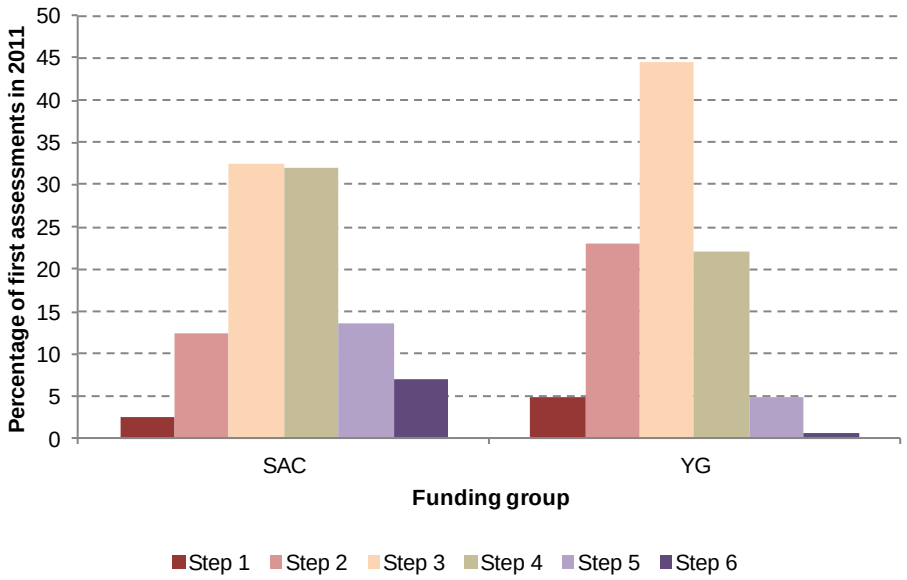
Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 18,806 learners who were enrolled in SAC- or YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 and were assessed at least once in 2011 for General Numeracy.

Read with Understanding

Figure 30 displays the learner profiles on first Read with Understanding assessment in 2011 for learners enrolled in programmes leading to NZQF Level 1 to 3 qualifications, according to funding, and shows similar patterns to the General Numeracy profiles in Figure 29. Learners in SAC-funded programmes tended to have relatively high scores (with 53 per cent of learners at Steps 4 to 6), while the learners in Youth Guarantee programmes tended to have lower scores (28 per cent at Steps 4 to 6). Conversely, the proportion of learners at Steps 1 to 3 was relatively high among Youth Guarantee learners (37 per cent) and lower among learners in SAC-funded programmes (24 per cent).

Figure 30

First Read with Understanding assessment in 2011 for learners in SAC- or YG-funded programmes at NZQF levels 1 to 3: Learning Progressions Steps, by funding group



Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 22,608 learners who were enrolled in SAC- or YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 and were assessed at least once in 2011 for Read with Understanding.

3.5 Skills and provider types

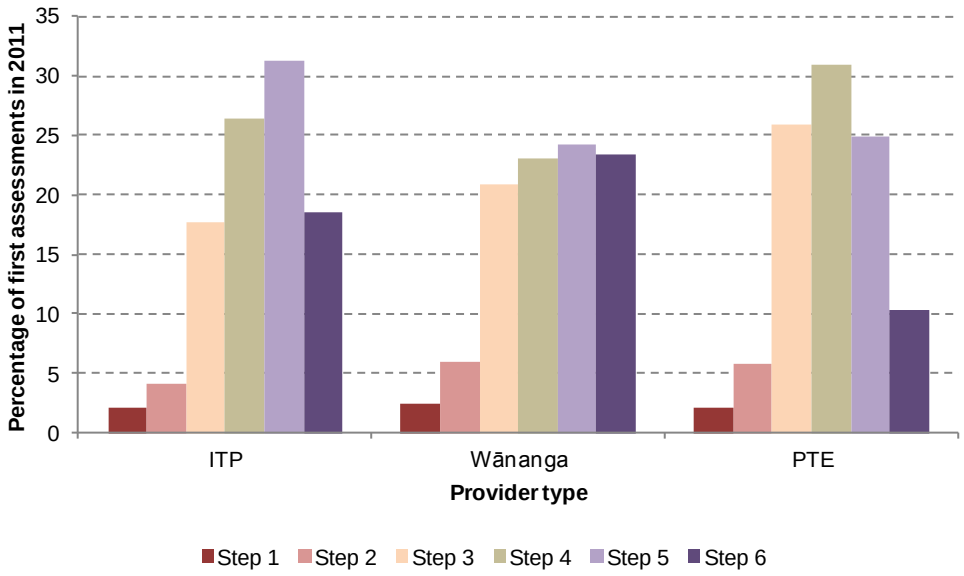
In this section, learners studying in SAC- and YG-funded programmes at qualification levels 1 to 3 are compared according to the type of education provider they were enrolled with. All ITPs and wānanga were included in the set of providers of such programmes, but only a small proportion of all PTEs.

These comparisons need to be treated with caution given the relatively low rates of assessment of learners in wānanga and PTEs (see section 2.7). The different types of provider also have populations of learners with different characteristics. Not only were there considerable variations between different providers within the same type, but there were differences between provider types in the ethnic and language backgrounds of learners, and the proportions of learners studying at different qualification levels and in different funding groups. Analysis of these variations is beyond the scope of the current report.

Figure 31 compares the learner profiles by provider type on first assessment for General Numeracy, for learners studying in SAC- and YG-funded programmes leading to qualifications at NZQF Levels 1 to 3. Learners' scores tended to be somewhat higher at ITPs than at wānanga, while learners at PTEs tended to have slightly lower scores than learners at wānanga. More specifically, the proportion of learners at Steps 1 to 3 combined was 24 per cent at ITPs, 29 per cent at wānanga and 34 per cent at PTEs, while the pattern for Steps 5 and 6 combined was 50 per cent at ITPs, 48 per cent at wānanga, and 35 per cent at PTEs.

Figure 31

First General Numeracy assessment in 2011 for learners in SAC- or YG-funded programmes at NZQF levels 1 to 3: Learning Progressions Steps, by provider type



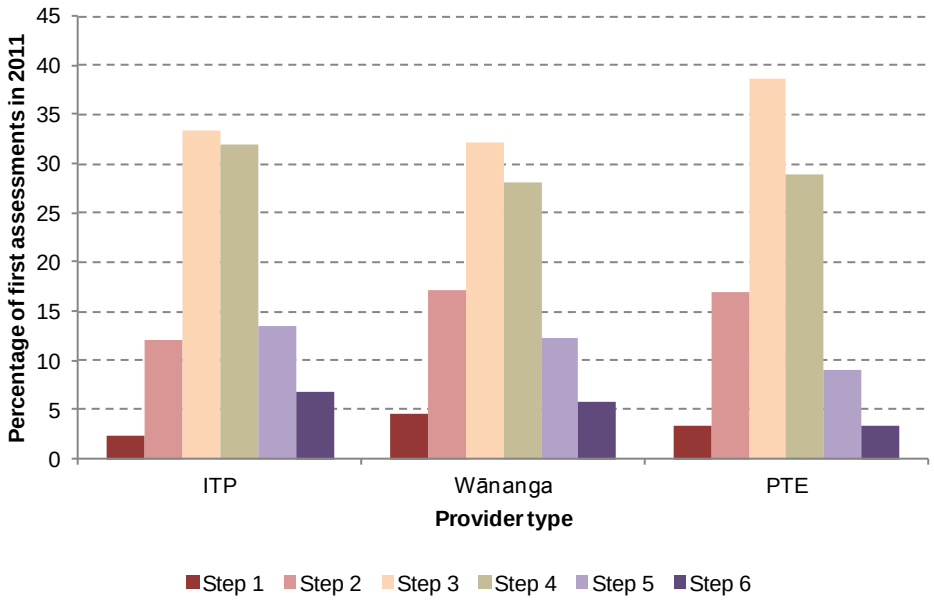
Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 18,806 learners who were enrolled in SAC- or YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 and were assessed at least once in 2011 for General Numeracy.

Read with Understanding

The corresponding learner profiles according to provider type for first assessments for Read with Understanding are shown in Figure 32. As with General Numeracy, learners' scores tended to be somewhat lower at wānanga than at ITPs, and lower again at PTEs. More specifically, the combined proportions at Steps 4, 5 and 6 were 52 per cent at ITPs, 46 per cent at wānanga, and 41 per cent at PTEs, while the combined proportions at Steps 1 and 2 were 14 per cent at ITPs, 22 per cent at wānanga, and 20 per cent at PTEs.

Figure 32

First Read with Understanding assessment in 2011 for learners in SAC- or YG-funded programmes at NZQF levels 1 to 3: Learning Progressions Steps, by provider type



Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 22,608 learners who were enrolled in SAC- or YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 and were assessed at least once in 2011 for Read with Understanding.

3.6 Summary of skill profiles on first assessment in 2011

Analyses in this chapter are based on the first assessments of learners in 2011 for the skills General Numeracy and Read with Understanding.

Analyses of Assessment Tool data for all assessed learners

The differences between the Learning Progressions for the two skills means that overall, the proportion of learners at Steps 5 and 6 for General Numeracy (50 per cent) approximates the proportion of learners at Steps 4, 5 and 6 for Read with Understanding (51 per cent).

Broadly speaking, the profiles of learner skills at first assessment showed a pattern of increasing skill with age up to the 25-34 age group, then a slight decline for older groups. The proportions of learners at Steps 5 and 6 for General Numeracy, and at Steps 4, 5 and 6 for Read with Understanding increased from between 30 and 40 per cent for the 16-17 age group, to over 50 per cent for those 18 and over, peaking at over 55 per cent for the 25-34 age group.

Scores for General Numeracy on first assessment tended to be higher for men than for women, but there were only small gender differences for Read with Understanding.

First assessment scores for General Numeracy showed considerable variation in the combined proportion of learners at Steps 5 and 6 in each ethnic group: 60 per cent of European learners, 35 per cent of Māori, 28 per cent of Pasifika, 59 per cent of Asian and 46 per cent of Other ethnic group learners.

Read with Understanding showed an ethnic pattern quite distinct from that for General Numeracy. The combined proportion of learners at Steps 4, 5 and 6 varied as follows: 65 per cent of European learners, 44 per cent of Māori, 26 per cent of Pasifika, 34 per cent of Asian and 39 per cent of Other ethnic group learners.

On first assessment for both General Numeracy and for Read with Understanding in 2011, learners whose first language was English tended to have higher scores than learners with other first languages.

Analyses of Assessment Tool data matched to enrolments

Learners in SAC- or YG-funded programmes studying at higher NZQF levels of qualification tended to have higher first General Numeracy and Read with Understanding assessment scores. In fact, the differences were remarkably regular across levels, with the percentages of learners at Steps 5 and 6 for General Numeracy and at Steps 4, 5 and 6 for Read with Understanding increasing steadily from Level 1 (under 30 per cent) up to Bachelors and higher degrees (over 70 per cent).

For learners studying in SAC- and YG-funded programmes at NZQF Levels 1 to 3, those in SAC-funded programmes tended to score higher than those in Youth Guarantee.

On first assessment for both General Numeracy and for Read with Understanding, learners studying in SAC- or YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 showed the following pattern according to type of provider: the proportion of learners at the highest Steps was greatest at ITPs, slightly less at wānanga, and lowest at PTEs.

In brief

Learners were relatively more likely to record first assessment scores for General Numeracy corresponding to Learning Progressions Steps 5 and 6, or scores for Read with Understanding corresponding to Steps 4, 5 and 6, if they were in one or more of the following categories:

- aged 25 to 34
- speakers of English as a first language
- enrolled for Bachelors or higher degree programmes

And for the subset of learners enrolled in SAC- or YG-funded programmes at NZQF Levels 1 to 3, the groups more likely to be at higher Steps on first assessment were those:

- in SAC rather than YG
- studying at ITPs or wānanga

Conversely, the learners more likely to be at Steps 1 and 2 on first assessment for General Numeracy or for Read with Understanding were in the categories:

- aged 16-17 and 55+
- with first language other than English
- studying at NZQF Level 1

And the learners studying in SAC- or YG-funded programmes at Levels 1 to 3 more likely to be at Steps 1 and 2 were in the funding and provider groups:

- YG rather than SAC
- Private training establishment (PTE)

First assessment scores for General Numeracy and for Read with Understanding showed different patterns according to gender and ethnic group. Learners were more likely to record first assessment scores for General Numeracy corresponding to Learning Progressions Steps 5 and 6 if they were in one or more of the following categories:

- male
- European or Asian

Conversely, the learners more likely to be at Steps 1 and 2 on first assessment for General Numeracy were:

- female
- Pasifika

Learners were more likely to record first assessment scores for Read with Understanding corresponding to Learning Progressions Steps 4, 5 and 6 if they were in one or more of the following categories:

- female (marginally)
- European or Māori

Conversely, the learners more likely to be at Steps 1 and 2 on first assessment for Read with Understanding were in the categories:

- male (marginally)
- Pasifika, Asian or Other ethnic group

4 MEASURING GAINS IN SKILL IN 2011

This chapter is based on analysis of data from learners who have been assessed at least twice for the same skill in 2011[11]. As in Chapter 3, the analysis is restricted to the skills General Numeracy and Read with Understanding.

The analyses are based on comparing the first and last assessments in 2011 for each learner for each skill. In most cases, the last assessment was the second assessment, but for a small proportion of learners it was the third or a further repeat assessment (see section 2.6). Choosing the first and last assessments allows the longest possible time between assessments to be compared. This should allow the greatest chance for improvements in numeracy and reading to become evident. However, it should be noted that in the small number of cases where learners have been assessed more than twice for the same skill, the last assessment score may not be higher than for other reassessments of the learner.

This chapter presents an initial analysis of learner gain, from the point of view of reporting results, without investigating any link to programme effectiveness, or other possible explanations. There are a number of factors which could potentially affect the extent of measured learner gains in skill, but which are not considered here. One of these is time, whether measured as time elapsed between first and last assessments, or in terms of hours of instruction or other measures of amount of educational provision. Another is the type of assessment, whether adaptive (full-length or Snapshot) or non-adaptive (online or offline), whether a difficulty level or threshold is set or not; and whether the first and last assessments are of the same type or not. A third factor is whether the first and last assessments were completed by the same organisation or not, or were carried out in the context of the same educational programme or not. A fourth is the degree of engagement of educators and learners in the assessment process. Consideration of these factors awaits further in-depth analysis.

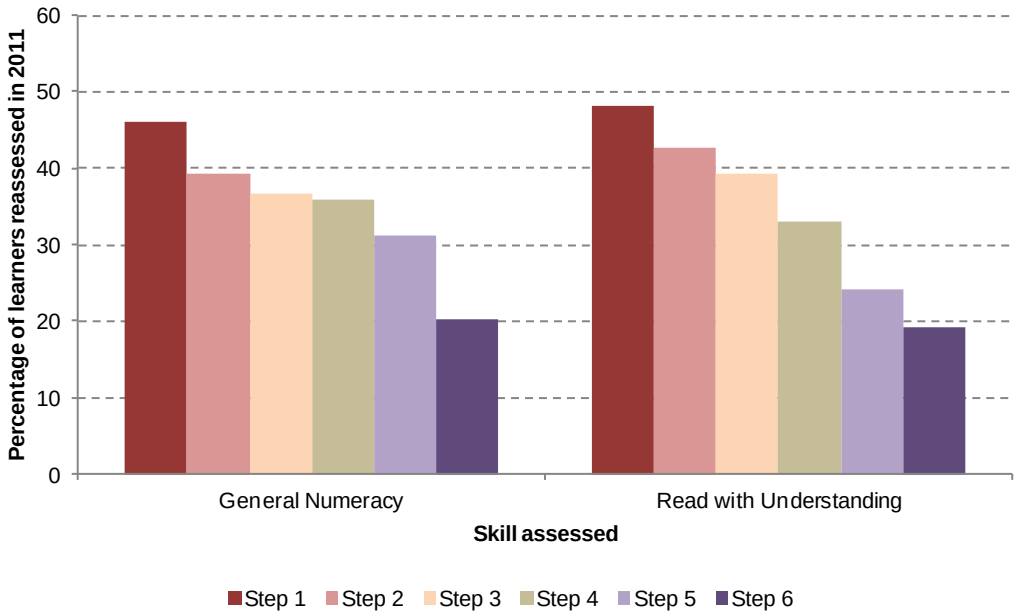
In 2011, 50,418 learners were assessed at least once for General Numeracy, and of these, 16,097 learners (32 per cent) were assessed at least once more; while 66,101 learners were assessed at least once for Read with Understanding, and 22,933 of these (35 per cent) were assessed at least once more in 2011.

According to the Tertiary Education Commission's guidelines for the use of the Assessment Tool[12], learners whose first assessment scores corresponded to Step 6 for numeracy or Steps 5 and 6 for reading did not need to be assessed again. However around 20 per cent of such learners were reassessed, though this was a smaller proportion than learners whose first assessment scores corresponded to lower Steps, as can be seen in Figure 33. In fact, between 40 and 50 per cent of learners whose first assessment was at Step 1 were reassessed, while approximately 30 to 40 per cent of learners whose first assessments were at Steps 2 to 5 for General Numeracy or at Steps 2 to 4 for Read with Understanding were reassessed.

[11] Data from the pilot year 2010 has not been included in this analysis because it may have different characteristics from data from the first full year of implementation, 2011. In particular, there was relatively little use of the Assessment Tool by ITPs in 2010, but extensive use in 2011 (see section 2.4).
[12] Strictly speaking, this guidance applies to programmes with embedded literacy and numeracy, and programmes funded in the categories Workplace Literacy and Intensive Literacy and Numeracy: see Appendix B.

Figure 33

Percentage of assessed learners who were reassessed in 2011, by Learning Progressions Step on first assessment, for General Numeracy and Read with Understanding



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 50,418 learners initially assessed for General Numeracy, and 66,101 learners initially assessed for Read with Understanding (including 42,457 learners assessed for both skills).

How much improvement in learners' Assessment Tool scores which should we expect to occur in the course of 2011? Some sobering indications can be gained from the work of Stephen Reder[13], particularly his research based on the Longitudinal Study of Adult Learning in Portland, Oregon, USA (Reder 2009, 2012). This study followed 940 high-school dropouts from 1998 through to 2005. One of Reder's main conclusions from this study was that improvements in scores for proficiency assessments (of a kind similar to the Assessment Tool) tended to be modest and long-term: they might not be apparent within a single educational programme and might only become evident over a period of years. He argues that the relationship between educational provision and improvements in literacy and numeracy proficiency is indirect: that the main effect of educational programmes is to change learners' literacy and numeracy practices, for instance by encouraging learners to read more frequently and read a wider range of materials; and that it is these changes in literacy and numeracy practices that over time lead to improvements in literacy and numeracy proficiency scores.

Reder (2012) summarises these points as follows:

> … the data exhibit a strong positive relationship between program participation and changes in literacy and numeracy *practices* measures. With many statistical controls in place, there are strong relationships between participation in adult education programs and increased engagement with literacy (e.g., reading books) and numeracy (e.g., using math at home) practices. The sequence of the observed changes makes it clear that program participation influences practices rather than vice-versa …
>
> More frequent reading and writing activities lead over a long period of time (approximately 5-6 years) to greater proficiency. The estimated practice engagement

[13] Reder is one of the leading international researchers on adult literacy and numeracy development.

effect – leading from engagement in literacy practices to increased literacy proficiency – remains significant with numerous demographic and background variables controlled.

4.1 Changes between first and last assessments in 2011

In looking at changes between first and last assessments, the question of interest is to what extent learners improved their skills. This is not as simple as asking how many learners experienced increases in these scores between first and last assessments, because there is some random variability in the assessment process.[14] Because of this variability, even learners whose skills remain stable could appear to rise or fall between one assessment and another. If there is a fall in scores, it is reasonable to interpret this as a sign of stability in skills rather than a deterioration, since learners are unlikely to actually lose skills while involved in an educational programme. On the other hand, if there is a rise in scores, is this due to a genuine improvement in skills, or just to the element of random variability in the assessment process?

Scores and changes in scores are not precise measurements but rather are subject to uncertainty: the degree of uncertainty can be estimated, and the Assessment Tool provides estimates of uncertainty in the form of the standard error attached to each score. Because an increase in scores is a difference between two relatively imprecise measurements, it is subject to greater uncertainty than the individual scores. The degree of uncertainty can be represented by a standard error, the standard error of the score increase, which can be calculated from the individual standard errors of the first and last scores (see Chapter 6 for details), and is greater than either of the individual standard errors. Different learners may have score increases of the same size, but different standard errors for those score increases. To take this into account, we can calculate a standardised score increase, which is the score increase divided by the standard error of the score increase.

When the standardised score increase is above 1.645, the probability of such a positive increase occurring through random variation is estimated at 1 in 20 (i.e. 5 per cent),[15] or in other words, we can conclude with 95 per cent confidence that the increase is not simply due to random variation. This threshold is the basis on which the Assessment Tool reports statistically significant gain. It represents a compromise between trying to exclude apparent gains which are actually due to random variations, while on the other hand as far as possible identifying genuine improvement in a learner's skills. It is not a perfect instrument: there will still be some random changes counted as statistically significant gain (false positives), and there will be some genuine improvements which are not counted as statistically significant gain (false negatives).

Thus the significance threshold divides score increases into two categories: those showing statistically significant gain, which we can be very confident represent genuine improvements in skills, and those that do not, which include falls, and which either represent no real change in skills, or increases which we cannot be highly confident are due to genuine improvement.

There are reasons to expect that the likelihood of a learner experiencing statistically significant gain will depend on the starting point, that is, the score on the first assessment. Learners whose first assessment score is very high have little room to move because they are near the maximum, and so we would not expect to find many learners whose first assessment is at Step 6 to show significant gain: this is a 'ceiling effect'. In addition, learners whose scores correspond to Steps 5 and 6 for General Numeracy or Steps 4, 5 and 6 for Read with Understanding are

[14] A change in Learning Progressions Step between one assessment and another is not a good measure of improvement either. If a learner's first assessment score was just below the cutoff between two Steps, then the learner could appear to improve by one Step if they scored a few points higher on a second assessment, though this change could be due to random variation. Conversely, a learner could show a very large and significant gain in scores but still be within the score range corresponding to a single step, and hence appear not to have improved in terms of a change in Step.

[15] Based on assuming that the scores follow a Normal distribution, which is a reasonable assumption when we have scores from a large number of learners, as is the case here.

generally considered to have sufficient skills to undertake study, at least at Levels 1 to 3, and would not be expected to be the focus of embedded literacy and numeracy.

On the other hand, learners whose first assessment score is low have scope to make large strides which will show up as statistically significant gain. It is also to be expected that more instructional effort may be directed at learners whose first assessment scores are low, and so we could expect many such learners to experience genuine improvement in skills, which should lead to a higher proportion of such learners showing statistically significant gain, compared with learners whose first assessments are in the middle or upper part of the score range. Low-skilled learners may also benefit from the assistance of fellow learners with higher skills.

The distribution of statistically significant gain for General Numeracy and for Read with Understanding is represented in Figure 34, in terms of the percentage of learners with first assessment at each Learning Progressions Step whose score increase was large enough to meet the criteria for statistically significant gain.

There is clearly a fairly strong relationship between first assessment score, as represented by the Learning Progressions Steps, and the percentage of learners recording statistically significant gain.[16]

The rest of this chapter contains a series of graphs presenting the significant gain profiles of different groups of learners. There is an important caveat on interpreting these graphs, in that the set of learners enrolled in particular programmes who have been assessed at least twice for a particular skill is not necessarily representative of all the learners in those programmes. Of learners studying in SAC- or YG-funded programmes at NZQF Levels 1 to 3, for instance, only 20 to 30 per cent were assessed at all (see section 2.5), and of assessed learners, the proportion reassessed varied from over 40 per cent for learners whose first assessment was at Step 1 to around 20 per cent for those with first assessment at Step 6. If there are non-random factors that affect the likelihood of learners being assessed a first and a second time, then these factors could affect the distribution of scores for assessments and re-assessments and hence the distribution of score increases.

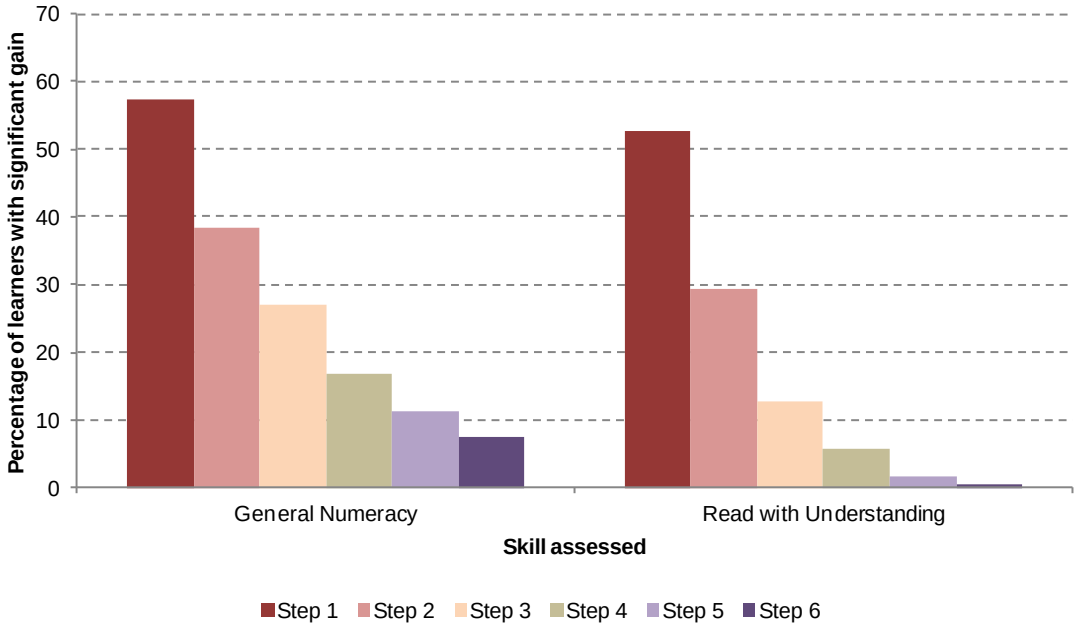
[16] In statistical terms, the correlation coefficient of first score and achievement of significant gain was about -0.3 for General Numeracy and about -0.4 for Read with Understanding. For these calculations, achievement of significant gain was represented by an indicator variable with value 1 for statistically significant gain and 0 for absence of statistically significant gain.

The overall distribution of statistically significant gain for General Numeracy and for Read with Understanding is represented in Figure 34, in terms of the percentage of learners with first assessment at each Learning Progressions Step whose score increase was large enough to meet the criteria for statistically significant gain.

There is clearly a fairly strong relationship between first assessment score, as represented by the Learning Progressions Steps, and the percentage of learners recording statistically significant gain.[17]

Figure 34

Percentage of learners showing significant gain between first and last assessments in 2011 for General Numeracy and Read with Understanding, by first assessment Step



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 16,097 learners reassessed for General Numeracy, and 22,933 learners reassessed for Read with Understanding (including 13,733 learners reassessed for both skills).

Because of the relationship between the initial Step result and the extent of significant gain, the analyses in the remainder of this chapter will be based on the percentages of learners at each initial Step achieving statistically significant gain.

The following sections contain comparisons of statistically significant gain profiles by characteristics of learners and provision as summaries of observations. Given that these are observations of a new kind, for which we have little previous experience to base explanations on, further in-depth analysis is required before making any attempt to account for differences in the rates of significant gain.

[17] In statistical terms, the correlation coefficient of first score and achievement of significant gain was about -0.3 for General Numeracy and about -0.4 for Read with Understanding. For these calculations, achievement of significant gain was represented by an indicator variable with value 1 for statistically significant gain and 0 for absence of statistically significant gain.

4.2 Gains for different groups of learners

In general, learners were somewhat more likely to be reassessed for Read with Understanding than for General Numeracy.

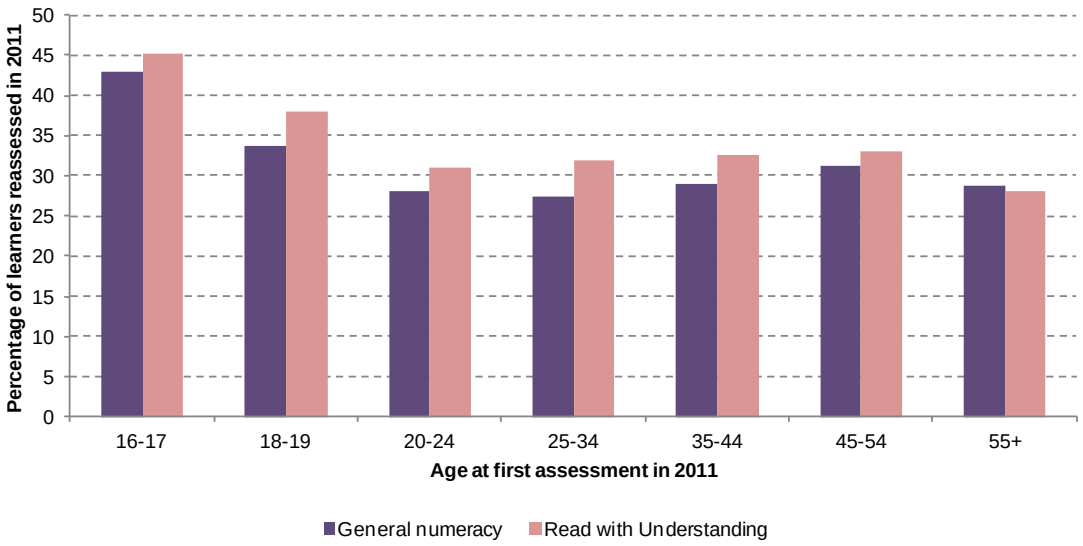
Of 77,362 learners assessed at least once in 2011 across all skills, 74,062 (96 per cent) were assessed for at least one of General Numeracy or Read with Understanding. Of the 50,418 learners initially assessed for General Numeracy, 16,097 (32 per cent) were reassessed. Of the 66,101 learners initially assessed for Read with Understanding, 22,933 (35 per cent) were reassessed. These totals include 42,457 learners who were assessed at least once for both skills, of whom 13,733 (32 per cent) were reassessed for both skills.

Age groups

Of learners assessed at least once in 2011 for General Numeracy or for Read with Understanding, the percentage who were assessed again in 2011 for the same skill is shown in Figure 35 according to age at first assessment. Learners in the 16-17 and 18-19 age groups were most likely to be reassessed for these skills. The rate of reassessment was above 25 per cent for both skills for all age groups.

Figure 35

Percentage of learners reassessed in 2011 for General Numeracy and for Read with Understanding, by age at first assessment in 2011

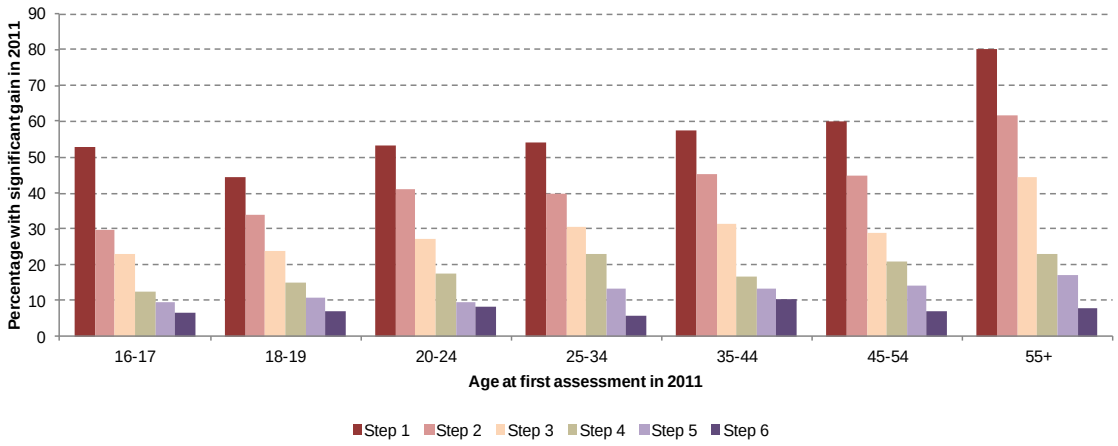


Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 49,773 learners aged 16 and over who were initially assessed for General Numeracy in 2011, and 65,612 learners aged 16 and over who were initially assessed for Read with Understanding (including 42,084 learners who were assessed for both skills).

Figures 36 and 37 display the statistically significant gain profiles for different age groups of learners, for General Numeracy and Read with Understanding respectively. Both Figures show a general trend with increasing age of a greater percentage of learners experiencing significant gain. For General Numeracy this applies to learners whose first assessments were at Steps 1 to 5, while for Read with Understanding it applies to learners whose first assessments were at Steps 1 to 3. The most prominent exception to this trend for both skills is that 16-17-year-olds whose first assessments were at Step 1 had a higher rate of significant gain than people aged 18-19 whose first assessments were at Step 1.

Figure 36

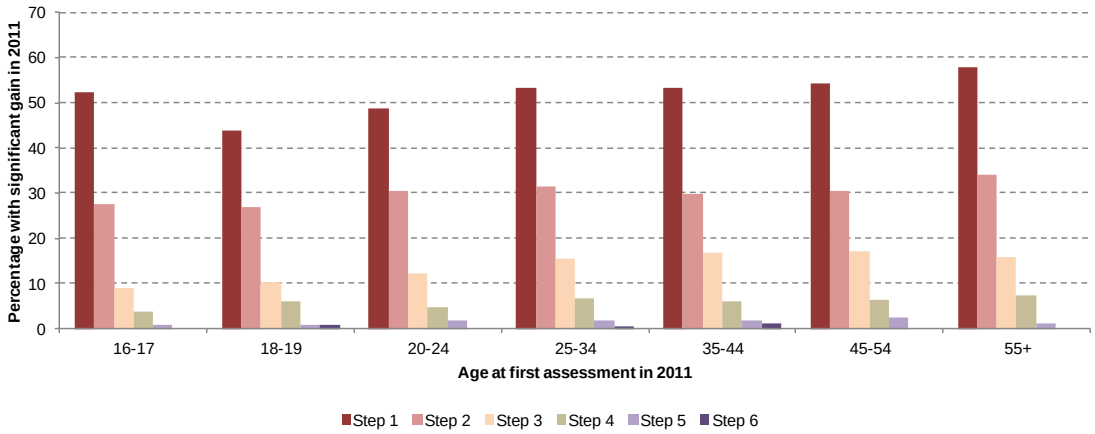
Percentage of learners with significant gain in 2011 for General Numeracy, by initial Step and age



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 15,951 learners aged 16 and over who were reassessed for General Numeracy in 2011.

Figure 37

Percentage of learners with significant gain in 2011 in Read with Understanding, by initial Step and age



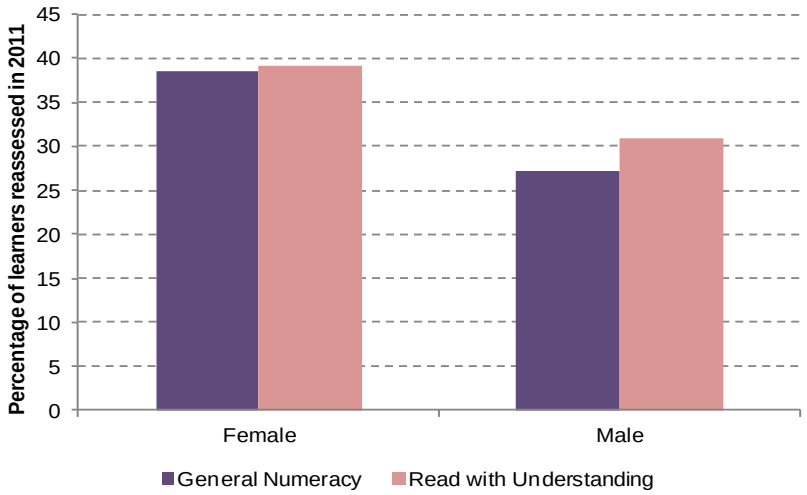
Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 22,770 learners aged 16 and over who were reassessed for Read with Understanding in 2011.

Gender

The rate of reassessment according to gender for General Numeracy and Read with Understanding is illustrated in Figure 38. Women were much more likely than men to be reassessed for either skill. Given that men were considerably more likely to be assessed initially (see section 2.6), the effect of this is to even out the numbers of men and women who were assessed and then reassessed.

Figure 38

Percentage of learners reassessed in 2011 for General Numeracy and for Read with Understanding, by gender

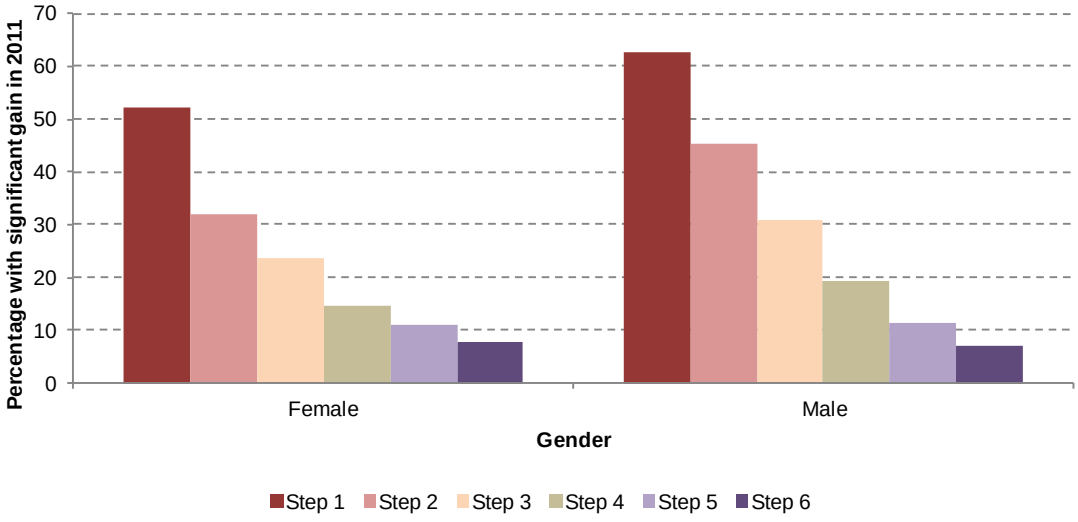


Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 50,418 learners who were initially assessed for General Numeracy in 2011, and 66,101 learners who were initially assessed for Read with Understanding (including 42,470 learners assessed for both skills).

The statistically significant gain profiles for women and men are displayed in Figures 39 and 40 for General Numeracy and Read with Understanding respectively. For both skills men had larger percentages of significant gain for the lower initial Steps: Steps 1 to 4 for General Numeracy and Steps 1 to 3 for Read with Understanding.

Figure 39

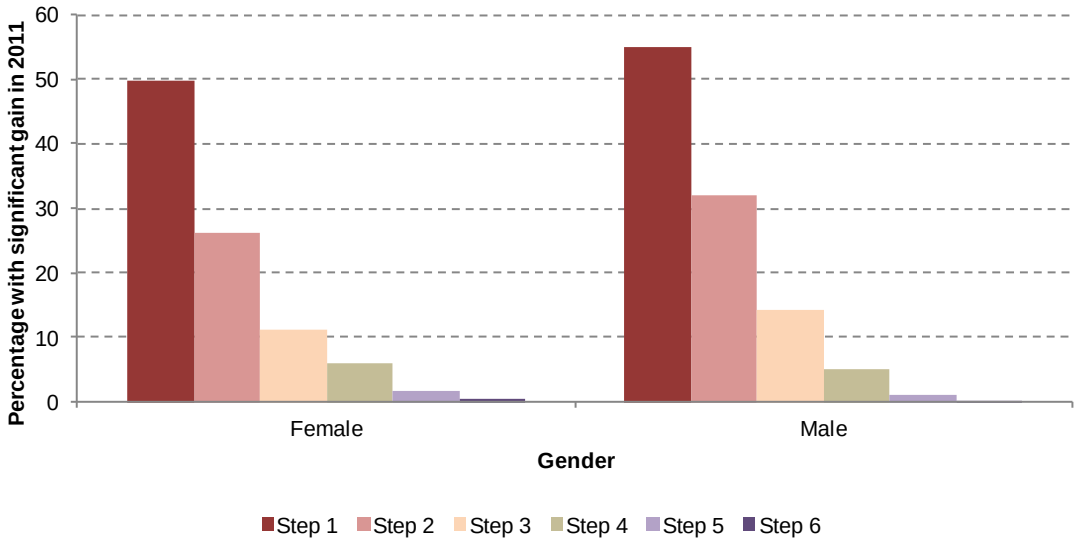
Percentage of learners with significant gain in 2011 for General Numeracy, by initial Step and gender



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 16,097 learners reassessed for General Numeracy in 2011.

Figure 40

Percentage of learners with significant gain in 2011 for Read with Understanding, by initial Step and gender



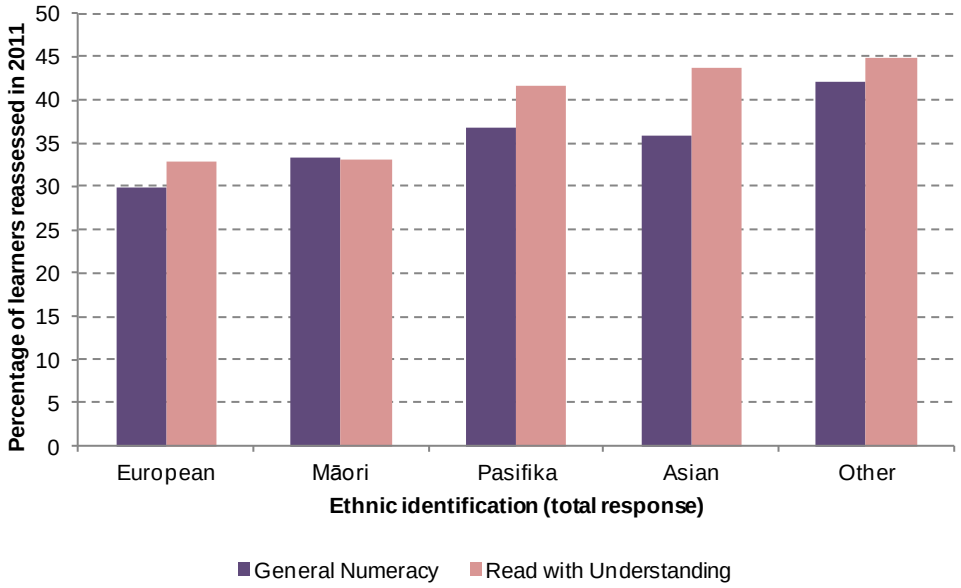
Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 22,933 learners reassessed for Read with Understanding in 2011.

Ethnic groups

The rates of reassessment in 2011 according to ethnic identification are displayed in Figure 41. Learners who identified as Pasifika, Asian or in the 'Other' group were more likely to be reassessed than learners in the European or Māori groups, but the reassessment rates were sufficient for analysis of all these ethnic groups.

Figure 41

Percentage of learners reassessed in 2011 for General Numeracy and for Read with Understanding, by ethnic identification



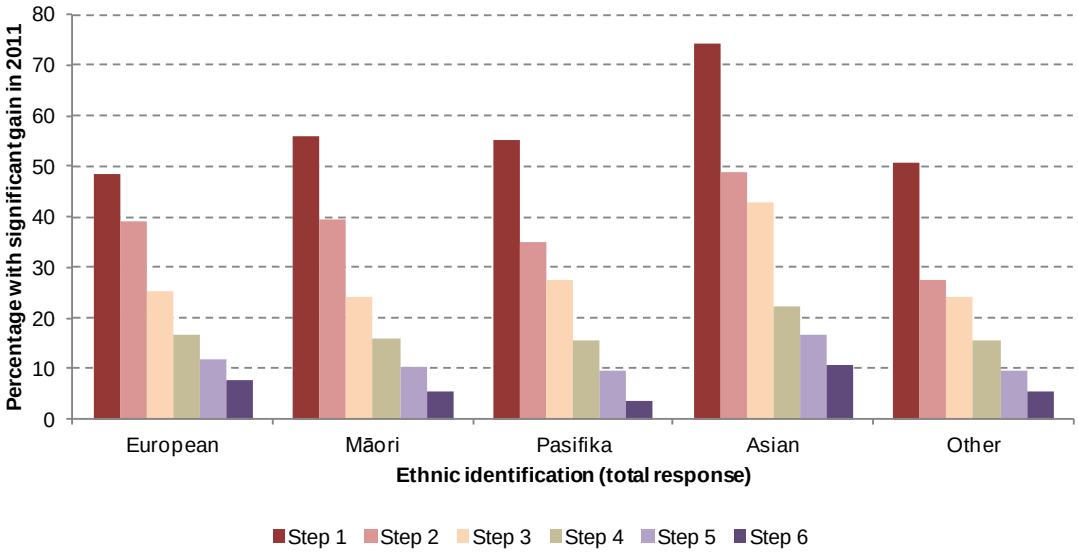
Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 47,180 learners with specified ethnic group who were initially assessed for General Numeracy in 2011, and 62,397 learners with specified ethnic group who were initially assessed for Read with Understanding (including 39,494 learners assessed for both skills).

Figures 42 and 43 compare total response ethnic groups in terms of rates of significant gain for General Numeracy and Read with Understanding respectively. The comparisons are somewhat different for the two skills.

For General Numeracy, the Asian group showed higher rates of significant gain than the other ethnic groups, across all initial Steps. Among the non-Asian groups, for the same initial Step, Māori and Pasifika with first assessment at Step 1 showed higher rates of significant gain than the remaining groups, European and Māori with first assessment at Step 2 showed higher rates of significant gain, and Pasifika with first assessment at Step 3 showed higher rates of significant gain than other groups.

Figure 42

Percentage of learners with significant gain in 2011 in General Numeracy, by initial Step and ethnic identification



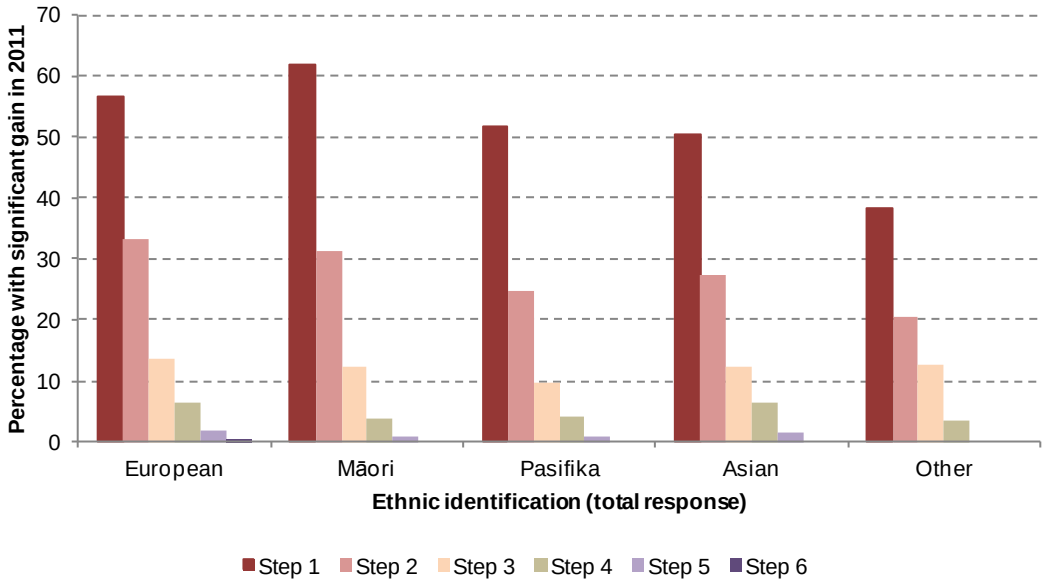
Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 15,123 learners with specified ethnic identification who were reassessed in 2011 for General Numeracy.

For Read with Understanding, the main difference was among learners whose first assessment was at Step 1, where the Māori group and to a lesser extent the European group showed higher rates of significant gain than the other ethnic groups.[18] The 'Other' group showed lower rates of significant gain for learners with initial Steps 1 and 2. Among learners with first assessment at Step 3, the Pasifika group showed somewhat lower rates of significant gain than the other ethnic groups.

[18] This is probably related to the fact that these two groups are more likely to have English as their first language: see next section.

Figure 43

Percentage of learners with significant gains in 2011 in Read with Understanding, by initial Step and ethnic identification



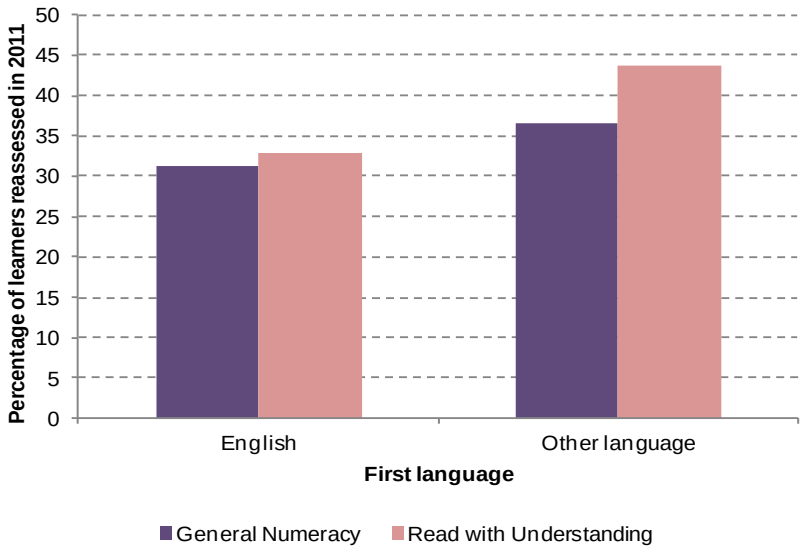
Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 21,833 learners with specified ethnic identification who were reassessed in 2011 for Read with Understanding.

First language

The rates of reassessment in 2011 for General Numeracy and for Read with Understanding, according to learners' first languages, are shown in Figure 44. Learners with first language other than English were more likely to be reassessed than those with English as first language, especially for Read with Understanding. However, there were sufficient reassessments of learners in both language categories, for both skills, to allow analysis of learner gain by first language.

Figure 44

Percentage of learners reassessed in 2011 for General Numeracy and for Read with Understanding, by first language



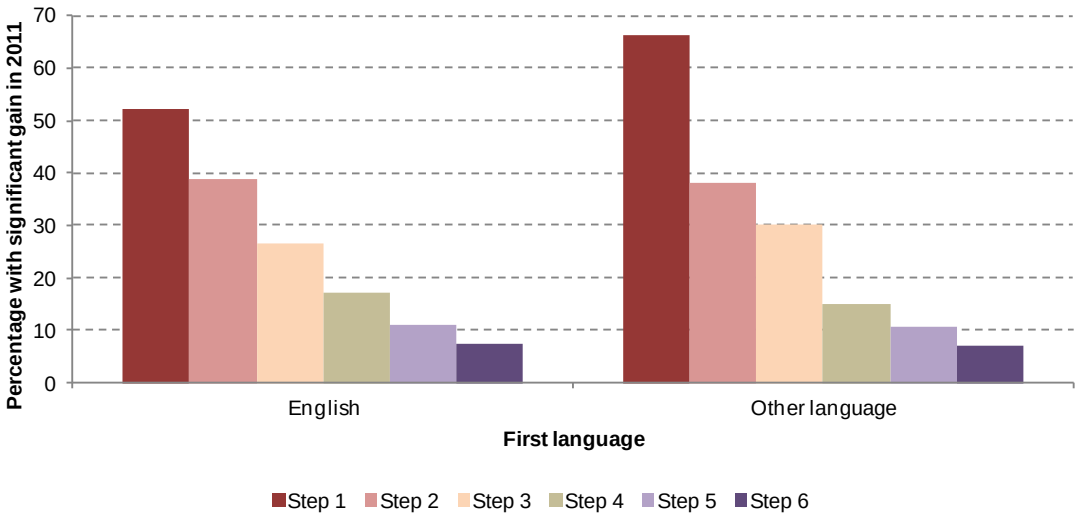
Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 49,642 learners with specified first language who were initially assessed for General Numeracy in 2011, and 65,089 learners with specified first language who were initially assessed for Read with Understanding (including 41,776 learners assessed for both skills).

The statistically significant gain profiles of learners with English as their first language are compared with those of learners with other first languages, in Figure 45 for General Numeracy and in Figure 46 for Read with Understanding.

For General Numeracy the main difference was among learners whose first assessment was at Step 1, where learners whose first language was not English had a higher rate of significant gain than native English speakers.

Figure 45

Percentage of learners with significant gain in 2011 for General Numeracy, by initial Step and first language

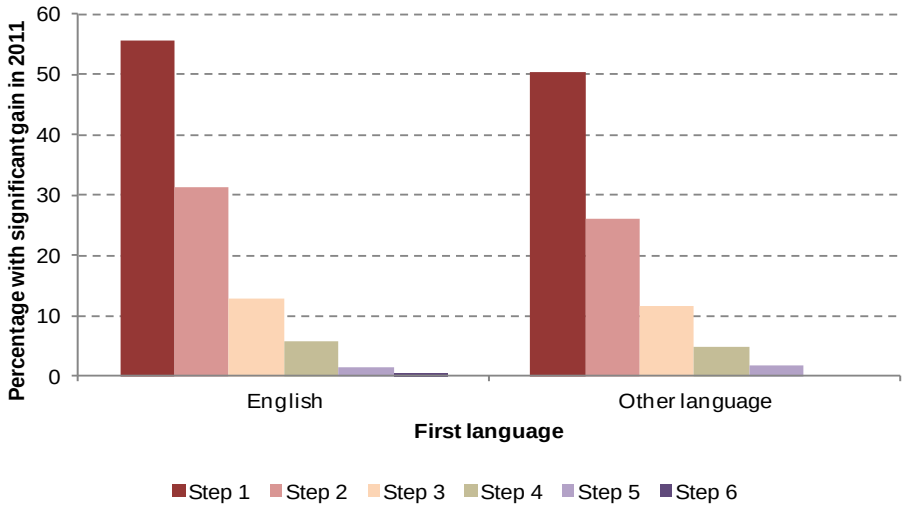


Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 15,901 learners with specified first language who were reassessed in 2011 for General Numeracy.

For Read with Understanding the comparison is reversed: among learners whose first assessments were at Steps 1 and 2, those whose first language was English showed a somewhat higher rate of significant gain.

Figure 46

Percentage of learners with significant gain in 2011 in Read with Understanding, by initial Step and first language



Source: Tertiary Education Commission data, and Ministry of Education calculations, based on records of 22,674 learners with specified first language who were reassessed in 2011 for Read with Understanding.

Because ethnic groups differ considerably in the extent to which members have English as a first language (see Table 3 in section 2.7), differences in first language can provide at least a partial explanation for ethnic differences in rates of significant gain. In particular, it was shown in Figure 43 that the rates of significant gain for learners with initial Read with Understanding assessment at Steps 1 and 2 was lower for such learners in the Pasifika, Asian and Other groups (with a relatively high proportion with first language other than English) than in the European and Māori groups (with a high proportion with English as a first language). This is of course in line with the comparison by first language in Figure 46.

Although language appears to have a stronger effect (at least for learners starting at Step 1) on General Numeracy than Read with Understanding gains, as shown in Figure 45, this does not translate into such a clear ethnic effect, in that in Figure 42, the Pasifika and Other groups do not clearly show more gains in General Numeracy from initial Steps 1 and 2 than the European and Māori groups. On the other hand, the Asian group, with the highest proportion with a first language other than English, was also the group with the greatest percentage with significant gain in General Numeracy from initial Steps 1 and 2.

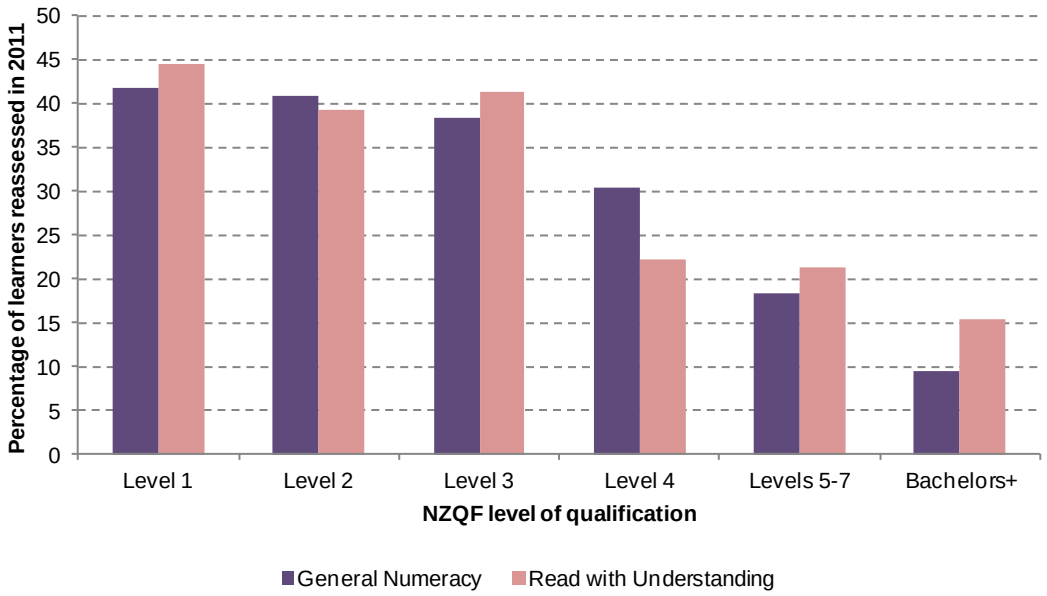
4.3 Gains at different qualification levels

This section and the following sections use learner-based matching of the Assessment Tool data to enrolment data for 2011 (see Chapter 6 for details). Learners studying at each qualification level are analysed separately. Individual learners may be included in more than one qualification level if they were enrolled in more than one qualification in 2011.

The rates of reassessment of learners in 2011 for General Numeracy and Read with Understanding according to qualification level of enrolment are shown in Figure 47 for learners in SAC- and YG-funded programmes. Of learners initially assessed in 2011 for these skills, over 35 per cent at Levels 1 to 3 were reassessed, but the reassessment rate was considerably lower for learners at Level 4 and above. Learners at Level 4 and above also had a lower rate of initial assessment, and consequently the number of learners at Level 4 and above who were assessed initially and then reassessed is relatively small (especially those initially at Steps 1 and 2), and in fact insufficient for the analysis to follow.

Figure 47

Percentage of learners in SAC- or YG-funded programmes who were reassessed in 2011 for General Numeracy and for Read with Understanding, by level of qualification



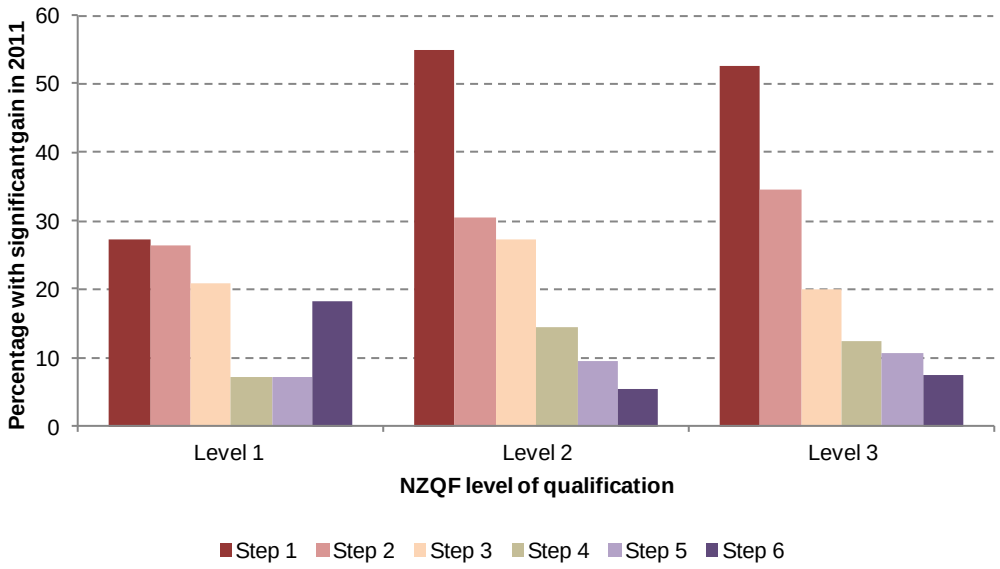
Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 23,479 learners in SAC- or YG-funded programmes who were initially assessed for General Numeracy in 2011, and 30,963 such learners who were initially assessed for Read with Understanding (including 21,283 learners who were assessed for both skills).

Figures 48 and 49 display the statistically significant gain profiles for learners in SAC- and YG-funded programmes who were studying at different New Zealand Qualifications Framework (NZQF) levels of qualification, for General Numeracy and Read with Understanding respectively.

For General Numeracy, there were considerably higher rates of statistically significant gain among learners with initial Steps 1 and 2 who were studying at NZQF Levels 2 and 3 compared with the corresponding learners studying at Level 1. On the other hand, there was a higher rate of gain for learners at Level 1 whose first assessment was at Step 6 than for learners studying at Levels 2 and 3.

Figure 48

Percentage of learners in SAC- or YG-funded programmes with significant gain in 2011 in General Numeracy, by initial Step and NZQF level of qualification

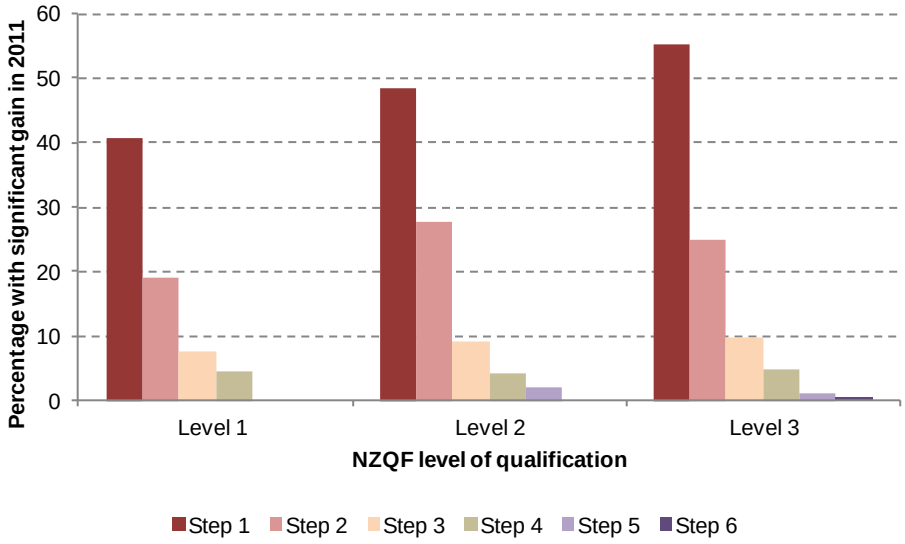


Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 7,613 learners in SAC- and YG-funded programmes at NZQF Levels 1 to 3 who were assessed at least twice for General Numeracy in 2011. For the purposes of analysis, there were insufficient learners for NZQF level 4 and higher, especially at initial Steps 1 and 2. Learners enrolled in qualifications at more than one level in 2011 are counted in each level.

For Read with Understanding, the main difference was for learners whose first assessment was at Step 1, with the percentage showing significant gain increasing from Level 1 to Level 2 to Level 3.

Figure 49

Percentage of learners in SAC- or YG-funded programmes with significant gain in 2011 in Read with Understanding, by initial Step and NZQF level of qualification



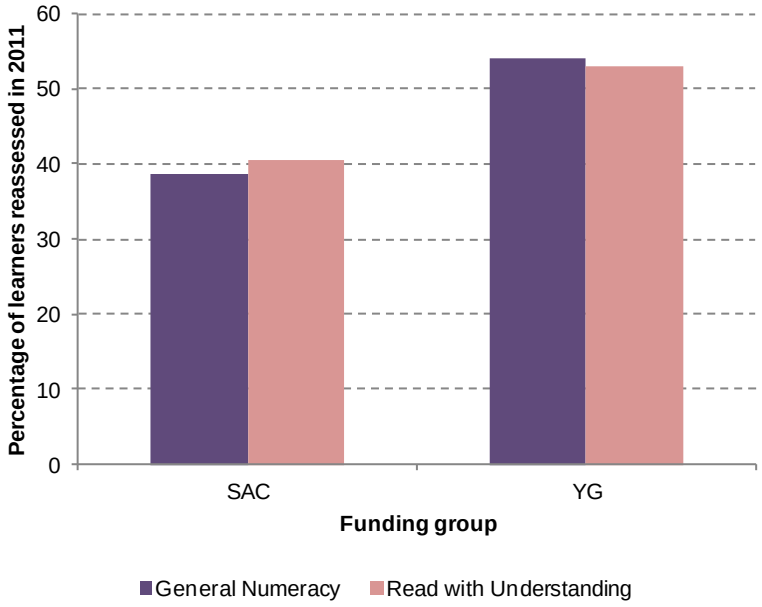
Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations based on records of 9,496 learners in SAC- and YG-funded programmes at NZQF Levels 1 to 3 who were assessed at least twice for Read with Understanding in 2011. For the purposes of analysis, there were insufficient learners for NZQF level 4 and higher, especially at initial Steps 1 and 2. Learners enrolled in qualifications at more than one level in 2011 are counted in each level.

4.4 Gains by learners in different funding groups

Figure 50 shows the rate of reassessment of learners in 2011 for General Numeracy and Read with Understanding according to funding group.

Figure 50

Percentage of learners in SAC- or YG-funded programmes at NZQF Levels 1 to 3 who were reassessed in 2011 for General Numeracy and for Read with Understanding, by funding group



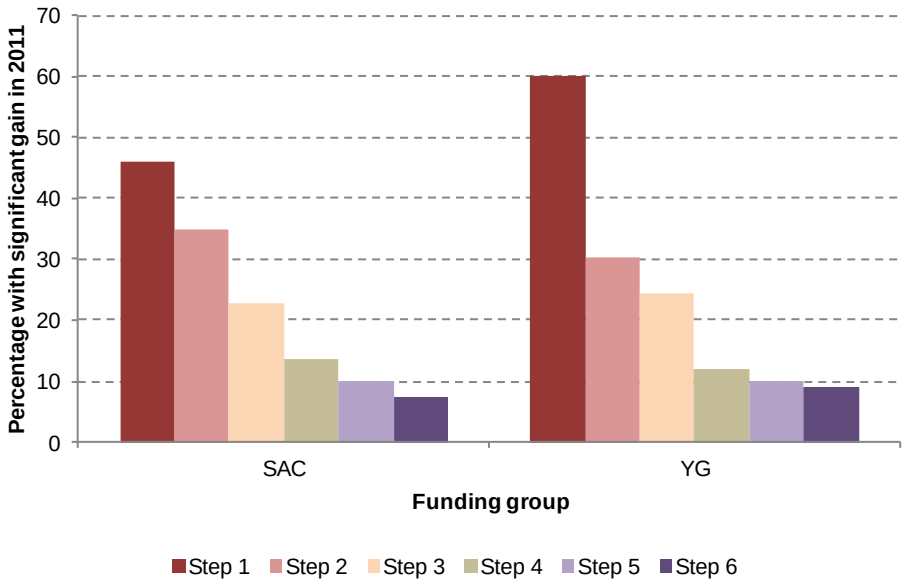
Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 18,806 learners enrolled in SAC- and YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 who were initially assessed for General Numeracy in 2011, and 22,608 such learners who were initially assessed for Read with Understanding (including 16,929 learners who were assessed for both skills).

Figures 51 and 52 compare the rates of statistically significant gain for learners enrolled in programmes at NZQF levels 1 to 3, in different funding groups, for General Numeracy and Read with Understanding respectively.

For General Numeracy, Youth Guarantee-funded learners had a higher rate of significant gain compared with SAC-funded learners if their first assessment was at Step 1, but a lower rate of gain if their first assessment was at Step 2.

Figure 51

Percentage of learners in SAC- or YG-funded programmes at NZQF levels 1 to 3 with significant gain in 2011 in General Numeracy, by initial Step and funding group

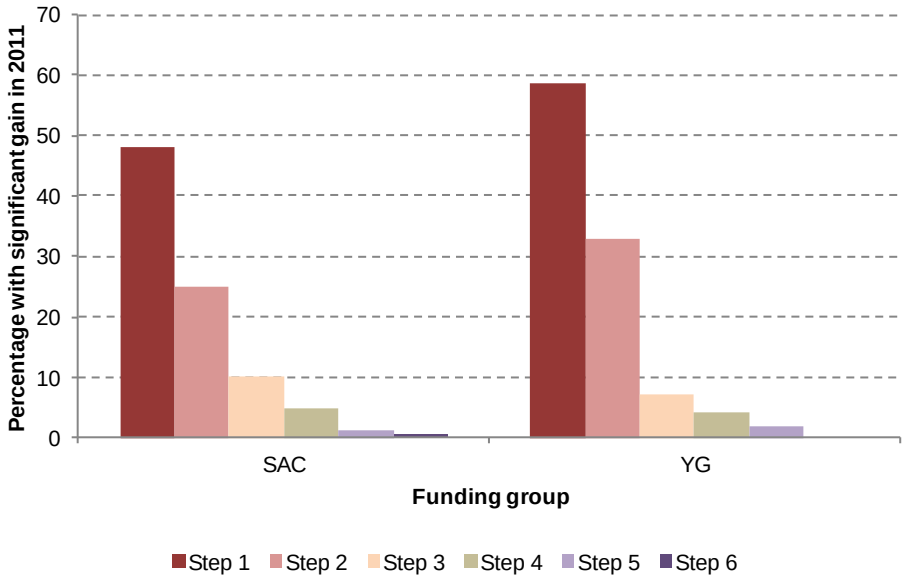


Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 7,613 learners in SAC- and YG-funded programmes at NZQF Levels 1 to 3 who were assessed at least twice for General Numeracy in 2011. Learners enrolled in qualifications in more than one funding group are counted in each group.

For Read with Understanding, among learners whose first assessment was at Step 1, the Youth Guarantee learners had higher rates of gain than the SAC-funded group. The Youth Guarantee group had a higher rate of gain for initial Step 2, and a lower rate for initial Step 3.

Figure 52

Percentage of learners in SAC- or YG-funded programmes at NZQF levels 1 to 3 with significant gain in 2011 in Read with Understanding, by initial Step and funding group



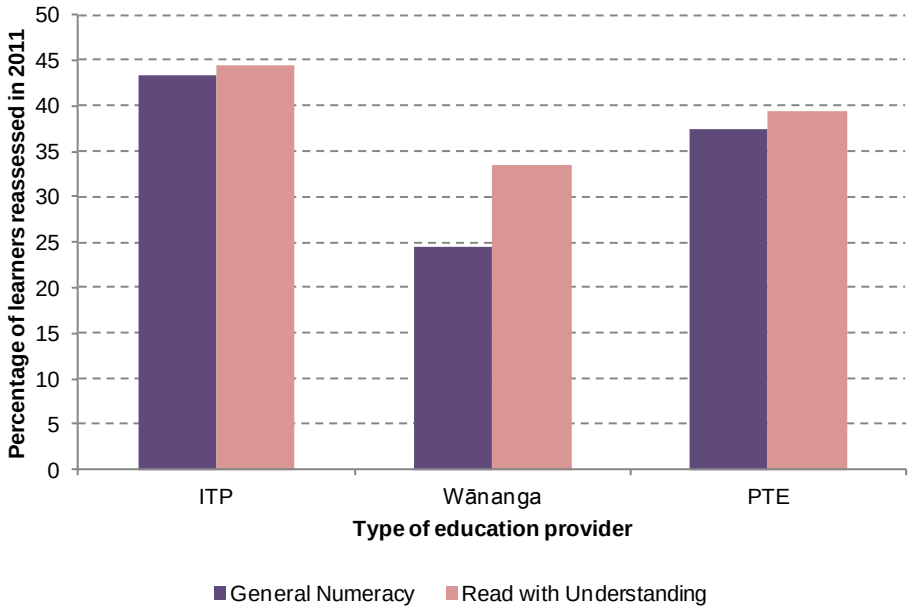
Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 9,496 learners in SAC- and YG-funded programmes at NZQF Levels 1 to 3 who were assessed at least twice for Read with Understanding in 2011. Learners enrolled in qualifications in more than one funding group are counted in each category.

4.5 Gains for learners at different types of provider

Figure 53 shows the reassessment rates for learners in SAC- or YG-funded programmes according to the type of education provider they were enrolled in. All these rates were above 30 per cent, except for the reassessment of General Numeracy among learners at wānanga. Reassessment rates at wānanga for both General Numeracy and Read with Understanding were noticeably lower than for the other provider types.

Figure 53

Percentage of learners in SAC- or YG-funded programmes who were reassessed in 2011 for General Numeracy and for Read with Understanding, by provider type



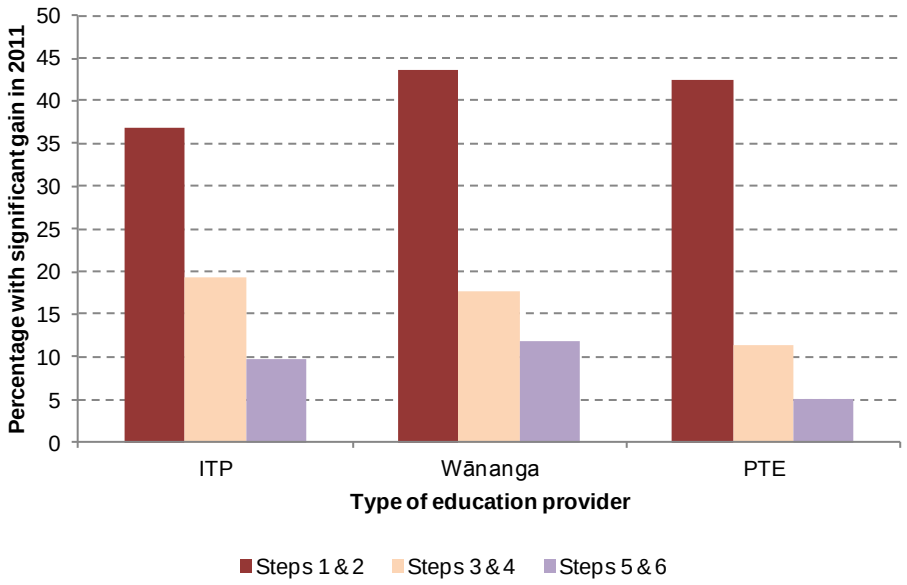
Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 18,806 learners enrolled in SAC- and YG-funded programmes leading to qualifications at NZQF Levels 1 to 3 who were initially assessed for General Numeracy in 2011, and 22,608 such learners who were initially assessed for Read with Understanding (including 16,929 learners who were assessed for both skills).

The following profiles of learner gain according to provider type need to be treated with considerable caution given the relatively low rates of assessment of learners in wānanga and PTEs (see section 2.7). And as noted in section 3.5, not only were there large variations between different providers within the same type, but there were differences between provider types in the ethnic and language backgrounds of learners, and the proportions of learners studying at different qualification levels and in different funding groups. Analysis of these variations is beyond the scope of the current report.

The significant gain profiles for learners in different provider types can be seen in Figure 54 for General Numeracy (with the six initial Steps aggregated into three categories), and in Figure 55 for Read with Understanding. For General Numeracy, learners at ITPs had a somewhat lower rate of gain for initial Steps 1 and 2, and a somewhat higher rate of gain for Steps 3 and 4, than the other provider types.

Figure 54

Percentage of learners in SAC- or YG-funded programmes at NZQF Levels 1 to 3 with significant gain in 2011 in General Numeracy, by aggregated initial Step and education provider type

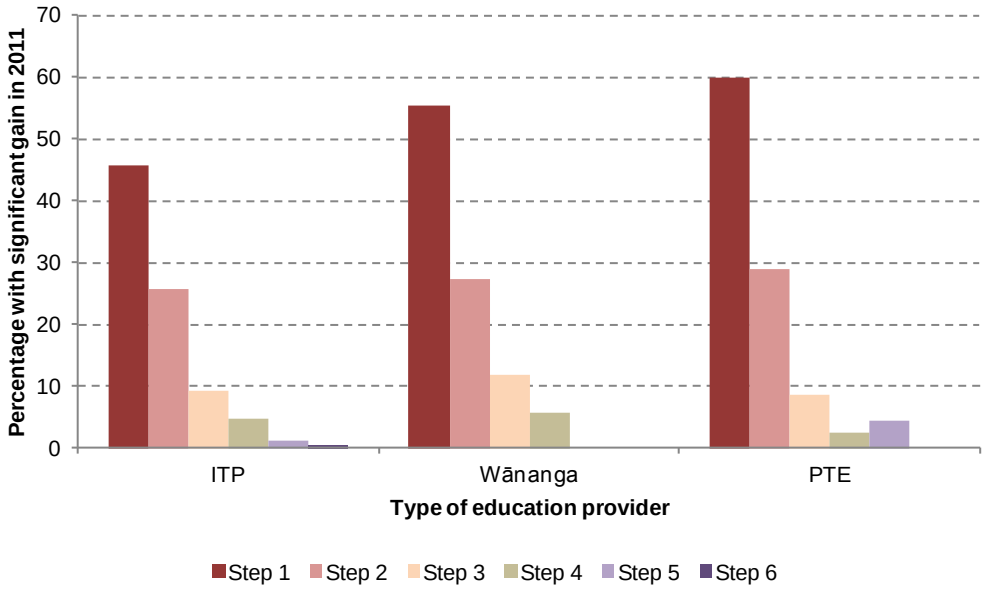


Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 7,613 learners in SAC- and YG-funded programmes at NZQF Levels 1 to 3 who were assessed at least twice for General Numeracy in 2011. Learners enrolled in qualifications in more than one provider type are counted in each category. Note that the six initial Steps have been aggregated into three categories, because of relatively small numbers of reassessed learners at wānanga.

For Read with Understanding, learners at PTEs and wānanga had higher rates of gain for initial Step 1.

Figure 55

Percentage of learners in SAC- or YG-funded programmes at NZQF levels 1 to 3 with significant gain in 2011 in Read with Understanding, by initial Step and provider type



Source: Tertiary Education Commission and Ministry of Education data, and Ministry of Education calculations, based on records of 9,496 learners in SAC- and YG-funded programmes at NZQF Levels 1 to 3 who were assessed at least twice for Read with Understanding in 2011. Learners enrolled in qualifications in more than one provider type are counted in each type.

4.6 Summary

Analyses of Assessment Tool skill gains for all assessed learners

In 2011, 50,418 learners were assessed at least once for General Numeracy, and of these, 16,097 learners (32 per cent) were assessed at least once more in 2011; while 66,101 learners were assessed at least once for Read with Understanding, and 22,933 of these (35 per cent) were assessed at least once more in 2011.

Between 40 and 50 per cent of learners whose first assessment was at Step 1 were reassessed, while approximately 30 to 40 per cent of learners whose first assessments were at Steps 2 to 5 for General Numeracy or at Steps 2 to 4 for Read with Understanding were reassessed. Of learners whose first assessments were at Step 6 for General Numeracy or at Steps 5 and 6 for Read with Understanding, only about 20 per cent were reassessed.

There was a strong relationship between first assessment score, as represented by the Learning Progressions Steps, and the percentage of learners recording statistically significant skill gain. Learners whose first assessments were at Step 1 included the greatest proportions (over 50 per cent) of learners recording statistically significant gain, when compared with learners whose first assessments were at higher Steps. On the other hand, the smallest proportions of learners recording significant gain were among learners whose first assessments were at Step 6.

Comparisons can be made of statistically significant gain profiles by characteristics of learners and of provision. Given that these are observations of a new kind, for which we have little previous experience to base explanations on, further in-depth analysis is required before attempting to account for differences in the rates of significant gain.

Learners in the 16-17 and 18-19 age groups were most likely to be reassessed.[19] For both General Numeracy and Read with Understanding there was a general trend with increasing age of a greater percentage of learners showing significant gain. For learners who scored at Step 1 on first assessment, those aged 55 and over had the greatest percentage showing significant gain.

Women were more likely than men to be reassessed for General Numeracy and for Read with Understanding. For both skills men had larger percentages of significant gain for the lower initial Steps: Steps 1 to 4 for General Numeracy and Steps 1 to 3 for Read with Understanding.

Learners who identified as Pasifika, Asian or in the 'Other' ethnic group were more likely to be reassessed than learners in the European or Māori ethnic groups. For General Numeracy, the Asian group showed higher rates of significant gain than the other ethnic groups, across all initial Steps. Among the non-Asian groups, Māori and Pasifika with first assessment at Step 1 showed higher rates of significant gain than the remaining groups. For Read with Understanding, the main difference was among learners whose first assessment was at Step 1, where the Māori group and to a lesser extent the European group showed higher rates of significant gain than the other ethnic groups.

Learners with first language other than English were more likely to be reassessed than those with English as first language, especially for Read with Understanding. For General Numeracy the main difference was among learners whose first assessment was at Step 1, where learners whose first language was not English had a higher rate of significant gain than native English speakers. For Read with Understanding the comparison is reversed: among learners whose first

[19] This is probably related to the fact that Youth Guarantee learners were much more likely to be assessed and reassessed than learners in SAC-funded programmes. Other youth-oriented funding groups such as Youth Training and Trades Academies may also have had relatively high rates of assessment and reassessment.

assessments were at Steps 1 and 2, those whose first language was English showed a somewhat higher rate of significant gain.

Analyses of Assessment Tool skill gains for learners with SAC- or YG-funded enrolments

Of learners whose Assessment Tool results could be matched to enrolments in SAC- or YG-funded programmes, and who were initially assessed in 2011 for General Numeracy and Read with Understanding, over 35 per cent at Levels 1 to 3 were reassessed, but the reassessment rate was considerably lower for learners at Level 4 and above. For General Numeracy, there were considerably higher rates of statistically significant gain among learners with initial Steps 1 and 2 who were studying at NZQF Levels 2 and 3 compared with the corresponding learners studying at Level 1. On the other hand, there was a higher rate of gain for learners at Level 1 whose first assessment was at Step 6 than for learners studying at Levels 2 and 3. For Read with Understanding, the main difference was for learners whose first assessment was at Step 1, with the percentage showing significant gain increasing from Level 1 to Level 2 to Level 3.

The reassessment rate was above 35 per cent for learners funded through the Student Achievement Component, and above 50 per cent for Youth Guarantee. For General Numeracy, Youth Guarantee-funded learners had a higher rate of significant gain compared with SAC-funded learners if their first assessment was at Step 1, but a lower rate of gain if their first assessment was at Step 2. For Read with Understanding, among learners whose first assessment was at Step 1, the Youth Guarantee learners had higher rates of gain than the SAC-funded group.

Reassessment rates at wānanga for both General Numeracy and Read with Understanding were noticeably lower than for the other provider types. For General Numeracy, learners at ITPs had a somewhat lower rate of gain for initial Steps 1 and 2, and a somewhat higher rate of gain for Steps 3 and 4, than the other provider types. For Read with Understanding, learners at PTEs and wānanga had higher rates of gain for initial Step 1.[20]

[20] These comparisons need to be treated with caution given the relatively low rates of assessment of learners in wānanga and PTEs, and the fact that different types of provider also have populations of learners with different characteristics.

5 CONCLUSION

The total number of assessments in the pilot year of 2010 was 45,594, while in the first full year of implementation in 2011, 210,713 individual assessments were carried out.

The greatest proportion of assessments in 2011 (approximately 45 per cent) was for the skill Read with Understanding, followed by General Numeracy (approximately 33 per cent). These two skills have been the focus of analysis in this report in terms of distributions of learners' scores on first assessment in 2011, and the distribution of learners' statistically significant gains between first and last assessments for the same skill in 2011.

Most assessments in 2011 were adaptive online assessments, but within this category, the shorter Snapshot assessment was rapidly adopted, from the time it was introduced in February 2011, to the point where it became the most commonly used assessment type in October 2011. There was an overall decline through 2011 in the use of the full adaptive online assessment, indicating that the Snapshot was at least partly displacing the full adaptive online assessment, particularly for second or later assessments.[21] This rapid change in type of assessment used is indicative of the dynamic nature of the data set of assessments carried out in 2011. It remains to be seen whether the patterns of results reported here continue to be evident in later years of use of the Assessment Tool, or whether these patterns represent an initial phase before the Assessment Tool results settle into a more stable state.

The largest group (approximately 45 per cent) of assessments in 2011 were completed by private training establishments (PTEs). The second-largest group (33 per cent) of assessments were completed by institutes of technology and polytechnics (ITPs), and the third largest group (about 10 per cent) by industry training organisations (ITOs).

Previous chapters have considered Assessment Tool use, first assessment profiles, and patterns of learner gain as distinct topics. In this chapter, these three topic areas are brought together under each of the set of learner characteristics used in the analyses (that is, age, gender, ethnic group and first language), and also under each of the characteristics of provision for matched assessments (qualification level, funding group and provider type), in order to view the results from a different perspective.

But first it is useful to recapitulate the major limitations of this study, in terms of data used and the extent of the analysis.

5.1 Limitations of this study

Data limitations

The Single Data Return provides data on only a subset of tertiary enrolments. Other reporting mechanisms are used to compile data on the following funds:

- Targeted Training (Foundation-Focused Training Opportunities, Youth Training, Skill Enhancement)
- Industry Training
- Trades Academies
- Workplace Literacy Fund
- Intensive Literacy and Numeracy Fund

[21] In fact for both General Numeracy and Read with Understanding, where reassessed learners' first assessments were full-length adaptive, 39 per cent of last assessments were Snapshot assessments.

Examination of partial and/or preliminary enrolment data for 2010 and 2011 indicates that the Assessment Tool was used to assess a large number of learners enrolled in programmes supported by these funds.

However, the enrolment data that was complete and verified at the time of writing was for learners enrolled in SAC- and YG-funded programmes, and only this enrolment data has been used for matching to the Assessment Tool data. Hence analyses of Assessment Tool use and results according to qualification level, funding group and type of education provider in this report only apply to SAC- and YG-funded programmes.

Analyses of Assessment Tool use and results according to demographic characteristics of learners (age, gender, ethnic group and first language) are based solely on Assessment Tool data, and this will include those learners enrolled in programmes other than those funded by the Student Achievement Component or Youth Guarantee fees-free tertiary places scheme. The main drawback of the data for these analyses is that approximately 5 per cent of learners in the Assessment Tool data for 2011 have unspecified ethnic group.

Limitations of analysis

This is a report on some trends in the use of the Assessment Tool and patterns of results related to some characteristics of learners (age, gender, ethnic group and first language) and of educational provision (qualification level, programme funding, type of education provider). Given that the Assessment Tool is relatively new, the emphasis here is on providing an initial set of empirical observations.

Analysis of Assessment Tool scores is limited to the two skills General Numeracy and Read with Understanding, because by far the greatest number of assessments were for these two skills, and so the assessments of these two skills provide the best data for detailed statistical analysis. All assessments for these two skills are pooled together and used regardless of which assessment type (adaptive or non-adaptive, online or offline, full-length or Snapshot) was involved.

Analysis of possible gains in these two skills is based on a simple comparison of first and last assessments in 2011 for the same skill, for the relatively small subset of learners who were assessed more than once in 2011. This approach does not take account of the nature, length or intensity of the educational programmes that learners were enrolled in, and is thus only a first step towards understanding the extent to which programmes may enhance learners' skills.

At this stage it is necessary to be very cautious about interpreting the statistical patterns reported here. One reason for caution is that the set of learners assessed using the Assessment Tool in 2011 was a relatively small subset of all tertiary learners enrolled in that year, and it is clear from the initial analyses reported here that it was not representative of all tertiary learners; that is, learners with certain characteristics, in certain types of educational provision, were more likely to be assessed than others.

Another reason for caution is that experience of the process of implementation of the Assessment Tool (see Haggland and Earle 2012) indicates that successful implementation requires understanding of the purposes of assessment and engagement with the Assessment Tool on the part of educators and especially learners. The assessment scores for learners who lacked understanding and engagement were likely to understate their skills. Changes in scores between initial and progress assessments could reflect changes in level of engagement as well as actual changes in skills.

A further reason for caution is that there are clearly relationships between different characteristics which are analysed separately in this report. For example, there are relationships between ethnic group and first language, and between age and level of study, and different types of provider differ in terms of the characteristics of learners enrolled in their programmes.

To develop sound interpretations of the data which take into account the non-random selection of which learners were assessed, as well as the relationships between different characteristics of learners and provision, would require careful multivariate statistical modelling. Such modelling might also be able to shed light on the effect of variable understanding and engagement by educators and learners. Such statistical modelling is beyond the intended scope of this report, but it is anticipated that it will be an important part of future research in the Ministry's work on literacy, language and numeracy.

5.2 Analyses of Assessment Tool data for all assessed learners

The differences in design between the Learning Progressions for the two skills means that the proportion of learners at Steps 5 and 6 for General Numeracy (50 per cent) approximates the proportion of learners at Steps 4, 5 and 6 for Read with Understanding (51 per cent).

In 2011, 50,418 learners were assessed at least once for General Numeracy, and of these, 16,097 learners (32 per cent) were assessed at least once more in 2011; while 66,101 learners were assessed at least once for Read with Understanding, and 22,933 of these (35 per cent) were assessed at least once more in 2011.

Between 40 and 50 per cent of learners whose first assessment was at Step 1 were reassessed, while approximately 30 to 40 per cent of learners whose first assessments were at Steps 2 to 5 for General Numeracy or at Steps 2 to 4 for Read with Understanding were reassessed. Of learners whose first assessments were at Step 6 for General Numeracy or at Steps 5 and 6 for Read with Understanding, only about 20 per cent were reassessed.

There was a strong relationship between first assessment score, as represented by the Learning Progressions Steps, and the percentage of learners recording statistically significant gain. Learners whose first assessments were at Step 1 included the greatest proportions (over 50 per cent) of learners recording statistically significant gain, when compared with learners whose first assessments were at higher Steps. On the other hand, the smallest proportions of learners recording significant gain were among learners whose first assessments were at Step 6.

Age

The spread of assessed learners' ages was wide, but there was a concentration on younger learners, with 31 per cent of learners assessed aged between 16 and 19.

Broadly speaking, the profiles of learner skills at first assessment showed a pattern of increasing skill with age up to the 25-34 age group, and then a slight decline for older groups. The proportions of learners at Steps 5 and 6 for General Numeracy, and at Steps 4, 5 and 6 for Read with Understanding increased from between 30 and 40 per cent for the 16-17 age group, to over 50 per cent for those 18 and over, peaking at over 55 per cent for the 25-34 age group.

Learners in the 16-17 and 18-19 age groups were most likely to be reassessed. For both General Numeracy and Read with Understanding there was a general trend with increasing age of a greater percentage of learners showing significant gain. For learners who scored at Step 1 on first assessment, those aged 55 and over had the greatest percentage showing significant gain.

Gender

Of assessed learners, more were male (56 per cent) than female.

Scores for General Numeracy on first assessment tended to be higher for men than for women, but there were only small gender differences for Read with Understanding.

Women were more likely than men to be reassessed for General Numeracy and for Read with Understanding. For both skills men had larger percentages of significant gain for the lower initial Steps: Steps 1 to 4 for General Numeracy and Steps 1 to 3 for Read with Understanding.

Ethnic group

Compared with the ethnic proportions in the overall population, Māori and Pasifika learners were over-represented among the assessed learners, while European and Asian learners were under-represented. Māori in particular were strongly over-represented, while Europeans were strongly under-represented.

For learners enrolled in SAC- or YG-funded programmes at Levels 1 to 3, the ethnic distribution of assessed learners largely corresponded to the overall ethnic distribution of enrolled learners. This provides the basic explanation for the relatively high proportion of assessed learners who were Māori and the low proportion who were European, in comparison with the adult population. However, learners in SAC- or YG-funded programmes at Levels 1 to 3 were somewhat more likely to be assessed (in comparison to the ethnic distribution of enrolments) if they identified as Pasifika, or as belonging to an ethnic group other than European, Māori, Asian or Pasifika.

First assessment scores for General Numeracy showed considerable variation in the combined proportion of learners at Steps 5 and 6 in each ethnic group: 60 per cent of European learners, 35 per cent of Māori, 28 per cent of Pasifika, 59 per cent of Asian and 46 per cent of Other ethnic group learners.

Read with Understanding showed a pattern quite distinct from that for General Numeracy. The combined proportion of learners at Steps 4, 5 and 6 varied as follows: 65 per cent of European learners, 44 per cent of Māori, 26 per cent of Pasifika, 34 per cent of Asian and 39 per cent of Other ethnic group learners.

Learners who identified as Pasifika, Asian or in the 'Other' ethnic group were more likely to be reassessed than learners in the European or Māori ethnic groups. For General Numeracy, the Asian group showed higher rates of significant gain than the other ethnic groups, across all initial Steps. Among the non-Asian groups, Māori and Pasifika with first assessment at Step 1 showed higher rates of significant gain than the remaining groups. For Read with Understanding, the main difference was among learners whose first assessment was at Step 1, where the Māori group and to a lesser extent the European group showed higher rates of significant gain than the other ethnic groups.

First language

Of assessed learners, 17.5 per cent had a first language other than English. Learners in the Pasifika, Asian and Other ethnic groups were much less likely to have English as a first language than learners in the European and Māori ethnic groups.

On first assessment for both General Numeracy and for Read with Understanding in 2011, learners whose first language was English tended to have higher scores than learners with other first languages.

Learners with first language other than English were more likely to be reassessed than those with English as first language, especially for Read with Understanding. For General Numeracy the main difference was among learners whose first assessment was at Step 1, where learners whose first language was not English had a higher rate of significant gain than native English

speakers. For Read with Understanding the comparison is reversed: among learners whose first assessments were at Steps 1 and 2, those whose first language was English showed a somewhat higher rate of significant gain.

5.3 Analyses of Assessment Tool data matched to enrolments

Qualification level

For learners in SAC- or YG-funded programmes who could be identified as studying at Levels 1 to 3, the proportion assessed at least once was between 19 per cent (for Level 1) and 31 per cent (for Level 3). For learners at Level 4, the proportion was a little lower, at 16 per cent. Only a small proportion (less than 5 per cent) of learners studying in Level 5 to 7 diplomas, and at bachelors or higher were assessed even once.

Learners studying at higher NZQF levels of qualification tended to have higher first General Numeracy and Read with Understanding assessment scores. In fact, the differences were remarkably regular across levels, with the percentages of learners at Steps 5 and 6 for General Numeracy and at Steps 4, 5 and 6 for Read with Understanding increasing steadily from Level 1 (under 30 per cent) up to Bachelors and higher degrees (over 70 per cent).

Of learners initially assessed in 2011 for General Numeracy and Read with Understanding, over 35 per cent at Levels 1 to 3 were reassessed, but the reassessment rate was considerably lower for learners at Level 4 and above. For General Numeracy, there were higher rates of statistically significant gain among learners with initial Steps 1 and 2 who were studying at NZQF Levels 2 and 3 compared with the corresponding learners studying at Level 1. On the other hand, there was a higher rate of gain for learners at Level 1 whose first assessment was at Step 6 than for learners studying at Levels 2 and 3. For Read with Understanding, the main difference was for learners whose first assessment was at Step 1, with the percentage showing significant gain increasing from Level 1 to Level 2 to Level 3.

Funding group

The highest rate of use of the Assessment Tool among learners studying at NZQF Levels 1 to 3 was found in the funding group Youth Guarantee fees-free tertiary places (76 per cent), while the rate was considerably lower in SAC-funded programmes (25 per cent).

For learners studying in SAC- and YG-funded programmes at NZQF Levels 1 to 3, those in SAC-funded programmes tended to have higher first assessment scores for both General Numeracy and for Read with Understanding, and the learners in Youth Guarantee programmes tended to have lower scores.

The reassessment rate was above 35 per cent for learners funded through the Student Achievement Component, and above 50 per cent for Youth Guarantee. For General Numeracy, Youth Guarantee-funded learners had a higher rate of significant gain compared with SAC-funded learners if their first assessment was at Step 1, but a lower rate of gain if their first assessment was at Step 2. For Read with Understanding, among learners whose first assessment was at Step 1, the Youth Guarantee learners had a higher rate of gain than the SAC-funded group.

Type of provider

Focusing again on learners enrolled in SAC- and YG-funded programmes leading to qualifications at Levels 1 to 3, the highest rate of assessment was found in institutes of technology and polytechnics (36 per cent), with a lower overall rate at private training establishments (20 per cent), and an even lower rate at wānanga (15 per cent).

On first assessment for both General Numeracy and for Read with Understanding, learners studying in qualifications at NZQF Levels 1 to 3 showed the following pattern according to type of provider: the proportion of learners at the highest Steps was greatest at ITPs, slightly less at wānanga, and considerably less at PTEs.

Reassessment rates at wānanga for both General Numeracy and Read with Understanding were noticeably lower than for the other provider types. For General Numeracy, learners at ITPs had a somewhat lower rate of gain for initial Steps 1 and 2, and a somewhat higher rate of gain for Steps 3 and 4, than the other provider types. For Read with Understanding, learners at PTEs and wānanga had higher rates of gain for initial Step 1.

6 DATA AND DEFINITIONS

6.1 Acronyms and abbreviations

ITO	Industry Training Organisation
ITP	Institute of Technology or Polytechnic
LLN	Literacy, language and numeracy
NSI	National Student Index
NSN	National Student Number
NZQF	New Zealand Qualification Framework
PTE	Private Training Establishment (this category includes the organisations formerly known as OTEPs: Other Tertiary Education Providers)
SAC	Student Achievement Component (this is the main tertiary tuition fee subsidy)
SDR	Single Data Return
TEC	Tertiary Education Commission
TSEC	Tertiary Sector Enrolments and Completions data set
YG	Youth Guarantee fees-free tertiary places scheme (for 16 and 17-year-olds)

6.2 Data sets

Two sets of data provide the basis for the analyses in this report:

- Literacy and Numeracy for Adults Assessment Tool data for all of 2010 and 2011, extracted by the Tertiary Education Commission on 27 February 2012.[22] The data set contains one record for each assessment for each learner. Each learner is identified by a National Student Number (NSN). An Assessment ID identifies a batch of assessments of a particular skill and assessment type, set up by an organisation at a particular time for a particular group of learners, typically members of a class or programme. The date of assessment is taken as the setup date in the case of non-adaptive for printing assessments, or otherwise as the date on which the assessment is completed online and submitted to the Assessment Tool database. Each assessment is identified by the learner's NSN, the Assessment ID number and assessment date.

- Tertiary Sector Enrolment and Completions (TSEC) data for 2010 and 2011. This is compiled by the Ministry of Education from the Single Data Return (SDR) for December 2010 and for December 2011. Tertiary education providers which receive Student Achievement Component (SAC) funding from the Tertiary Education Commission are required to submit Single Data Returns. The data used for matching to the Assessment Tool

[22] Data from non-adaptive for printing assessments are due to be submitted to the Assessment Tool database within eight weeks of the assessment being set up. All data from 2011 non-adaptive for printing assessments should have been submitted by this date, but there may be a small number of 2011 assessments which were submitted late, after this date, and which are therefore not included in the analysis data set.

data is a subset of TSEC data relating to learners enrolled in SAC-funded programmes or programmes funded by the Youth Guarantee fees-free tertiary places scheme (referred to generally in this report as 'SAC- or YG-funded programmes').

There are a number of limitations on these data sets which affect the scope of analysis.

Of 77,362 learners assessed at least once in 2011 using the Assessment Tool, 42,720 (55 per cent) could be identified in the TSEC data. This includes all assessed learners in SAC-funded courses and all assessed learners in Youth Guarantee fees-free tertiary programmes. It includes some of the assessed learners in Foundation-focused Training Opportunities, Youth Training, Trades Academies and Industry Training, and the data for these learners is indicative rather than definitive.

The remaining 34,642 learners were presumably enrolled or registered with education providers or training organisations which were not required to submit Single Data Returns. Information on such learners is compiled in data sets other than the Single Data Return: at the time of writing, these data sets were not yet available for the complete 2011 year.

The 2011 TSEC data only partially covers enrolments in programmes in the following funding groups:

- Targeted Training (Foundation-Focused Training Opportunities, Youth Training, Skill Enhancement)
- Industry Training
- Trades Academies

And accordingly enrolments in these programmes are not included in the data set used for matching with Assessment Tool data.[23]

Furthermore, TSEC lacks information on which learners were supported by the following funds[24]:

- Workplace Literacy Fund
- Intensive Literacy and Numeracy Fund

Given these limitations, the tertiary enrolment data for matching to Assessment Tool data has been restricted to enrolments in Student Achievement Component and Youth Guarantee-funded programmes.

The Tertiary Education Commission (2012) estimates that 39,000 learners were enrolled in courses with embedded literacy, language or numeracy (LLN) in 2011. However, it has not generally been possible to identify the specific courses involved, for the purposes of analysis.

There has been provision in the Single Data Return framework since 2010 for education providers to report which of their courses have embedded LLN. While the number of learners assessed using the Assessment Tool, and the number of assessments undertaken have expanded rapidly in 2011, there appears to be a considerable lag in providers' identification of courses with embedded LLN. Since it is not currently possible to identify most of the specific courses

[23] Analysis of incomplete data for these funding groups from 2010 and 2011 indicates that large numbers of learners in these programmes were assessed, and it is envisaged that such learners will be included in future analyses of Assessment Tool results.
[24] Analysis of incomplete data from 2011 indicates that large numbers of learners supported by these funds were assessed, and it is envisaged that such learners will be included in future analyses of Assessment Tool results.

with embedded LLN, and the learners enrolled in them, the provision of embedded LLN has not been incorporated into analyses in this report. This also means that it has not been possible to use the same matching procedures as required for the TEC's proposed performance indicators for embedded literacy and numeracy.

6.3 Matching data sets

Matching to the National Student Index

The main basis for matching is the National Student Number (NSN). Since it is possible for a learner to have been allocated more than one NSN, the NSNs from each data set are reconciled with the National Student Index (NSI) data set, and if necessary, replaced by the master NSN from NSI for such a learner before attempting to match with another data set.

Some NSNs may be unverified. There is no process or requirement to verify NSNs within the Assessment Tool. Organisations are only required to have a fully verified NSN for students enrolled in formal qualifications. Hence there were a few cases where NSNs on the input files did not match any NSN on the NSI. The NSN provided on the input file has been retained.

Matching Assessment Tool and TSEC data

Learner-based matching starts with identifying a group of learners enrolled in SAC- or YG-funded programmes, who may be in the same qualification level, funding group, or provider type, and is based on finding all relevant assessments of learners in that group, irrespective of which organisation completed the assessment. The main matching criteria are as follows:

- The National Student Number (NSN) in the TSEC data set is the same as the NSN in the Assessment Tool data, after reconciliation with National Student Index;
- the assessment date is in 2011;
- the assessment date is within the relevant qualification start and end dates, or in the 90 days before the start date. This is the period of time for which one provider can make use of assessments completed at another provider, rather than assess the learner again.

For each specific analysis, the data is then filtered so that there is one record for each learner: if a learner has been assessed, information on one particular assessment (or pair of assessments for the analysis of gain) is retained as may be required for the analysis at hand. For analysis by qualification level, this filtering process is carried out separately for each NZQF Level; for analysis by fund, for each funding group for learners in programmes at NZQF Levels 1 to 3; and for analysis by provider type, for each provider type for programmes at NZQF Levels 1 to 3.

This procedure provides a basis for forming sets of learners defined by qualification levels, funding groups or education provider types, and counts are then counts of learners.

For the analysis of assessment rates in section 2.7, the groups consisted of all learners enrolled in a particular category (qualification level, funding group or provider type) whether they were assessed or not, and each learner record retained an indicator of whether or not the learner was assessed at least once in 2011.

For the analysis of first General Numeracy and Read with Understanding assessments in Chapter 3, the groups consisted of all the learners enrolled in a particular category who were assessed at least once in 2011. The same groups were used for analysing rates of reassessment in Chapter 4.

For the analysis of changes between first and last assessment in 2011 in Chapter 4, the groups consisted of all learners enrolled in a particular category who had been assessed more than once in 2011 for General Numeracy or for Read with Understanding.

6.4 Definitions of variables

Step

The Assessment Tool produces a numerical score in the range 0-1000. 'Step' refers to the Step on the Learning Progressions that the scale score maps to.

These are the Step cut-points. The three Steps for Vocabulary are strictly speaking not Learning Progressions Steps, but are included here for convenience. The three Vocabulary Steps are called 'Emerging' (allocated here to Step 1), 'Expanding' (Step 2) and 'Extended' (Step 3).

Step	Numeracy	Reading	Vocabulary	Writing
1	0 – 396	0 – 431	0 – 467	0 – 296
2	397 – 450	432 – 523	468 – 609	297 – 411
3	451 – 528	524 – 608	610 – 1000	412 – 571
4	529 – 596	609 – 681		572 – 719
5	597 – 689	682 – 738		720 – 759
6	690 – 1000	739 – 1000		760 – 1000

Standard Error

This is the standard error of the scale score, based on the variation in responses by the learner to the assessment. Each assessment record in the Assessment Tool data includes a specific estimate of standard error.

This variable is important in the determination of statistically significant gain, because where the first or last score has a large standard error, the increase in score between first and last score needs to be correspondingly large in order to achieve statistical significance.

Standard errors tend to be higher for Snapshot assessments than for full diagnostic assessments. Standard errors also tend to be higher when the score is near the bottom or top of the range, i.e. for Steps 1 and 6.

Most of the assessments with large standard error (> 75) were Non-adaptive for Printing assessments. The bulk of the Non-adaptive for Printing assessments with large standard errors are found in: Writing assessments at Step 1 and Step 6, and Numeracy or Reading assessment at Step 6 where the Difficulty was set at Steps 1-3 or at Steps 2-5.

Only a small proportion of assessments with large standard error were full-length Adaptive assessments. For Adaptive assessments, large standard errors occurred where the scale scores were extreme: for numeracy and reading these were in the ranges 0-49 (at the bottom of Step 1) or 953-1000 (at the top of Step 6); for Vocabulary, in the range 875-983 (at the top of Step 3).

The standard error of a difference in scores (such as between the last and first assessments of a learner in 2011 for a particular skill) is calculated as the square root of the sum of the squares of the standard errors for the two scores. This standard error is thus greater than either of the standard errors of the individual scores, reflecting the fact that the uncertainty of the difference in scores is greater than the uncertainty of either individual score.

Date of birth and gender

Date of birth has been taken from the NSI, where an NSN match has been found.

Gender has been taken from the NSI, where an NSN match has been found. A very small proportion of learners, who could not be matched to the NSI, had unspecified gender.

Age at assessment

This is calculated as the integer part of the difference in years between date of birth (from the NSI, see above) and the assessment date (see above). A single learner can have different ages at assessment if the assessment dates are spread out over a period of time.

For analysis of learner gain by age in section 4.2, the age at the first assessment in 2011 is used, for consistency with the age profiles on first assessment in section 3.2. The age distribution in section 2.6 is also based on age at first assessment for consistency.

Ethnic identification

In both the Assessment Tool data and the TSEC data, up to three ethnicities are recorded for each learner. Analyses in this report are based on 'total response' ethnic identification. This means that a learner for whom two or three ethnicities are recorded is counted in each of the ethnic groups they identify with. Thus a learner who is recorded as having both European and Māori ethnicity is counted in both the European and the Māori ethnic groups for analysis.

In the 2011 Assessment Tool data set, 5.3 per cent of learners had unspecified ethnicity. In the TSEC subset of data on learners enrolled in SAC- and YG-funded programmes, only 0.5 per cent of learners had unspecified ethnicity. Accordingly, for analysis of Assessment Tool data matched to the TSEC subset, the TSEC ethnicity data is used in preference to the Assessment Tool ethnicity data.

First language

First language, if specified, is recorded in the Assessment Tool data as a Yes or No response to the question: "Is English the learner's first language?" In the 2011 Assessment Tool data, 1.5 per cent of learners had unspecified first language.

Fund and qualification level

The funding and qualification level data used in this report is derived from the TSEC data, in which each record of a learner's enrolment in a particular qualification includes a field recording the fund under which that learner's enrolment in the qualification is subsidised, and a field recording the NZQF level of the qualification.

Organisation type and provider type

Organisation type refers to a category of organisation responsible for administering assessments. These can be education providers or other training organisations, including employers. The Assessment Tool data includes a code number for each organisation that sets up an assessment and inputs the learner and assessment data. These code numbers can be used to identify the individual organisations, and the organisations can then be grouped into organisation types. Assessing organisations may or may not be the same institutions as the education providers.

Provider type refers to a category of education provider identified from its identification (EDUMIS) number in the Tertiary Sector Enrolments and Completions data set, and then grouped into types in the same way as assessing organisations.

APPENDIX A THE LEARNING PROGRESSIONS FOR ADULT LITERACY AND NUMERACY

The Learning Progressions for Adult Literacy and Numeracy (Tertiary Education Commission 2008a, b, c) were devised to represent competencies in reading, writing, listening, speaking and numeracy. The Learning Progressions represent the development of literacy and numeracy as movement (or progression) along a set of related continuums. These continuums can then be divided into a sequence of stages known as Steps. The Tertiary Education Commission (2008a: 6) describes the Learning Progressions as follows:

> The learning progressions have been developed in seven strands that reflect the key competencies of listening, speaking, reading, writing and numeracy[25]. Each strand is made up of progressions that together describe the development of expertise within the strand. As with other models that describe learning pathways, the learning progressions have been developed as a set of continuums. Each continuum describes how adult learners build their expertise, with each step along the continuum representing a significant learning development. The learning progressions also reflect the cumulative nature of learning—an adult learner may start at different places along the different continuums … and all adult learners build on and extend their existing knowledge and skills.

The Learning Progressions cover a specific range of competencies. As the Tertiary Education Commission (2008a: 9) explains:

> The learning progressions for reading, writing, speaking and listening pick up the learning process from a point where some basic, essential skill, knowledge and attitudes have already been developed. These include the ability to articulate words and to hear the sounds of whole words and a basic understanding of concepts about print. These progressions go on to identify the key steps along a continuum up to a point that describes the competencies that an adult needs in order to be able to meet the literacy demands in most of the spoken and written texts that they will engage with in their everyday lives. …
>
> The nature of numeracy knowledge and skills means that the learning progressions for numeracy should start at an earlier point, to ensure that essential initial numeracy learning is not overlooked. They identify most of the key steps in learning, up to a point that describes what adults need to know and be able to do in order to solve most of the mathematical problems they will meet in their everyday lives.

The Learning Progressions thus allow that there will be some learners who lack "basic, essential skill, knowledge and attitudes" needed for literacy development. For such learners the Tertiary Education Commission (2008d) has provided guidance to educators in the form of the *Starting Points* resources, along with a Starting Points Assessment Guide (Tertiary Education Commission, 2010).

[25] There are three strands for numeracy.

APPENDIX B TERTIARY EDUCATION COMMISSION GUIDANCE ON USING THE ASSESSMENT TOOL

The TEC provides guidance to organisations on using the Assessment Tool in *Using the Literacy and Numeracy Assessment Tools*.[26] The following excerpts from this guide provide relevant context to the analyses in this report:

> Providers and educators are encouraged to use the **online adaptive assessments** for reading and numeracy because the results are more robust and reliable. Over 2012, TEC will be reviewing the ongoing need for the paper-based assessments.
>
> The **Snapshot** is a shorter version of the adaptive assessment that is particularly suitable for progress assessments.
>
> The **Vocabulary Assessment** is most appropriate for learners with very low reading skills i.e. working at Starting Points or at the lower Steps of the Learning Progressions. It provides one way to assess learners who are not yet able to complete a reading assessment using the Assessment Tool.
>
> The **Non-adaptive** assessments are most appropriate only when access to the online assessment tool is limited or highly impractical. The TEC's preference is for learners to take online adaptive assessments as the technology it utilises is better able to robustly assess learner competencies.
>
> …
>
> Providers must use the TEC literacy and numeracy assessment tools but may use their own assessments, in addition, as they see fit.
>
> …
>
> Educators with an interest in addressing literacy and numeracy will want to know about the skills of learners as they enter programmes in order to adjust their delivery. They will also be interested in measuring learner progress.
>
> Therefore TEC expects providers to assess learners at the beginning of a period of learning and to undertake progress assessments at intervals where there is sufficient time and opportunity for learners to make gains.
>
> Providers should develop an organisation-wide plan for assessing learners' literacy and numeracy. The plan should ensure that:
>
> - assessments are planned to align with each individual learner's enrolment over their time of study
> - the key messages and delivery of literacy and numeracy assessments are consistent across the organisation

[26] http://www.tec.govt.nz/Documents/Forms per cent20Templates per cent20and per cent20Guides/Using-the-literacy-and-numeracy-assessment-tools.pdf, accessed 13 April 2012. These guidelines are current in 2012, but similar advice was offered in 2011.

- learners are not over-assessed (for example, where a learner completes a series of courses, assessing at the beginning and end of every course would be over-assessment); and
- educators are aware that they can use assessments from other educators or providers, if the learner has been assessed within the last 90 days.

…

Please note:

- Learners in embedded, intensive or workplace literacy courses should have at least one initial and one progress assessment, unless a learner is assessed at:
  - Step 5 or 6 for reading, or
  - Step 6 for numeracy, or
  - Step 5 or 6 for writing.
- The assessment areas used in progress assessments must be the same as those used for initial assessments. For example, if a provider administered initial assessments in writing and numeracy, then progress assessments in writing and numeracy must also be used. This ensures consistency in using the Assessment Tool and underpins reliable reporting on learner gain
- For embedded literacy and numeracy:
  - courses of 3 months duration or more are expected to provide sufficient opportunity for literacy and numeracy teaching and learning; and
  - the timing of initial and progress assessments should relate to the full duration of learner's enrolment in level 1 to 3 courses, not on a course-by-course basis. This takes a holistic, learner-centred approach and avoids over-assessment.

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