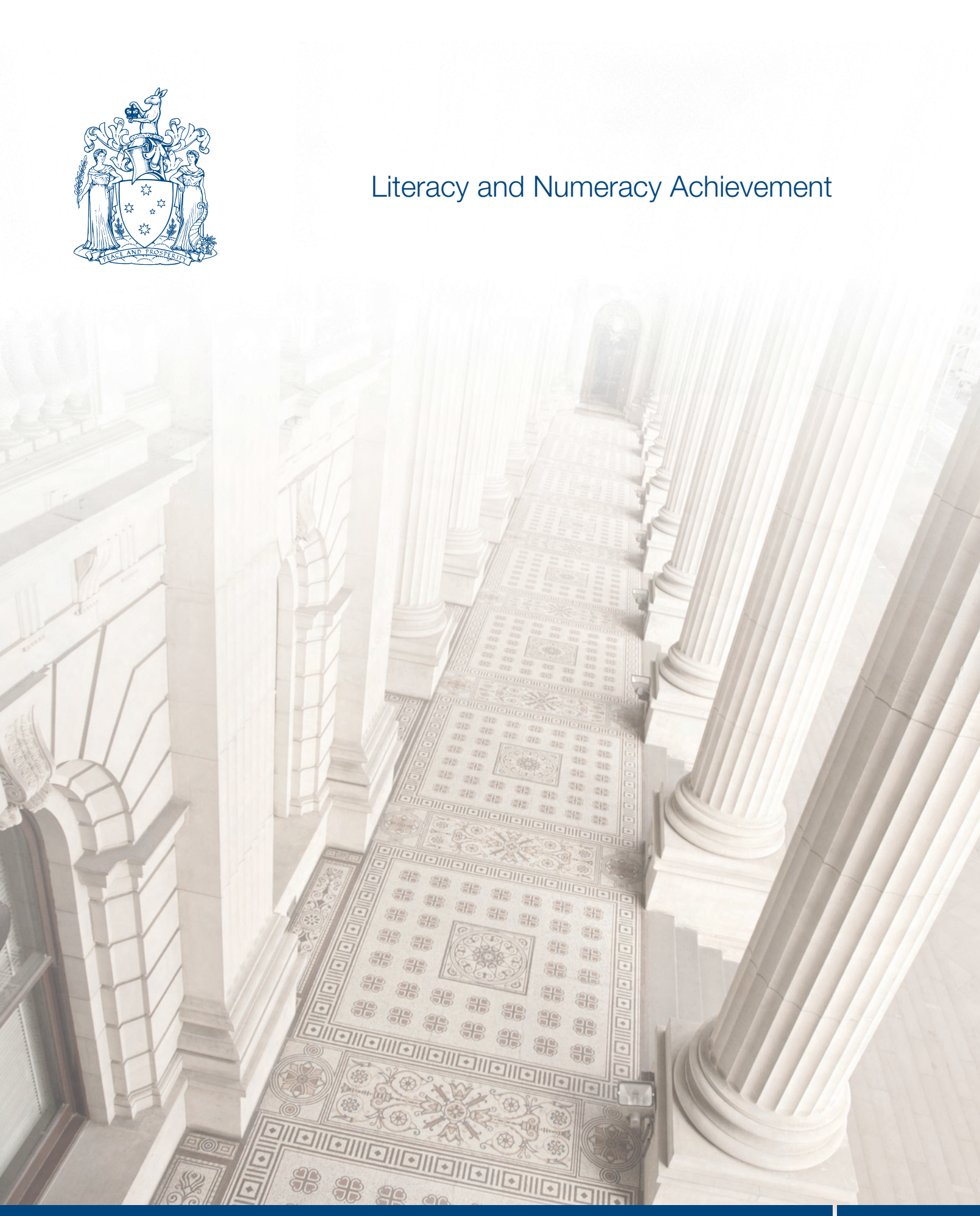
Literacy and Numeracy Achievement



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Victorian Auditor-General's Office

Auditing in the Public Interest

The Hon. Robert Smith MLC
President
Legislative Council
Parliament House
Melbourne

The Hon. Jenny Lindell MP
Speaker
Legislative Assembly
Parliament House
Melbourne

Dear Presiding Officers

Under the provisions of section 16AB of the *Audit Act 1994*, I transmit my performance report on *Literacy and Numeracy Achievement.*

Yours faithfully

D D R PEARSON
Auditor-General

4 February 2009

Foreword

A literate and numerate child is reasonably assured of a fair go in our society.

Accordingly a basic obligation to our children is to equip them with the reading, writing and maths skills needed to fulfil their potential. In an increasingly competitive global economy, we also need to achieve real, sustained improvements in these core skills over time.

Victoria has invested heavily in this complex and challenging area, with more than $1.1 billion allocated over the past six years for improving literacy and numeracy in government schools.

While there is evidence of real gains in some areas, the overall report card for the 10 years to 2007 is disappointing. Past efforts have not led to the sustained improvements that were expected. While the most recent evidence from the 2008 national indicators shows promise, it is too soon to make a call on future trends.

It is time to reassess past approaches. There is clear evidence of the need to focus effort early, on the students that need support, and for that support to be closely monitored and sustained as those students progress through school.

New approaches must be backed by long-term data that sufficiently differentiates performance, to take account of changing demographics and movements between school sectors. The protracted delay in introducing the unique student number system has worked against the collection and analysis of such data at the level it matters most – the individual.

D D R PEARSON
Auditor-General

4 February 2009

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1 Executive summary

1.1 Introduction

Competence in literacy and numeracy is essential for the pursuit of lifelong learning and career opportunities. Studies have shown that individuals without adequate skills in these areas are at a significant disadvantage in education, employment opportunities, earnings potential, social status and self-esteem.

The Department of Education and Early Childhood Development (DEECD) has overall responsibility for improving the literacy and numeracy achievements of government school students in Victoria. DEECD supports schools and teachers to improve student literacy and numeracy through a range of programs.

DEECD and the Victorian Curriculum and Assessment Authority (VCAA) assess and monitor student achievement at selected year levels through statewide testing across all government schools. Teachers also assess and monitor the progress of individual students, including making judgments of student progress against the state education curriculum (known as the Victorian Essential Learning Standards) at the end of each semester.

Over the last six years there has been a major focus on further developing the curriculum, school leadership and teaching and learning in government schools. There has also been $42.1 million invested in new initiatives specifically for schools with poor literacy and numeracy achievement. This funding was in addition to the $120 million spent annually to improve literacy and numeracy across all government schools.

The objective of the audit was to determine whether student literacy and numeracy are improving in Victoria's government schools.

Primarily this involved a detailed analysis of DEECD's and VCAA's statewide student achievement data covering the period 1998 to 2007. While the principal focus was on trends in state average achievement, we also examined achievement for different socio-economic status (SES) groups, the nine DEECD education regions and for the lowest- and highest-achieving students.

These results were then considered against DEECD's initiatives since 1998 to support improved student literacy and numeracy achievement, including DEECD's response to the recommendations of our 2003 literacy audit.

This audit assessed trends in student achievement against the expected performance level set for students in Victorian government schools.

The results from the new national testing program, the National Assessment Program – Literacy and Numeracy (NAPLAN), introduced in 2008, are encouraging. However, the data have not been used because the minimum standards for student achievement set under NAPLAN are not comparable to those set for the government school sector in Victoria, and the published data do not specifically identify and separate the performance of the government school sector from the non-government school sector.

The national and international benchmark results are also acknowledged but were not used for this audit for the same reasons the NAPLAN data were not used. These benchmarks are also lower than Victoria's achievement standards.

1.2 Overall conclusion

National and international experience indicates that improving literacy and numeracy is a complex and challenging task. The government has made a significant commitment, investing $1.19 billion in initiatives over the past six years.

Nevertheless, over the 10–year period to 2007, DEECD's efforts have not resulted in a marked improvement in average literacy and numeracy achievement across age groups.

The most substantial improvement was in the ability of Prep to Year 2 students to recognise written words although there is not data to confirm whether word comprehension also improved. Moderate improvements in other areas of literacy were also evident for this age group. This demonstrates that the improvement program introduced for this age group worked and that big gains can be generated at a system-wide level. The improvements for Number by students in their early years were also encouraging. Some small to moderate impacts for the particular sub-groups examined for this audit were also evident.

However, the improvements in literacy and numeracy made by students in the early years were not sustained as they progressed through schooling. Students generally performed less well in numeracy than in literacy, with average student performance often further below the expected level, and with fewer improving trends apparent.

DEECD expected improvements in literacy and numeracy achievements resulting from its actions since 2003 would start to emerge by 2008. DEECD considers the NAPLAN results bear out its expectations. However DEECD also acknowledges the results are indicative and not conclusive because NAPLAN is a new test with no comparable data. Given the limited improvement in student achievements shown by the statewide data from 1998 to 2007 and the national benchmark results from 2001 to 2007, it seems unlikely literacy and numeracy achievements could markedly change over the course of one year.

Nevertheless, these results need to be monitored in coming years across the full range of achievement, to see whether they can be sustained and further improved upon. This should include the use of disaggregated analysis of Victoria's performance to enable an understanding of levels of, and changes in, performance of government schools.

It is clear that in order to make a difference, both the nature and the scale of the literacy and numeracy strategies currently being applied need to be thoroughly re-assessed. There is a need to focus effort early, on the students that need support, and for that support to be closely monitored and sustained as students progress through school. This focus is needed for both low-SES schools and for low-achieving students in higher-SES schools.

The overwhelming evidence indicates that the greatest improvements will come from systematic and sustained intervention in the early years. Effectiveness of strategies for students who have fallen behind in later years also needs to be re-assessed.

Improving the literacy and numeracy skills of students remains a significant challenge. Failure to succeed can have serious consequences as it puts at risk the opportunities for students to achieve their full potential. It is therefore recommended that DEECD revisits its strategies to improve student achievement and to rigorously oversight the purposeful use of the resources allocated for this critical area of education.

Importantly, DEECD needs to improve the usefulness of student literacy and numeracy assessment data for monitoring long-term trends and the progress of individual students. Promptly introducing the system of unique student numbers would dramatically improve the capacity to identify and monitor students needing support.

1.3 Key findings

1.3.1 Literacy and numeracy assessments

DEECD and VCAA collect data each year through four statewide assessments: Assessment of Reading (AoR), teacher judgments of student progress, Achievement Improvement Monitor (AIM) and the Victorian Certificate of Education (VCE). These assessments span the school years from Prep to Year 12 and different elements of student literacy and numeracy skills.

The four assessments had a range of limitations when used to analyse long-term trends. Not all students were assessed in the same way, the extent to which the full range of student abilities was measured varied, some data sets were not consistent over time, and the capacity to track the progress of individual students was restricted.

As a result, our analysis focused on the AIM and VCE data sets, the assessments that were collected in a standardised way and consistent over time.

1.3.2 Literacy and numeracy achievements since 1998

The audit analysed the trends in average achievement over time and how average achievement compared with the expected level of performance identified by the curriculum standard for each year level, as set by the VCAA. It is recognised that changing demographics and student movement in the latter years of schooling from the government to the non-government sector may have affected the results.

Trends in average literacy achievement

Our analysis found that between 1998 and 2007:

- The most substantial improvements were made by students in Prep to Year 2 for recognising written words, although there is not data to confirm whether word comprehension also improved, e.g., 20 per cent more Prep students reached a state reading benchmark. Moderate improvements also occurred for other areas of literacy at these year levels.
- Some slight improvements were made between Years 3 and 7, e.g., equivalent to half a term of learning at Year 7, but average literacy achievement declined over time at higher year levels. Average student performance dropped further below the expected level each year as students progressed from Year 3 to Year 9 to be more than 1 term below the expected level by Year 9.
- No improvement was recorded by VCE students in Years 11 and 12. Average VCE achievement was slightly below the standardised mean.

Trends in average numeracy achievement

Our analysis found that between 1998 and 2007:

- Achievement in the set of maths skills called ‘Number’ for Years 3 and 5 students showed some moderate improvements between 1999 and 2007, e.g., increasing by over half a term of learning at Year 3. Improvements in other areas of numeracy were slight.
- Numeracy achievement declined in recent years in some other areas of maths for students in Years 3 to 9 e.g., by four weeks of learning in Year 7, prior to 2007. In Years 11 and 12, although achievement in the more difficult maths studies improved, overall, achievement declined and was below the state average.
- Numeracy achievement declined more in Years 7 to 12 than in Prep to Year 6. Average student performance also dropped further below expected levels each year from Year 3 to Year 9.

Trends in achievement for students from key sub-groups

Our analysis found that between 1998 and 2007:

- The achievement gap between students from high- and low-SES schools was considerable at all year levels, e.g., representing 15 months of learning at Year 9 for both literacy and numeracy. These gaps had not narrowed over time for either literacy or numeracy.

- The Eastern Metropolitan region consistently outperformed all other regions. There were some improvements for students in the low-SES metropolitan regions, suggesting that initiatives targeted at low-SES schools may have had an impact, however student achievement declined in several non-metropolitan regions.
- The lowest-achieving students were well behind their higher-achieving counterparts. There were, however, some encouraging signs of improvement among the lowest-achieving students in literacy though not in numeracy. There was also improvement amongst the highest-achieving students in numeracy but not literacy.

1.4 Ways to improve literacy and numeracy

1.4.1 Support for literacy

Efforts to improve literacy achievement over the last 10 years have done little to improve the average achievement of students across the state. Although the considerable focus on early years literacy in the late 1990s led to some good initial gains, there has been no system-wide assessment of the ongoing effectiveness of key elements of the approach, such as the Reading Recovery intervention. DEECD needs to routinely evaluate, at a system-wide level, the ongoing effectiveness of its support to schools, teachers and students and sustain targeted support and interventions beyond the early years for students who need it.

1.4.2 Support for numeracy

Low student achievement results for numeracy indicate that effective programs are needed to better support all teachers in further developing their numeracy teaching strategies. The existing focus on Number should be maintained, although programs should also focus on improving teachers' knowledge of the maths discipline, particularly in areas other than Number. The programs need to be appropriate to the different stages in the development of students' mathematical understanding as they progress through school. DEECD has increased its support for numeracy teaching in recent years however it also needs to monitor the effective use of this support. There is also an urgent need for early intervention and for sustained support for students who need it.

1.4.3 Support to address social disadvantage

The literacy and numeracy achievements of students from low-SES schools need to improve significantly to meet expected levels. Funding to address social inequity in literacy and numeracy achievement equates to around 3 per cent of the total schools' budget. This is very low in light of the large achievement deficit of students from low-SES schools. Some of DEECD's low-SES regions have demonstrated that the achievement of students from low-SES schools can be improved. The challenge now is

to expand this work effectively across all low-SES schools, and to set targets for reducing the achievement gap between students from low- and high-SES schools.

1.4.4 Support for low-achieving students

The audit results highlight the need to target the large numbers of students who are achieving well below the expected level, especially for numeracy. Focusing on schools with low achievement rather than individual students with low achievement—the common practice—may miss the large number of students in higher-SES schools who are also achieving well below the expected level.

1.4.5 Continuous improvement

DEECD needs to use a consistent and evidence-based continuous improvement approach for improving student literacy and numeracy achievement. For example, it has not evaluated the success of the Early Years programs for literacy and numeracy, in place for over seven years, its system-wide programs for teacher professional development or set challenging targets to help drive improvement.

DEECD needs to improve the usefulness of its statewide student assessment data. For example, no information is collected on the literacy and numeracy skills of students commencing their Prep year, against which their progress can be measured. There is also no standardised assessment of numeracy for Prep to Year 2 students.

The teacher judgments of student progress provide a holistic assessment of student progress over each year from Prep to Year 10 but the limited number of curriculum progression points used for the assessments does not accurately differentiate the great range in student achievement that exists. This is an important issue to address because until a national curriculum is implemented, teacher judgments provide the only statewide assessment of student achievement against the challenging standards of learning set for Victorian students.

A system of unique student numbers for all students is still being developed. The lack of a student identifier is a fundamental deficiency because it limits student tracking, system-wide monitoring of student achievement, evaluations of support initiatives and targeting of support to individual students.

1.5 Recommendations

DEECD should:

- Adopt a stronger focus on numeracy, by:
  - developing and implementing an early intervention strategy for students struggling with numeracy
  - strengthening support provided to teachers to further develop their knowledge of, and teaching strategies for, maths, and to select and implement the appropriate strategies **(Recommendation 6.1)**.

- Address the performance gap between high- and low-SES schools, including setting targets for reducing the influence that school socio-economic disadvantage has on student literacy and numeracy achievement **(Recommendation 6.2)**.
- Identify and address the issues contributing to the declining literacy and numeracy achievement in some non-metropolitan regions, and identify and share across regions the successful approaches underlying the good results achieved by the low-SES metropolitan regions **(Recommendation 6.3)**.
- Improve identification and targeting of students achieving well below the expected level in literacy and numeracy in the early years of schooling in all schools, and sustain support for those who need it as they progress through school **(Recommendation 6.4)**.
- Implement a consistent and evidence-based continuous improvement approach to improving student literacy and numeracy achievement through:
  - setting challenging long-term achievement targets
  - identifying and addressing any issues that may limit the effectiveness of the Early Years programs and one-on-one literacy interventions in schools
  - continuing successful initiatives for as long as feedback and evaluations indicate they are needed **(Recommendation 7.1)**.
- Improve the value of the student literacy and numeracy achievement data for monitoring student progress, by:
  - promptly introducing the Victorian Student Number and using it to monitor the progress of individual students and student cohorts, and to evaluate the impact of improvement initiatives
  - assessing the literacy and numeracy skills of all students starting Prep
  - improving the usefulness of the teacher judgment assessments, in conjunction with VCAA, by more accurately differentiating the range in student progress that is assessed through these judgments
  - working with VCAA to review and upgrade the AIM On Demand student assessment system **(Recommendation 7.2)**.

2 Audit Act 1994 section 16— submissions and comments

2.1 Introduction

In accordance with section 16(3) of the *Audit Act 1994* a copy of this report, or relevant extracts from the report, was provided to the Department of Education and Early Childhood Development (DEECD) and the Victorian Curriculum and Assessment Authority (VCAA) with a request for comments or submissions.

The comments and submissions provided are not subject to audit nor the evidentiary standards required to reach an audit conclusion. Responsibility for the accuracy, fairness and balance of those comments rests solely with the agency head.

2.2 Submissions and comments received

VCAA elected not to provide a separate submission or comment. DEECD's submission is included in full below.

RESPONSE provided by the Secretary, Department of Education and Early Childhood Development

DEECD welcomes the Auditor-General's report and supports its recognition that achieving literacy and numeracy outcomes is important to improve educational, social and economic prospects. DEECD also endorses the report's acknowledgement that, based on national and international experience, improving literacy and numeracy is a complex and challenging task.

DEECD is pleased to note the improvements in literacy which have been demonstrated over the past 10 years, especially in Prep to Year 2 students, and the significant improvements which have been observed in respect of Number skills. We accept that there is room for improvement, especially in other areas of numeracy, and tentative evidence of decline in some areas.

The reader's particular attention is drawn to the clear indication, evidenced by the 2008 national literacy and numeracy tests (NAPLAN) results, that Victoria is a very high performing jurisdiction in Australia. Australia, in turn, is a relatively high performing country by world standards, as evidenced, for example, by the OECD Programme for International Student Assessment (PISA) tests.

RESPONSE provided by the Secretary, Department of Education and Early Childhood Development – continued

Notwithstanding the audit results and encouraging NAPLAN report, DEECD accepts it cannot afford to be complacent. We accept that student achievement against expected performance levels can always be improved.

Through the recently released Blueprint for Education and Early Childhood Development, DEECD has reinforced literacy and numeracy outcomes as clear priorities for the Department. DEECD aims to continue to achieve significant improvements in literacy and numeracy as part of its mission to ensure a high-quality and coherent birth-to-adulthood learning and development system which builds the capability of every young Victorian.

DEECD notes that the focus of the audit has been on trends over the period 1998–2007. During this period, a number of demographic and socio-economic changes have been observed, not the least of which has been the changing composition of students. DEECD observes that no attempt has been made to allow for this in the report's assessment of progress over the period and believes this remains an area for investigation.

Despite this observation, DEECD is pleased to accept the majority of the recommendations contained in the report in full, with one notable exception, concerning Recommendation 7.2 which is partially accepted. In relation to "improving the usefulness of teacher judgment assessments, in conjunction with VCAA, by more accurately differentiating the range in student progress that is assessed through these judgments", the VCAA supports teacher judgment through the AIM On Demand tests. Through both newly introduced progress tests and through computer adaptive tests, teachers are able to conduct assessments of students that are complementary to teacher judgments made through classroom assessments. Such tests can already assist teachers to accurately differentiate student performance but ultimately teachers, informed by a range of evidence, including on demand test results, are best placed to make an on balance judgment about student performance.

The VCAA has recently completed an independent evaluation of the AIM On Demand tests. Amongst the recommendations of that evaluation is the suggestion that changes be made to the software to enhance the use of the program in schools. The VCAA will work cooperatively with DEECD to improve the system for delivery of on demand tests.

DEECD accepts all of the other recommendations in full and indicates that all are either in various stages of development or are being implemented.

The Victorian Government will be releasing a literacy and numeracy strategy in 2009. DEECD is also developing a Differentiated Support Framework, literacy and numeracy pilots for low-SES schools, professional learning opportunities for secondary numeracy teachers and a Maths and Science Education Strategy for release in 2009.

RESPONSE provided by the Secretary, Department of Education and Early Childhood Development – continued

Of particular note is the planned introduction of the Victorian Student Number (VSN) commencing with Victorian Government schools in mid 2009. A pilot implementation spanning up to 30 metropolitan schools in the Southern and Northern Metropolitan regions will be undertaken in mid February 2009 to the end of March 2009. DEECD supports the need for tracking student progression and for this reason has embarked on implementation of the VSN as a priority, consistent with the Government's objectives.

In accepting the majority of recommendations of the report in full, and the acceptance of Recommendation 7.2 in part, DEECD acknowledges that more can always be done.

We will be working to identify opportunities for further improvement with literacy and numeracy outcomes as part of our overall commitment to continuously improving the education and early childhood development system in Victoria.

2.2.1 Audit observations

DEECD's positive response to the report findings and recommendations is welcomed. The response highlights that there has been some improvement in some aspects of literacy over the 10 years to 2007. These results need to be weighed carefully against the other trend data presented in the report which show that gains in the early years are not necessarily sustained as students move through the school system.

The report acknowledges that changing demographics and socio-economic conditions will have impacted on results—for example, the movement of students between the public and private education systems. The 2003 audit on literacy standards in government schools noted the need to develop better methods of tracking children's achievement through school. Had the Victorian Student Number been introduced as recommended in 2003, it would have been practicable for this audit to take account of changes within the student population when analysing the results from testing and assessment.

3 Background

3.1 Defining literacy and numeracy

Literacy and numeracy skills provide the foundation for lifelong learning, rewarding and satisfying work, and a fulfilling personal life. The lifetime impact for individuals who are not literate or numerate can be enormous, and can include low self-esteem, social exclusion, loss of education and employment opportunities, and loss of earnings.

The definitions of literacy and numeracy used for this report are presented in Figure 3A.

Figure 3A
Defining literacy and numeracy

Literacy is defined in the Australian Government's literacy policy*(a)* as:

the ability to read and use written information, to write appropriately, in a wide range of contexts, for many different purposes, and to communicate with a variety of audiences. Literacy is integrally related to learning in all areas of the curriculum, and enables all individuals to develop knowledge and understanding. Reading and writing, when integrated with speaking, listening, viewing and critical thinking, constitute valued aspects of literacy in modern life.

Numeracy is defined by Australia's Ministerial Council on Education, Employment, Training and Youth Affairs*(b)* as:

the effective use of mathematics to meet the general demands of life at school and at home, in paid work, and for participation in community and civic life.

Note: (a) Department of Employment, Education, Training and Youth Affairs, *Literacy for All: The Challenge for Australian Schools, Commonwealth Literacy Policies for Australian Schools*, Australian Schooling Monograph Series No. 1/1998.
(b) Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA), *National Report on Schooling in Australia 1997*, MCEETYA, Melbourne, 1997, p. 130.

Source: Victorian Auditor-General's Office.

In this report, assessments of specific areas or skills in literacy and numeracy are identified by the assessment name (such as 'Reading' and 'Writing' for literacy, and 'Number' and 'Mathematics' for numeracy).

3.2 DEECD's approach to improving literacy and numeracy

3.2.1 Policies

The Department of Education and Early Childhood Development (DEECD) has overall responsibility for improving the literacy and numeracy of government school students in Victoria.

In 2001 the government's *Growing Victoria Together* policy document emphasised the importance of education for improving the life opportunities of all Victorians. The biggest challenges identified for school education were reducing the impact of social disadvantage and increasing the number of students completing secondary education.

In 2003 the *Blueprint for Government Schools* changed the ways in which DEECD's schools, regions and central office worked towards improving student outcomes, including literacy and numeracy achievements.

The *Blueprint* introduced a range of measures aimed at responding to diverse student needs, building school leadership and teacher skills, and improving school performance. Some measures were available to all government schools and others were targeted at schools identified as needing additional support.

In 2007 the government expanded its approach to improving student literacy and numeracy achievement in *Victoria's Plan To Improve Literacy And Numeracy Outcomes*.[1] This plan was released under the Council of Australian Governments' (COAG) National Reform Agenda, but the Commonwealth Government did not agree to fund the share of activities requiring its support. The state government has unilaterally begun work on the 11 actions it had committed to under the plan.

The government released its *Blueprint for Early Childhood Development and School Reform* in September 2008. This new five-year policy is aimed at driving improvement and integration of the early childhood and school sectors, and helping deliver the best possible outcomes for children and young people.

The key elements of DEECD's approach to improving literacy and numeracy levels across the government school system are:

- a relevant and developmentally appropriate curriculum
- annual funding to schools through the Student Resource Package and targeted funding for specific initiatives
- statewide initiatives such as the Early Years programs for literacy and numeracy
- professional development for teachers and principals, including specialist literacy and mathematics coaches in targeted schools, and evidence-based resources

[1] State Government of Victoria, *Victoria's plan to improve literacy and numeracy outcomes*, Department of Premier and Cabinet, April 2007.

- monitoring and evaluating progress at the school-level through the School Accountability and Improvement Framework and at the system-level.

Victoria has made significant changes to the curriculum and support for school leadership, teaching and learning, and initiatives for improving student literacy and numeracy in government schools, especially since 2003.

3.2.2 Funding

Core funding to schools in the 2008 calendar year totalled $3.2 billion, which included $124.7 million for literacy and numeracy programs in all schools. Core funding to all schools for literacy and numeracy programs from 2003 to 2008 is shown in Figure 3B.

Figure 3B
Funding for core literacy and numeracy programs, 2003–2008
($million)

Funding source	2003	2004	2005	2006	2007	2008
Literacy						
Early Years Literacy Program*(a)*	75.9	76.5	77.2	77.8	78.4	79.1
Reading Recovery	28.7	29.6	30.3	31.2	32.2	33.1
Subtotal	**104.6**	**106.1**	**107.5**	**109.0**	**110.6**	**112.2**
Numeracy						
Early Years Numeracy Program*(b)*	11.6	11.6	11.5	12.0	12.2	12.5
Total	**116.2**	**117.7**	**119.0**	**121.0**	**122.8**	**124.7**

Note: (a) Includes funding under the Keys to Life program and funding for literacy coordinators.
(b) Includes funding for numeracy coordinators.

Source: Victorian Auditor-General's Office, from DEECD data.

All schools also received literacy and numeracy support through the Schools for Innovation and Excellence initiative ($84.3 million between 2003 and 2007). Grants for maths and science equipment totalling $11.2 million were made available to all schools in 2006 and 2007. The government also committed $323.8 million to support its actions under the National Reform Agenda plan for the period 2007–08 to 2010–11.

Additional funding and support is targeted at schools with:

- low student literacy and numeracy achievement
- students with language backgrounds other than English
- students from Indigenous backgrounds
- students from disadvantaged backgrounds.

3.2.3 Key initiatives

Over the past decade DEECD has introduced several initiatives to improve the literacy and numeracy standards of government school students. In the late 1990s it focused on developing and implementing the Early Years Literacy Program and an intervention for Year 1 students with poor literacy skills. The Early Years Numeracy Program was also developed around this time and implemented in 2001.

In the early 2000s attention then focussed on improving the literacy and numeracy skills of students in the middle years of schooling— Years 5 to 10—with the introduction of:

- the Middle Years Reform Program
- Access to Excellence
- Restart
- Schools for Innovation and Excellence.

As a result of education-based research and evaluations the focus now is on teacher coaching and professional development initiatives for both primary and secondary teachers, including a greater focus on numeracy for secondary teachers.

Figure 3C describes the key support initiatives currently in place for improving student literacy and numeracy achievement.

Figure 3C
Initiatives for improving student literacy and numeracy achievement

Participant	Initiative	Years of operation
All schools	**Early Years literacy and numeracy programs:** system-wide programs for teaching literacy and numeracy in Prep to Year 4	1997–ongoing (literacy) 2001–ongoing (numeracy)
Schools with low literacy and numeracy achievements	**Literacy Improvement Teams:** a teacher coaching initiative for teachers of Years 3 to 8 in schools with low literacy achievement	2007–2011
	Teaching and Learning Coaches for Maths and Science: a teacher coaching initiative for teachers of Prep to Year 10 in schools with low maths and science achievement	2008–2009
Students with low literacy and numeracy achievements	**One-on-one literacy intervention:** interventions such as Reading Recovery for the lowest-achieving 20 per cent of Year 1 students in each school	1985–ongoing

Source: Victorian Auditor-General's Office.

DEECD also seeks to support schools with performance challenges, which may include low literacy and numeracy achievement, through the school review process and the Targeted School Improvement initiative that commenced in 2004.

Individual schools also implement literacy and numeracy improvement activities through their strategic and annual planning processes.

A list of the major initiatives introduced since 1998 for literacy and numeracy is provided in Appendix A.

3.3 Curriculum and assessment

The Victorian Curriculum and Assessment Authority (VCAA) develops the state curriculum. In 2006 the state curriculum changed from the Curriculum and Standards Framework—CSF to the Victorian Essential Learning Standards—VELS. The VELS was developed to update the curriculum and to provide higher standards of learning and as a result, the expected level of achievement for an average student now represents a 'challenging target'.

The VELS addresses literacy and numeracy not just through the English and mathematics disciplines but also through other areas of the curriculum, including:

- other disciplines, such as science and the arts
- physical, personal and social learning—e.g., health and physical development, interpersonal skills
- interdisciplinary learning—e.g., communication, thinking processes.

The standards identify the levels of performance that are expected for students at key intervals as they progress from Prep to Year 10. The standards are based on an informed 'best estimate' about the skills and knowledge a typical student should have at the different year levels.

The assessment scale used by teachers for reporting includes progression steps between the standards to describe the incremental improvements students make in reaching each standard. The standards comprise Levels one to six, with three progression points at 0.25 VELS/CSF levels intervals between the standards.[2] Since 1998 the scale has remained the same between curriculum changes, but with the introduction of the VELS in 2006 more advanced skills and knowledge were expected of students achieving the standards. The number of progression steps also increased, from two for the CSF, to three for the VELS.

[2] Three progression points are included above Level six to describe progress of students who are working beyond an end of Year 10 standard, whereas there is only one progression point below Level one to describe the progress of students with very low skills.

It is expected that the achievement of an individual student will fall within a range of half a year of learning below and above the standard or progression point relevant to their year level at school. However for the statewide data used in this analysis, average student achievement is compared to the median level of achievement expected for that year level, rather than to a range of achievement around the median level.

DEECD and VCAA assess and monitor student achievement through statewide testing at Years 3, 5, 7, 9, 11 and 12 across all government schools. Teachers also continuously assess and monitor the progress of their students to inform their teaching strategies and to report student progress to parents.

Specific assessment of student literacy and numeracy achievement starts in Prep with teacher judgments of student progress in literacy and numeracy against the VELS levels. Teachers judge student progress twice a year for every year from Prep to Year 10.

In Prep to Year 2, students also complete the Assessment of Reading. This assesses a student's ability to 'decode' text, which means reading aloud, without necessarily comprehending the text.

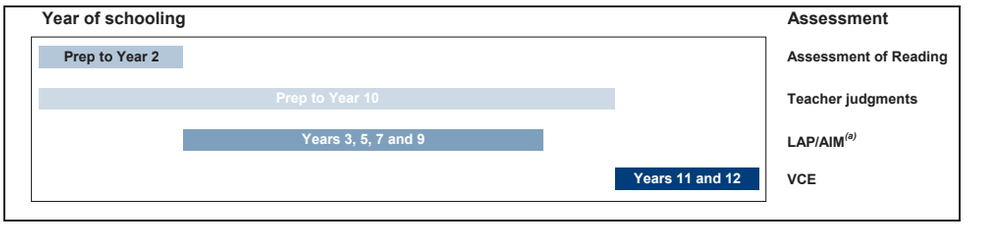
Until 2008, students in Years 3, 5, 7 and 9 were assessed through the Achievement Improvement Monitor (AIM) statewide testing program that had replaced the Learning Assessment Program (LAP) in 2000. In May 2008, AIM testing was replaced by the National Assessment Program – Literacy and Numeracy (NAPLAN), the first national assessment of student learning. All NAPLAN tests are conducted in early May, whereas Years 3, 5 and 7 AIM tests were held in the first week of August.

Both teacher judgments of student progress and LAP/AIM are referenced to the VELS/CSF to determine where the student's ability lies in relation to the learning standards.

Students doing the Victorian Certificate of Education (VCE) in their final years of schooling must complete an English study. Many also include at least one maths study.

The mechanisms for assessing student progress in literacy and numeracy are summarised in Figure 3D.

Figure 3D
Statewide literacy and numeracy assessments, Prep to Year 12



Note: (a) AIM was replaced with NAPLAN in 2008.
Source: Victorian Auditor-General's Office.

3.3.1 Targets for literacy and numeracy achievement

In 2001 the *Growing Victoria Together* strategy established the following target for literacy and numeracy: 'The proportion of Victorian primary students achieving the national benchmark levels for reading, writing and numeracy will be at or above the national average.' Victoria sets higher standards through the VELS than those set by the national benchmarks, which represent only minimum standards.

The state government's 2003 *Blueprint* strategies were aimed at reducing:

- the concentration of low student learning achievements in some schools and regions
- the high variation in achievement between classes
- the variation in achievements between schools with similar student populations.

No specific targets were set for either the levels of or timeframes for improvement in these areas.

Most recently, in DEECD's *Interim Corporate Plan for 2008–2010* released in June 2008, the expected outcomes for literacy and numeracy state: 'Children are meeting expected literacy and numeracy standards, and overall levels of literacy and numeracy are improving.' The indicative progress measure for this outcome is also based on progress against the minimum national standards rather than Victoria's higher standards.

3.3.2 Victorian achievements against national and international benchmarks

National benchmarks

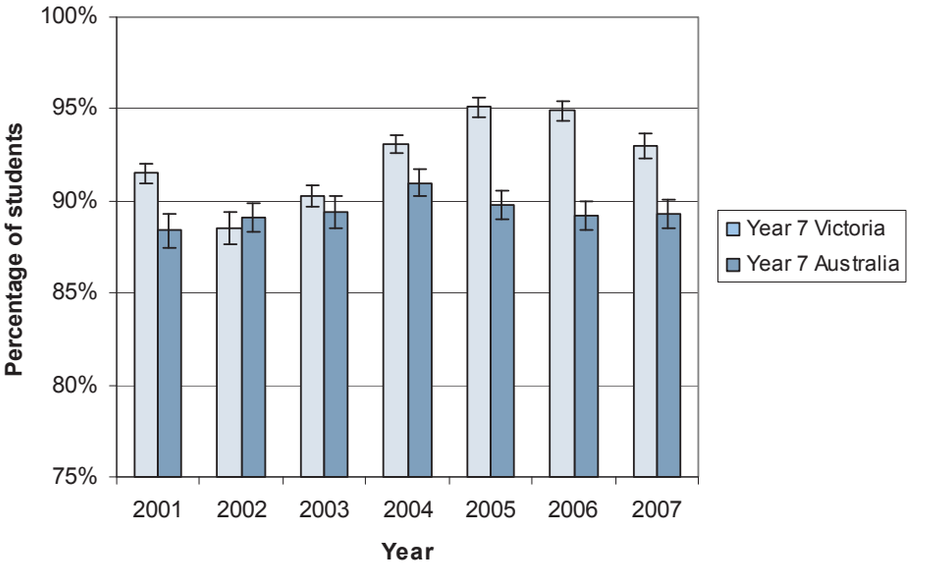
The national benchmarks, introduced in 1999, represent minimum standards or basic skills for literacy and numeracy achievement and are developed from the assessment data collected by all states and territories across the government, Catholic and independent school sectors. While the benchmarks are based on the national *Statements of Learning* and can be linked to the VELS, the standards they represent are not comparable with the more challenging standards expected of Victorian students through the VELS.

The Victorian school sector as a whole generally performed at or above the national average for both literacy and numeracy between 2001[3] and 2007 for Years 3, 5 and 7.

There was no significant change in the proportion of students achieving the national reading benchmarks for Years 3 and 5 over this period. Reading achievement improved at Year 7 up to 2006 but declined in 2007— although it remained above the national average (Figure 3E).

[3] The method for calculating the national benchmarks data changed in 2001 so the 1999 and 2000 data are not comparable with those collected from 2001.

Figure 3E
Percentage of Year 7 students reaching the national reading benchmark *(a)*

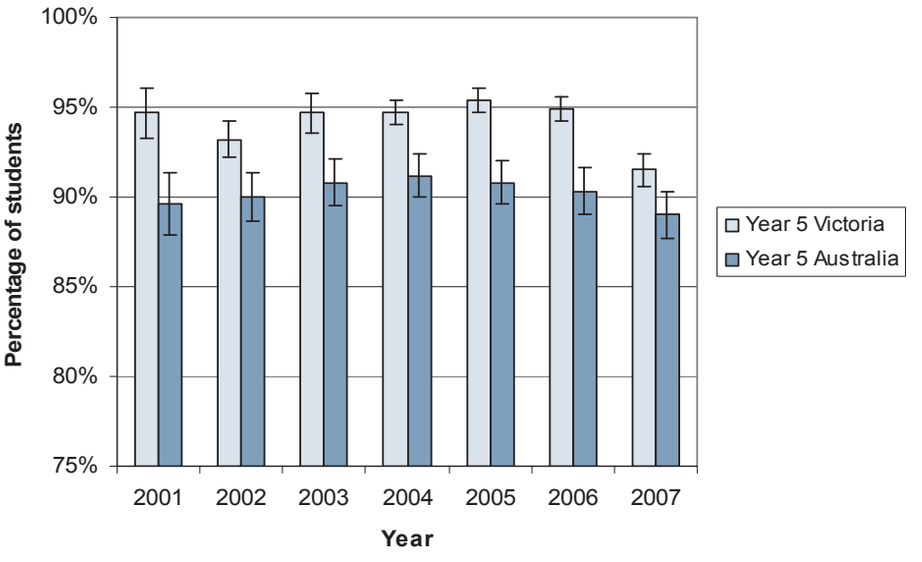


Note: (a) The 95 per cent confidence interval around the mean percentage of students achieving the benchmarks is indicated for each result.

Source: Victorian Auditor-General's Office, from Ministerial Council on Education, Employment, Training and Youth Affairs data.

For numeracy, the proportion of students reaching the national benchmark for Years 3, 5 and 7 changed little until 2007, when achievement declined for Year 5 numeracy, as illustrated in Figure 3F, but improved for Year 7 numeracy.

Figure 3F
Percentage of Year 5 students reaching the national numeracy benchmark *(a)*



Note: (a) The 95 per cent confidence interval around the percentage of students achieving the benchmarks is indicated for each result.

Source: Victorian Auditor-General's Office, from Ministerial Council on Education, Employment, Training and Youth Affairs data.

In 2008 the National Assessment Program testing of literacy and numeracy at Years 3, 5, 7 and 9 replaced the state and territory testing. The proportion of Victorian students (from all school sectors) achieving the new national minimum standards was above the national average in every test and at every year level. Victoria generally had the smallest proportion of students not achieving the minimum standards and often had the largest proportion of students achieving at the highest levels.

The national benchmarks and the NAPLAN results are not comparable with the more challenging learning standards expected of Victorian students. Nor is it possible to isolate the performance of the Victorian Government school sector from published data.

International benchmarks

The Organisation for Economic Cooperation and Development's (OECD) Programme for International Student Assessment (PISA) testing of 15-year-olds commenced in 2000 and is repeated every three years. Australia consistently performs well, although better for literacy than for numeracy (called mathematical literacy by the OECD).

The PISA 2006 testing results showed that the Victorian average achievement was similar to the national average for both literacy and numeracy. The number of Victorian students achieving at the highest level was below the national average for literacy and numeracy.

Although it can be harder for good performers to keep improving, between 2000 and 2006 some high-performing countries such as Korea and Hong Kong (China) continued to improve their literacy performance. Australian performance in literacy declined over the same period and performance in numeracy remained the same. Victorian performance remained unchanged for both literacy and numeracy.

3.4 2003 audit of literacy achievement

In 2003 the Auditor-General tabled a report, *Improving Literacy Standards in Government Schools*. The audit concluded that there had been some improvement for the lowest performing students in Years 3 and 5, and for students participating in the key literacy initiatives. However, from 1996 to 2002 there had been little improvement in statewide reading achievement at Years 3, 5 and 7.

The audit recommendations addressed a range of issues – the absence of a unique student identifier or number, flawed assessment practices, the need for targeted funding, barriers to evaluating the impact of programs, and control weaknesses in the assessment processing systems.

3.5 Audit objective and scope

The objective of this audit was to determine whether student literacy and numeracy achievements were improving in Victoria's government schools.

The audit examined DEECD's activities since 2003 to improve literacy in government schools, and their impact on student achievements relative to the achievement levels set for each school year.

The audit analysis relied on state data. The national benchmark data represented minimum standards and did not disaggregate the government, Catholic and independent school sectors. In concentrating on student average achievement, the audit did not examine the performance of special interest cohorts such as students from language backgrounds other than English, Indigenous students, students with disabilities or the influence of gender.

Specific literacy and numeracy activities and their impacts on individual student achievement were not examined in detail but the audit did examine the results of reviews and evaluations of these initiatives and programs undertaken by DEECD.

The audit also reviewed any actions DEECD and VCAA took in response to our 2003 audit recommendations and the results achieved.

A description of the audit method is provided in Appendix B.

4 Literacy and numeracy assessments

At a glance

Background

The Department of Education and Early Childhood Development and the Victorian Curriculum and Assessment Authority used four assessments to measure student literacy and numeracy achievement between 1998 and 2007: Assessment of Reading (AoR), teacher judgments of student progress, Achievement Improvement Monitor (AIM) and Victorian Certificate of Education (VCE). These assessments varied in their purpose, conduct and continuity.

This part of the report examines the strengths and limitations of the four assessments in showing long-term trends in student achievement, and the important implications of these strengths and limitations for the audit analysis.

Key findings

- While AoR indicated trends over time in students' ability to 'decode text', it assessed only one aspect of literacy and could be assessed differently by different teachers.
- Teacher judgments assessed student progress across the whole year, rather than at just one point in time, but had less value for indicating trends over time as the data sets were not continuous between 1998 and 2007 and there was a narrow distribution of student achievement at each year level.
- AIM provided a good indication of trends over time, but was less reliable for the highest- and lowest-achieving students.
- Although the standardised VCE results could not be used to indicate changes in state average achievement over time, the 'adjusted score', which compares the VCE results with the General Achievement Test results, could be used for this purpose.
- AIM and VCE adjusted score results were considered most useful for showing trends in student achievement over time, particularly because students were assessed in the same way in every school and the results were consistent and continuous.

4.1 Introduction

The audit analysis of student literacy and numeracy achievement from 1998 to 2007 used the statewide data collected by the Department of Education and Early Childhood Development (DEECD) and the Victorian Curriculum and Assessment Authority (VCAA).

These data were collected through four assessments:

- Assessment of Reading (AoR)
- teacher judgments of student progress
- Learning Assessment Program (LAP), which became the Achievement Improvement Monitor (AIM)
- Victorian Certificate of Education (VCE).

The assessments are summarised in Figure 4A.

Figure 4A
Summary of assessments used in the audit analysis of student achievement from 1998 to 2007

Year of school	Assessment		Purpose of assessment	Description of assessment	Data period
	Literacy	Numeracy			
Prep to Year 2	AoR	—	Accountability measure for expenditure of Early Years Literacy funding	Decoding text at different levels assessed by teachers listening to students read in a **semi-standardised** process	1998–2007
Prep to Year 10	Teacher judgments *(a)* • Reading • Writing • Speaking and Listening	Teacher judgments *(b)* • Number • Measurement • Chance and Data • Algebra/Structure	Reporting student progress to parents against the curriculum standards	**Professional judgments** made by the teacher about a student's progress against the curriculum standards	1998–1999 (CSF curriculum) 2000–2006 (CSFII curriculum) 2006-2007 (VELS curriculum)
Years 3, 5, 7 and 9	LAP/AIM *(c)* • Reading • Writing • Spelling	LAP/AIM • Number *(d)* • Mathematics	Reporting student standards to parents and as an accountability measure for school improvement	Statewide **standardised** pen and paper testing program using a common test across all students in the state at each year level	1999 LAP 2000–2007 AIM *(e)*
Year 11 and 12	VCE • English • English Language • English as a Second Language	VCE *(f)* • Further Maths • Maths Methods • Specialist Maths	Certified statement of completion of 13 years of state schooling	Combination of **semi-standardised** school-assessed coursework and **standardised** external exam(s)	1998–2007

Note: (a) The Curriculum and Standards Framework (CSF) was replaced by the Curriculum and Standards Framework II (CSFII) in 2000 and this was replaced by the Victorian Essential Learning Standards (VELS) in 2006, although 50 per cent of schools continued to assess students against the CSFII that year.
(b) The areas of numeracy assessed changed over time. Number: Prep to Year 6 from 1998–2007 but Years 7 to 10 only from 2006–2007; Measurement: Prep to Year 6 from 1998–2006; Chance and Data: Years 7 to 10 from 1998–2006; Measurement, Chance and Data: Prep to Year 10 from 2006–2007; Algebra: Years 7 to 10 from 1998–2006; Structure: 2006–2007.
(c) The Learning Assessment Program (LAP) was replaced with the Achievement Improvement Monitor (AIM) in 2000 and measured Reading and Writing only. Spelling was introduced with AIM.
(d) Results for the Number items (which make up about half of all the Mathematics items) are reported only for Years 3 and 5.
(e) LAP/AIM was administered to Year 3 and 5 students only until 2000. Year 7 students started AIM in 2001 and Year 9 in 2006. AIM was replaced by the National Assessment Program—Literacy and Numeracy (NAPLAN) standardised national testing in 2008.
(f) A fourth study, Mathematical Methods Computer Algebra System, was new and had relatively low student enrolments, so results from this study were not used for the audit.
Source: Victorian Auditor-General's Office.

'Standardised' assessments were based on a common task undertaken by all students, had the same administrative guidelines and were interpreted in the same way. 'Semi-standardised' tests met the first two criteria of the standardised assessments, but the judging criteria could be interpreted in different ways by different teachers. 'Professional judgments' means that teachers made judgments of student performance against the common statewide curriculum (the CSF/VELS). Teachers did not necessarily use the same procedures or judging criteria.

This part of the report examines the particular strengths and limitations of the four assessments, as these had important implications for the approach adopted for the audit analysis. The results of the audit analysis are presented in part 5 and further detail is provided in Appendix C.

4.2 Student assessments

4.2.1 Strengths of the assessment data

The audit found strengths with each of the assessments, namely:

- **AoR** results can be used to judge whether Victorian students' ability to decode text has improved, declined or remained stable over time.
- **Teacher judgments** are an appropriate mechanism for reporting to parents on the student's efforts for the year as they assess a student's progress against the breadth of the English and maths curricula throughout a whole year of learning.
- **AIM** results provide a good indication of trends over time as AIM was designed to measure changes in state average achievement over time and results are reported on the same scale. VCAA statistically adjusts the scores each year by a process called 'equating', to ensure that changes in the state mean over time reflect a real change in performance. The size of the statewide data sets also means that the measurement error associated with the statewide means is very small.
- **VCE** results reflect a student's ability using both work throughout the year and point-in-time testing and can be compared with the results predicted for the student based on their general ability, as assessed by the General Achievement Test (GAT).

Students in Year 12 typically undertake a selection of studies offered through the VCE and/or the Vocational Education and Training in schools (VET in schools) programs. All these Year 12 students must do one of the three Year 12 VCE English studies. The study of Mathematics is not compulsory in Year 12 but many students elect to take one or more of the four Year 12 VCE maths studies. This audit analysed data for all students completing Year 12 VCE studies, including Year 11 students undertaking a Year 12 VCE study.

A growing number of Year 12 students are participating in a third program, the Victorian Certificate of Applied Learning, which includes studies in English and maths but does not assess student achievement, only whether or not they completed the course.

Nearly every student doing a Year 12 VCE study also sits the standardised GAT, which includes testing of a student's general ability in the areas of English and maths. The VCAA calculates a predicted result for each student in English and maths based mainly on the student's GAT result, along with student's gender and the average result of the student's classmates. The difference between the result predicted from the GAT and the actual VCE result, called the 'adjusted score', indicates how much better or worse a student is performing than could be expected given their ability.

The adjusted score is a total measure of a range of factors that potentially influence a student's results, such as the value the school has added, but also a student's environmental factors e.g., their level of motivation.

The adjusted scores can also be used to judge whether the government school system's impact on its VCE student results has increased, diminished or stayed the same for the period 1998–2007.

4.2.2 Limitations of the assessment data

All four assessments had characteristics that limited the extent to which they could be used by this audit to show trends over time.

The AoR:

- is only a limited assessment of literacy skills. While it assesses phonics (knowledge of the sounds and letters of the alphabet), it does not assess other aspects of literacy such as fluency, vocabulary, comprehension, writing, speaking or listening
- does not link to curriculum standards or to testing at later year levels, such as the AIM testing at Year 3.

Teacher judgments:

- do not have continuous data sets between 1998 and 2007 because the curriculum changed twice; and the aspects of numeracy assessed in this way have also changed
- have a very narrow data distribution, indicating that they were made against insufficient curriculum progression points for accurately differentiating student achievement, i.e., students working within a term above or below the typical level could all be given the same score, even though their individual achievement could vary by up to six months. Moreover, the progress of the highest- and lowest-achieving students is not measured well as teachers tend to be conservative in their judgments
- are not made against standardised criteria.

A further issue relevant to the AoR and teacher judgment assessments was that data were collected centrally only by year level for each school, and not for each student.

AIM:

- is less reliable for the components of the tests that are assessed using only a few questions. For example, of the English components Reading is the most reliable, and Spelling the least. Of the maths assessments, Mathematics is more reliable than Number
- provides less reliable results for the highest- and lowest-achieving students
- does not provide a continuous scale from Year 3 to Year 9, so it is only possible to comment on students' progress (or growth) between Years 3 and 5 and again between Years 7 and 9.

In 2008 AIM was replaced with the national literacy and numeracy tests (NAPLAN). Unlike the AIM results, the NAPLAN results are not comparable to the Victorian curriculum and expected standards of learning and this will be the case until a national curriculum is adopted. In the interim, teacher judgments become the sole source of statewide data assessing Years 3 to 10 students against the Victorian standards.

VCE:

- does not indicate changes in student achievement over time, due to the standardisation process.[1] Thus, while in any one year the VCE results indicate whether performance is better or worse than the fixed state mean of 30 (standardised mean), they do not indicate whether standards have improved, declined or remained stable over time.

The other critical deficiencies identified by the audit in the suite of assessments were that:

- there is no standardised numeracy assessment data for all students in Prep to Year 2, although there is a semi-standardised literacy assessment
- there is no system-wide assessment of students' literacy and numeracy skills on entry to school, against which their progress could be measured.

4.2.3 Unique student numbers

There is no system of unique student numbers for identification of school students. This limits the value of the student achievement data in the following ways:

- It is hard to track the progress of individual students, particularly when students change schools.
- The growth in achievement that students make over time and the extent to which schools maximise this cannot be monitored at a system-wide level.
- It is difficult to measure the immediate and longer-term effectiveness of DEECD's programs and initiatives, on both individual student achievement and state average student achievement.

[1] The spread of VCE results for all Victorian students (government, Catholic and independent sectors) in any one year is adjusted to have a mean of 30 and a standard deviation of seven.

- The impact of changes in student enrolments and demographics between school sectors and between DEECD regions cannot be measured.
- Individual students in need of extra help with literacy or numeracy cannot be readily identified across the system.

4.3 Conclusion

Between 1998 and 2007, to identify student achievement, DEECD and VCAA used a suite of assessments across all years of schooling that included both point-in-time tests and more holistic assessments of student progress across a year of learning. The usefulness of the assessments for our analysis of trends in student achievement over time was limited by the differing characteristics of the assessments and gaps in the assessments.

Audit considered the two most reliable measures of statewide literacy and numeracy achievement over time were:

- LAP/AIM Reading and Mathematics results at Years 3, 5, 7 and 9
- VCE adjusted scores for English (combined results for the three studies) and Mathematics (Further Maths, Maths Methods and Specialist Maths) for VCE students at Years 11 and 12.

For the early years of schooling (Prep to Year 2), the audit used teacher judgment and AoR data because there was no AIM testing at those levels.

The implications of the limitations and gaps in the assessments for future data collection and recommended improvements are discussed in part 7.

5 Literacy and numeracy achievements since 1998

At a glance

Background

This part of the report provides an overview of the results of our analysis of student literacy and numeracy achievement data from 1998 to 2007.

The audit analysis relied primarily on the results of teacher judgments and Assessment of Reading for Prep to Year 2; Achievement Improvement Monitor (AIM) Reading and Mathematics testing at Years 3, 5, 7 and 9; and Victorian Certificate of Education (VCE) adjusted scores at Years 11 and 12.

Key findings

- There were some improvements in statewide average literacy achievement between 1998 and 2007, notably by students in their early years of schooling in one aspect of literacy.
- Students generally performed less well in numeracy than in literacy and for numeracy there were more indications of declining than improving performance.
- Some smaller improvements were made by primary school students in literacy and in one aspect of numeracy. Most other gains were slight.
- Fewer improvements were evident for secondary students and, as students progressed through school from Year 3 to Year 9, their literacy performance dropped further below the expected level each year.
- The average literacy and numeracy achievement of VCE students was consistently below the standardised mean, with little improvement evident over time, and below the achievement of non-government students.
- Some moderate improvements in literacy were made by students from low-socio-economic status (SES) schools and regions but rarely for numeracy and large divides between their achievements and those of their high-SES counterparts remain.
- Average achievement in some non-metropolitan regions, which were all low-SES regions, had declined for both literacy and numeracy.
- Some moderate improvements in literacy were made by both the lowest- and highest-achieving students but rarely for numeracy.

5.1 Introduction

We analysed the statewide data sets collected by the Department of Education and Early Childhood Development (DEECD) and the Victorian Curriculum and Assessment Authority. An overview of the assessments used to collect these data is provided in Figure 4A.

The assessments have been designed to serve different purposes and as a result some were better suited to showing long-term trends than others. For the audit analysis, we relied primarily on the results of:

- Achievement Improvement Monitor (AIM) Reading and Mathematics testing at Years 3, 5, 7 and 9
- Victorian Certificate of Education (VCE) adjusted scores for VCE students in Years 11 and 12.

As these data sets do not capture Prep to Year 2, the results from the following data sets were used:

- teacher judgments of student achievement
- the Assessment of Reading (AoR).

In addition to identifying trends in student achievement over time, the state average student performance was compared against the expected curriculum level—the expected median Victorian Essential Learning Standards (VELS) / Curriculum Standards Framework (CSF) level—at each year level, except for VCE students. While it is expected that the achievement of an individual student will fall within a range either side of the standard or progression point relevant to their year level at school, the state average is compared to the median level of achievement expected for that year level, rather than to a range of achievement around the median level.

The results for VCE students were compared to the standardised mean across all school sectors of 30.

Our analysis of statewide average trends was broken into three components:

- literacy achievement
- numeracy achievement
- achievement for three sub-groups of interest:
  - students from high- and low-SES schools
  - students from the nine DEECD regions
  - students with high and low achievement.

Further detail, including results from all assessment types, is provided in Appendix C.

Between 1998 and 2007 the number of students in government schools increased by 3 per cent, although the sector's share of all school enrolments declined by 2 per cent, to 64 per cent. Over the same period the number of students in non-government schools rose by 13 per cent and the sector's share of school enrolments increased by 2 per cent to 36 per cent of all students. These trends were more marked at Years 11 and 12, where 4 per cent of students moved from the government to the non-government sector over this period.

These changes may have influenced the average achievement of government school students but this was difficult to ascertain in the absence of a unique student number system.

5.2 Trends in average literacy achievement

5.2.1 Overall findings

Overall, there were some improvements in statewide average literacy achievement between 1998 and 2007: some of these gains were substantial; most were slight.

The main trends identified were:

- The most substantial improvements were made by students in Prep to Year 2 for the reading skill called 'decoding text'. These improvements followed closely on the introduction of the Early Years Literacy Program in 1997. Moderate improvements were also recorded in the teacher judgment data for Prep to Year 2.
- Slight improvements were made in later primary years, through to the start of secondary school (Year 7). However, literacy achievement then declined during secondary school. Average student performance dropped further below the expected level for each year level as students progressed from Year 3 to Year 9.
- The growth in literacy skills of individual students from Year 3 to Year 5 was lower than that recorded for students between Years 7 and 9 and declined over time.
- No improvement was evident for students in their final years of schooling (Years 11 and 12), who were slightly below the standardised mean.

5.2.2 Specific findings

The changes in the literacy achievements of students in the early years of schooling (Prep to Year 2) over the period 1998 to 2007 are summarised in Figure 5A.

Figure 5A
Summary of trends in statewide average student literacy achievement in the early years of schooling, 1998–2007

School year	Assessment	Literacy trend	Comments
Prep to Year 2	Teacher judgments	Moderate improvement	Average achievement improved by around one term of learning and remained above the expected level
	AoR	Substantial improvement	The proportion of students reading at the expected level increased between 1998 and 2003 by 20 per cent at Prep and 10 per cent at Year 2, but no further improvement occurred from 2004 to 2007

Source: Victorian Auditor-General's Office.

The AoR results reflect a common trend where performance improves rapidly following the introduction of a new program but then plateaus, and a new approach is required to improve performance beyond that plateau.

In the middle years of schooling (Years 3 to 10), improvements in student literacy achievement were much smaller (Figure 5B).

Figure 5B
Summary of trends in statewide average student literacy achievement in the middle years of schooling, 1999–2007

School year	Assessment	Literacy trend	Comments
Year 3	AIM	Slight improvement	Average achievement fluctuated but improved very slightly overall to be almost half a term above the expected level by 2007
Year 5	AIM	Slight improvement	Average achievement fluctuated and although it improved very slightly, average achievement was almost one term of learning below the expected level
Year 7	AIM	Slight improvement	Average achievement improved by around half a term between 2001 and 2004 to be half a term below the expected level, but has fluctuated since
Year 9*(a)*	AIM	n/a	Average achievement was more than one term below the expected level
Growth Year 3 to 5	AIM	Slight decline	The extent to which a student's literacy skills developed between Year 3 and Year 5 was below the amount expected (at one and three quarter years of learning compared to the expected two years of learning) and declined slightly
Growth Year 7 to 9*(a)*	AIM	n/a	The extent to which student skills developed was closer to the expected two years of learning

Note: (a) As only two years of data were available, achievement trends were not evident.
Source: Victorian Auditor-General's Office.

As students progressed from Year 3 to Year 9, their literacy performance dropped further below the expected level each year. This could reflect a real, relative drop in performance, or it could be that less demanding benchmarks have been set at the lower year levels and/or more demanding benchmarks have been set at the higher year levels.

However, where we could track the progress of individual students over time—from Year 3 to Year 5—the growth achieved in literacy skills had declined, indicating a real drop in performance between Years 3 and 5 over time. The progress of individual students could also be compared between Year 7 and Year 9 but there was insufficient data to identify a trend in growth between these years.

In the later years of schooling (for VCE students in Years 11 and 12) student literacy declined slightly (Figure 5C).

Figure 5C
Summary of trends in statewide average student literacy achievement in the later years of schooling, 1998–2007

School year	Assessment *(a)*	Literacy trend	Comments
Years 11 and 12	VCE	No change	Average achievement was slightly below the state average
	Adjusted score	Slight decline	Actual achievement was slightly below that predicted and declined relative to the predicted score from around 2000

Note: (a) Results in the three VCE English studies (English, English Language and English as a Second Language) were combined to provide one indicator of literacy achievement.
Source: Victorian Auditor-General's Office.

The average achievement of VCE students from government schools was consistently slightly below that of the non-government schools.

5.3 Trends in average numeracy achievement

5.3.1 Overall findings

Our analysis showed that moderate gains were made by primary school students in one set of maths skills (called Number). However, across the different numeracy skills assessed, there were more indications of declining rather than improving performance.

The main trends identified were that:

- Student achievement in Number showed some noticeable improvements between 1999 and 2007 (results only available for Years 3 and 5), while the teacher judgment data for Prep to Year 2 students showed slight improvements.
- Student numeracy declined in the other areas of maths (e.g., Space; Measurement, Chance and Data; Structure; and Working Mathematically) in Years 3 to 9. Numeracy also declined overall in Years 11 and 12, although achievement in the more difficult maths studies improved. Declining enrolment in the two advanced maths studies at Years 11 and 12 was another concern.
- Performance declined more in the secondary school years than in the primary years. Average student performance also dropped further below the expected level for each year level from Year 3 to Year 9.

It was difficult to identify an overall pattern for numeracy at VCE level because there were three optional maths studies of differing levels of difficulty and enrolments in each varied over the period.

5.3.2 Specific findings

Changes in the numeracy achievements of students in the early years of schooling (Prep to Year 2) over the period 1998 to 2007 are summarised in Figure 5D.

Figure 5D
Summary of trends in statewide average student numeracy achievement in the early years of schooling, 1998–2007

School year	Assessment	Numeracy trend	Comments
Prep to Year 2	Teacher judgment	Slight improvement	Average achievement improved by around half a term of learning to be more than half a year of learning above the expected level

Source: Victorian Auditor-General's Office.

Students in the middle years of schooling (Years 3 to 10) did less well in numeracy compared with students in the early years (Figure 5E).

Figure 5E
Summary of trends in statewide average student numeracy achievement in the middle years of schooling, 1999–2007

School year	Assessment	Numeracy trend	Comments
Year 3	AIM	Mixed results	Average achievement improved by almost one term for Number to be a term of learning above the expected level, but fell slightly for Mathematics to be almost half a term below the expected level
Year 5	AIM	Mixed results	Average achievement improved moderately for Number (by around one term of learning) to be just below the expected level whereas achievement in Mathematics changed little, remaining more than one term below the expected level
Year 7	AIM	Slight decline	Average achievement declined by almost half a term of learning prior to 2007 and was almost two terms or half a year of learning below the expected level
Year 9*(a)*	AIM	n/a	Average achievement was around three terms of learning below the expected level
Growth Year 3 to 5	AIM	Slight decline	The amount by which a student's numeracy skills developed between Year 3 and Year 5 was only one and three quarter years of learning compared to the two years of learning expected
Growth Year 7 to 9*(a)*	AIM	n/a	Slightly less growth was achieved between Years 7 and 9 relative to the growth that occurred between Years 3 and 5

Note: (a) As only two years of data were available, achievement trends were not evident.
Source: Victorian Auditor-General's Office.

Primary school students (Prep to Year 6) consistently performed better in Number than in the other areas of numeracy. This is not surprising, as Number is a focus area for maths teachers as the concepts learnt in Number are foundational to the development of concepts in other areas of numeracy.

As students progressed from Year 3 to Year 9, declining trends became more common. The average achievement level of students also dropped further below the expected level with each year level from Year 3 to Year 9 and, as with literacy, the amount of growth in learning made by students between Year 3 and Year 5 declined over time.

In the later years of schooling (Years 11 and 12), student numeracy declined slightly over the period (Figure 5F).

Figure 5F
Summary of trends in statewide average student numeracy achievement in the later years of schooling, 1998–2007

School year	Assessment	Numeracy trend	Comments
Years 11 and 12	VCE	Slight decline	Average achievement declined overall, to be slightly below the state average, although achievement in the two advanced maths studies showed improving trends
	Adjusted score	Slight decline	Actual achievement declined relative to the predicted score prior to 2006 and was slightly below that predicted

Source: Victorian Auditor-General's Office.

The overall decline in numeracy masked improving trends for the two advanced maths studies. The overall decline occurred alongside an overall decline in enrolments in VCE maths studies since 2003, which was primarily in the two advanced maths studies. The combination of decreasing enrolments in advanced maths and improving trends for these studies indicates that, increasingly, only the more able students are taking these studies.

As was the case for literacy, the average numeracy achievement of government school VCE students was consistently below that of the non-government students. The migration of students to the non-government sector may have affected these results.

The adjusted scores indicate that, in general, the government school system is adding little value to the literacy and numeracy achievements of its VCE students.

5.4 Trends in achievement for students from key sub-groups

5.4.1 Performance of students from low- and high-socio-economic status schools

The audit examined the trends in performance over the period 1998 to 2007 for the students from the 25 per cent of schools with the highest socio-economic status (SES) and the students from the 25 per cent of schools with the lowest.

Overall finding

Our analysis found that the achievement gap between students from low- and high-SES schools was wide at all year levels for both literacy and numeracy, and the gap did not narrow over time.

Specific findings

Figure 5G summarises general patterns in numeracy and literacy achievement data for students from low- and high-SES schools.

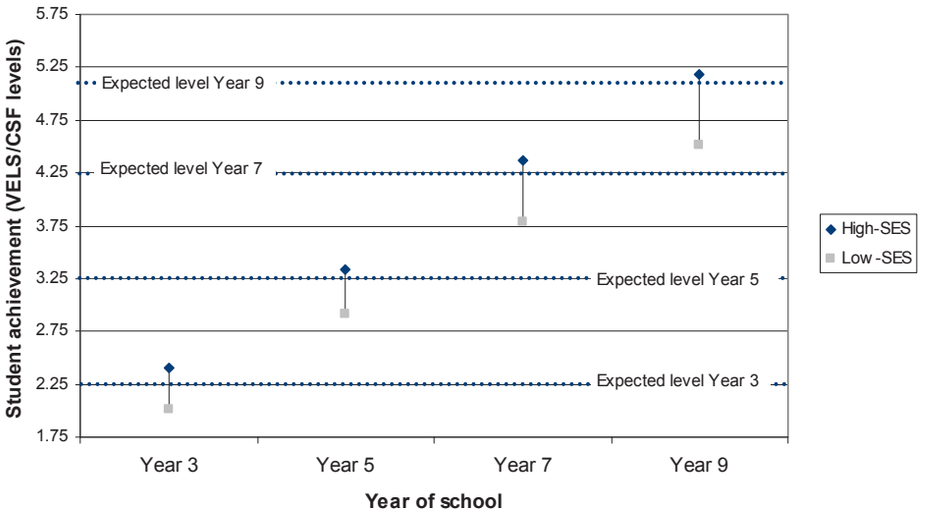
Figure 5G
Trends in literacy and numeracy achievement for students from low- and high-SES schools, 1998–2007

School year	Literacy trend	Numeracy trend	Comments
Early Years Prep to Year 2	No change	No change	There was a large gap between students from low- and high-SES schools which did not narrow over time
Middle Years Years 3 to 10	Moderate improvement	No change	Literacy of Years 5 and 7 students from low-SES schools improved by half to one term of learning, as it did for Year 7 students from high-SES schools Students from low-SES schools experienced more growth in literacy skills than students from high-SES schools between Years 3 and 5
Later Years Years 11 and 12	Slight decline	Mixed results	Literacy of students from low-SES schools declined slightly more than for students from high-SES schools Numeracy overall improved for students from high-SES schools. It improved for students from low-SES schools in the easier maths but students did not do as well as predicted for advanced maths There was a substantial gap in achievement between students from low- and high-SES schools for both literacy and numeracy

Source: Victorian Auditor-General's Office.

Students from low-SES schools were up to a year or more below the achievement level of their counterparts from high-SES schools for both literacy and numeracy. This is illustrated for numeracy (2007 AIM Maths results) in Figure 5H.

Figure 5H
Average AIM Mathematics achievement by school year level and SES group (low and high), 2007



Source: Victorian Auditor-General's Office, from VCAA data.

Figure 5H also shows that the achievement gap widened as students progressed through school from Years 3 to 9.

If school SES had no influence on achievement, we would expect that students from the 25 per cent of schools with the lowest SES would be equally represented among the low- and high-achieving students. However, students from the 25 per cent of schools with the lowest SES were over-represented amongst the lowest-achieving students (comprising 33 per cent of the total number, not the 25 per cent expected). They were also under-represented amongst the highest-achieving students (comprising 15 per cent of the total number, not the 25 per cent expected).

International research

In 2006 the OECD ranked Australia 14th out of 29 countries for the extent to which students with the lowest maths achievement come from low-SES backgrounds.

In Australia students with the lowest maths achievement were 3.2 times more likely to be from low-SES backgrounds. Countries doing better included Iceland (with the lowest likelihood, at 2.1 times more likely) and Canada (2.7 times more likely).

5.4.2 Performance of students across DEECD regions

Government schools are located in nine education regions across the state:

- four metropolitan—Eastern, Northern, Southern and Western
- five non-metropolitan—Barwon South-Western, Hume, Loddon Mallee, Gippsland and Grampians.

The audit examined the extent to which student achievement over the period 1998 to 2007 varied between the DEECD regions. We recognise however, that the performance of regions over time is likely to have been affected by demographic change. For example, students moving from the government to non-government school sector.

Overall findings

Our analysis found large gaps in achievement between the regions. These widened as students progressed from Year 3 to Year 9. The Eastern region consistently outperformed all others. Eastern was also the only region with a high SES, based on the average SES of the schools in the region.

There were some improvements for students in the low-SES metropolitan regions, suggesting that initiatives targeting students in low-SES schools may have had an impact. This was not the case for students from non-metropolitan regions, where many examples of declining performance were recorded.

Specific findings

Eastern was the only region that performed above the expected level for both literacy and numeracy and the gap between it and the other regions was substantial (Figure 5I).

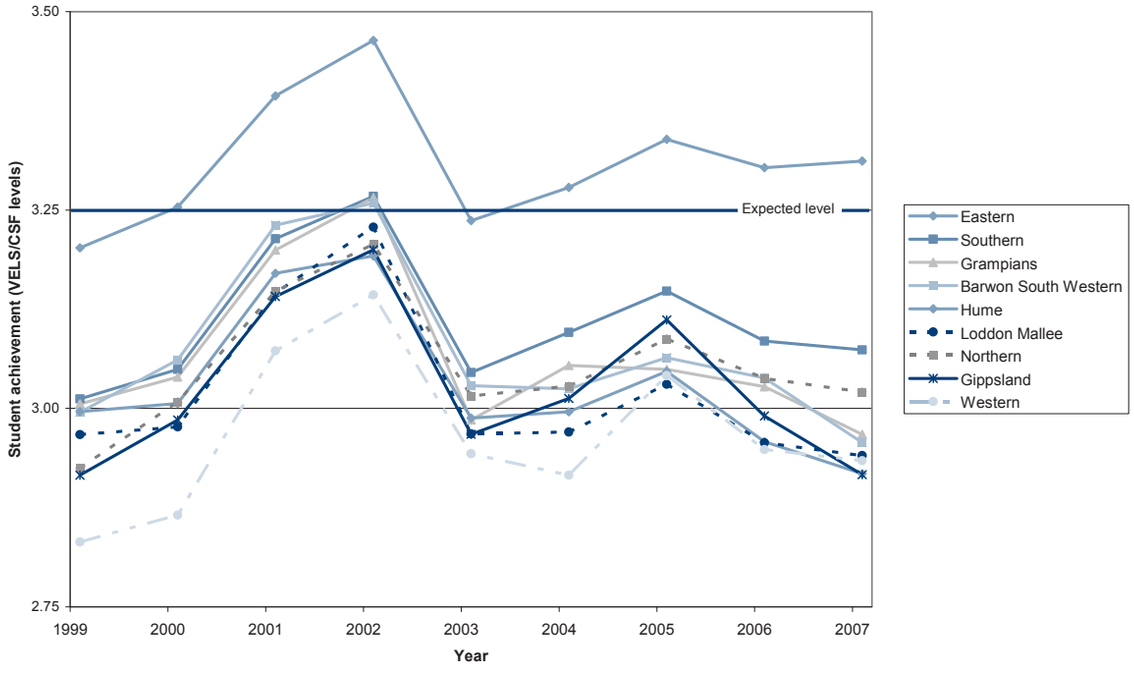
Figure 5I
Trends in literacy and numeracy achievement for DEECD regions, 1998–2007

School year	Literacy trend	Numeracy trend	Comments
Early Years Prep to Year 2	Moderate improvement	Moderate improvement	Eastern region (high SES) was the best-performing region for both literacy and numeracy
			For both literacy and numeracy, the gap between Eastern and the lowest-performing region remained around one term of learning
			For both literacy and numeracy, achievement improved by an average of one term of learning across all regions
Middle Years Years 3 to 10	Mixed results	Mixed results	Gap between Eastern and other regions was around three terms of learning
			Better growth occurred for some lower-SES regions (e.g., Northern and Western) than for Eastern in literacy and numeracy
Later Years Years 11 and 12	Slight decline	Mixed results	Gap between Eastern and other regions was large
			Most low-SES regions declined or remained steady for numeracy except for Western and Southern, which both improved
			Slight decline in average literacy achievement for lower-SES regions, although Northern and Western both did better than predicted

Source: Victorian Auditor-General's Office.

Some encouraging improvements were identified in the other metropolitan regions, but performance trended downwards in some of the non-metropolitan regions for both literacy and numeracy. These patterns are illustrated in Figure 5J for numeracy (Year 5 AIM Mathematics).

Figure 5J
Year 5 AIM Mathematics achievement, by region, 1999–2007



Source: Victorian Audit-General's Office, from VCAA data.

Eastern region's superior performance is related to SES. It is the only region with a high SES, as indicated by a low rating on DEECD's Student Family Occupation index (SFO). The average SFO rating for Eastern is 0.35 compared with a range of 0.48 to 0.56 in the other eight regions.

Our analysis found some improvements for students in low-SES regions that were not apparent in the average performance data. This suggests that some activities targeting students in low-SES schools have had an impact, but only in a few regions and not to such a degree that it influenced the state average achievement.

5.4.3 Performance of the lowest- and highest-achieving students

The audit examined the extent to which trends for the lowest- and highest-achieving students improved between 1998 and 2007.

Overall finding

Our analysis found that the lowest-achieving students were well behind their high-achieving counterparts. There were, however, encouraging signs of improvement among the lowest-achieving students in literacy though not in numeracy and amongst the highest-achieving students in numeracy but not literacy.

Specific findings

For both numeracy and literacy, the lowest-achieving students were around two years of learning behind the highest-achieving students but gradual improvements were evident in the literacy skills of the lowest-achieving students at Years 3, 5 and 7 (Figure 5K).

Figure 5K
Trends in literacy and numeracy achievement for the lowest- and highest-achieving students, 1998–2007

School year	Literacy trend	Numeracy trend	Comments
Early Years Prep to Year 2	n/a *(a)*	n/a *(a)*	For both literacy and numeracy, the proportion of students in the low-achieving group grew from almost zero in Prep to 5 per cent in Year 2 For both literacy and numeracy, the proportion in the high-achieving group ranged between 2 and 9 per cent of students and changed little between Prep and Year 2
Middle Years Years 3 to 10	Moderate improvement (low-achievers)	Moderate improvement (high-achievers)	Literacy skills of the low-achieving students improved by close to one term of learning at Year 3 but there was no change for the high-achieving students For literacy, 25 per cent of Year 3 students were in the low-achieving group (11 000 students) and this increased to 37 per cent (14 800 students) by Year 9. The proportion of students in the high-achieving group fell, from 34 per cent at Year 3 (14 800 students) to 21 per cent at Year 9 (10 000 students) Numeracy skills of the high-achieving students improved by up to almost half a year of learning at Year 5 but there was no change for the low-achieving students For numeracy, there were 20 000 students in the low-achieving group by Year 9, compared to 11 000 in Year 3, and only 5 600 in the high-achieving group by Year 9, compared to 10 500 in Year 3
Later Years Years 11 and 12	No change *(b)*	No change *(b)*	Literacy achievement did not change for either the high-achieving group (12 per cent of VCE students) or low-achieving group (24 per cent of VCE students) Numeracy achievement did not change for either the high-achieving group (14 per cent of VCE students) or low-achieving group (23 per cent of VCE students)

Note: *(a)* The method for analysing performance groups could not be used on the teacher judgment data collected under the CSF, and there were insufficient data collected under the VELS to establish trends.
(b) As the performance groups for the standardised VCE data are one standard deviation either side of the mean, whether the VCE results or the adjusted scores were used the proportions of students in each group remained the same.

Source: Victorian Auditor-General's Office.

5.5 Conclusion

Despite the limitations with the suite of assessments for the purpose of our analysis of long-term trends, they are, nonetheless, valuable for monitoring student achievement.

Over the 10-year period to 2007, DEECD's efforts have not resulted in a marked improvement in average literacy and numeracy achievement across age groups but have had some small to moderate impacts for the particular sub-groups examined for this audit. Students generally performed less well in numeracy than in literacy, with average student performance often further below the expected level, and with fewer improving trends apparent.

The improvement in the ability of Prep to Year 2 students to recognise written words was encouraging, although there is not data to confirm whether word comprehension also improved. It demonstrated that the program introduced just prior to these improvements worked in the area of achievement to which it was directed. This result also demonstrates that big gains can be generated at a system-wide level. The improvements for Number were also encouraging.

The improvements in literacy and numeracy made by students in the early years of schooling were not sustained as they progressed through schooling.

6 Ways to improve literacy and numeracy

At a glance

Background

This part of the report examines the initiatives undertaken by the Department of Education and Early Childhood Development (DEECD) to improve student achievement in literacy and numeracy, and the future actions that we consider now need to be taken to achieve this aim.

Key findings

- DEECD has invested significantly in initiatives to improve literacy since 1998 but has not routinely evaluated the system-wide effectiveness of this support.
- Support to improve numeracy has been limited. In particular there is no early intervention program for students struggling with numeracy in the same way that there is for literacy.
- Resourcing for initiatives to address social disadvantage in literacy and numeracy achievement appears inadequate to address the large achievement deficit of students from low-socio-economic status (SES) schools.
- Programs that target schools with low literacy and numeracy achievement rather than low-achieving individual students are missing another category of students achieving well below the expected level.
- There are no intervention programs to sustain literacy or numeracy support through the middle years of schooling for individual students in need.

Key recommendations

- DEECD should adopt a stronger focus on numeracy by introducing an early intervention strategy for students struggling with numeracy and strengthening support for mathematics teaching **(Recommendation 6.1)**.
- DEECD should more specifically address the performance gap between high- and low-SES schools **(Recommendation 6.2)**.
- DEECD should address the declining literacy and numeracy achievement in some non-metropolitan regions, and build on the successful work of the low-SES metropolitan regions **(Recommendation 6.3)**.
- DEECD should improve targeting of and sustain support for students achieving well below the expected level in literacy and numeracy **(Recommendation 6.4)**.

6.1 Introduction

Based on the student achievement results and the Department of Education and Early Childhood Development's (DEECD's) evaluations of literacy and numeracy initiatives, the audit has identified the following four key areas for improvement:

- work smarter to improve literacy
- greatly strengthen support for numeracy
- reduce the influence of social disadvantage
- sustain support for low-achieving students.

This part of the report examines, in relation to each key area, the improvement initiatives that have been taken by DEECD over the decade to 2007 and their impact, new initiatives in 2008 and the future actions which we consider need to be pursued by DEECD to effect improvements.

6.2 Support for literacy

6.2.1 Initiatives since 1998 to improve literacy

Victoria has invested significantly in initiatives to improve literacy over the last decade, namely:

- a system-wide Early Years Literacy Program, operating since 1997
- funding for one-on-one intervention programs for the lowest performing 20 per cent of Year 1 students in each school, in place since 1985
- a number of initiatives aimed at schools with poor literacy achievement—e.g., Restart, which employed additional teachers for Year 7 students with poor literacy achievement in 100 schools (2002–2004), and the Literacy Improvement Teams coaching initiative for teachers of Years 3 to 8 (2007 to present)
- initiatives to support middle years students in all schools in key areas including literacy—e.g., the Middle Years Reform Program (2001–2003), aimed at improving literacy and increasing attendance in all secondary schools
- additional support for teachers through the English Developmental Continuum that links teaching strategies to the progression points and Victorian Essential Learning Standards (VELS) for English; professional development for literacy leaders; and online literacy professional learning resources for all teachers.

Additional initiatives targeted at improving schools with a range of performance challenges, including poor literacy and numeracy achievement, were the Targeted School Improvement initiative and diagnostic school reviews. Both commenced in 2004.

Since 2003 there has also been a renewed effort to improve learning outcomes through systemic improvements to the curriculum, school leadership, and teaching and learning. Professional development is also increasingly conducted in schools and within classrooms, based on evidence of the effectiveness of this approach.

A list of the major initiatives introduced since 1998 for literacy and numeracy is provided in Appendix A.

6.2.2 Impact of initiatives

Reviews and evaluations of the Early Years Literacy Program, Restart and the literacy teacher coaching initiative generally showed improved literacy achievement for the students involved.

Our 2003 audit and DEECD's review of the Early Years literacy and numeracy programs in 2004 identified some improvements in the literacy achievements of early years students. However, DEECD's 2004 review concluded that neither the literacy program nor the Reading Recovery intervention had been fully implemented seven years after their introduction. Nothing has been done since to evaluate their effectiveness.

DEECD's evaluations of Middle Years programs such as Restart showed some positive results, including improvements for students with the lowest achievement. DEECD's monitoring also indicates that the English Developmental Continuum is valued by schools.

In 2007, 800 primary and secondary schools, or around 50 per cent of all schools, participated in specific professional development for literacy leaders in schools. One thousand teachers participated, or 3 per cent of the teaching workforce. However, we found there had been no assessment of the extent to which this training and the online literacy professional learning resources available for all teachers were being used; and whether literacy teaching in classrooms was improving as a result.

6.2.3 New initiatives

In 2008, on the basis of encouraging interim evaluation results, DEECD extended the literacy teacher coaching initiative for a further three years. This is a positive move that gives schools and teachers a better chance to consolidate and sustain the new teaching practices introduced.

A potential constraint to expanding the initiative beyond the 45 coaches and 100 schools involved is the limited supply of expert literacy coaches. More than half of the 45 literacy coaches already work in schools as early or middle year's literacy coordinators or Reading Recovery teachers.

6.2.4 Future actions needed to improve literacy

Efforts to improve literacy achievement over the last 10 years have mostly led to only small improvements in the average achievement of students across the state. DEECD needs to improve evaluation of the contribution and ongoing effectiveness of its support for literacy in the early years. This issue is examined in more detail in part 7 of this report. Just as importantly, DEECD needs to sustain this support beyond the early years for students who need it. DEECD also needs to examine whether its approach to professional development in literacy for teachers is actually leading to improved classroom teaching practices.

6.3 Support for numeracy

6.3.1 Initiatives since 1998 to improve numeracy

In contrast to literacy, there has been considerably less investment in improving student numeracy achievements. This is demonstrated by:

- no intervention program for students struggling with maths at any year level
- no targeted initiative for schools with low numeracy achievements and dedicated solely to improving numeracy
- no standardised assessment of student numeracy in Prep to Year 2
- less targeted funding
- less professional development for numeracy leaders in schools
- about 50 per cent less time spent by schools on teaching numeracy in the early years.

DEECD developed the Early Years Numeracy Program out of the Early Numeracy Research Project (1999–2001) and introduced it to all schools in 2001, along with the Early Years Numeracy Interview. This was followed by research into middle years numeracy between 2003 and 2006, from which a number of teaching resources were developed.

Since 2006 DEECD has been increasing its system-wide and targeted support for improving student numeracy. Central to this is the Mathematics Developmental Continuum, which links teaching strategies to the progression points and VELS standards for maths. Additional support has primarily consisted of teaching resources and professional development programs, and the Fractions and Decimals Online Interview assessment tool for middle years students.

A list of the major initiatives introduced since 1998 for literacy and numeracy is provided in Appendix A.

6.3.2 Impact of initiatives

Evaluations of initiatives from the last 10 years that have included a numeracy focus—e.g., the Early Numeracy Research Project and Schools for Innovation and Excellence—identified numeracy improvements for participating students.

The Early Years Numeracy Interview was never introduced as a system-wide assessment tool in the same way that the Assessment of Reading was for literacy. Even after the online version was developed in 2006, it was only being used by around 25 per cent of primary schools. Following further modifications usage has increased to around 60 per cent of primary schools.

DEECD's annual survey of school principals indicates that the Mathematics Developmental Continuum is valued by schools. Support for maths teachers is also provided through professional development for secondary numeracy leaders. In 2007 this involved almost 300 teachers from 150 schools, or 2 per cent of secondary teachers in 50 per cent of schools. However the impact on numeracy teaching in their schools was not assessed.

6.3.3 New initiatives

The following initiatives were introduced by DEECD in 2008 to provide additional support for improving numeracy achievement:

- the two-year maths and science teacher coaching initiative, through which 153 coaches wholly or partly focused on maths are working in 274 government schools with poor numeracy results
- online numeracy professional learning for teachers
- the Fractions and Decimals Online Interview for Years 3 to 8
- three new maths and science specialist centres in secondary schools across Victoria
- 50 scholarships each year from 2008 to 2010 for maths and science graduates who train to teach in government schools.

The relatively low level of maths skills of some primary teachers and the correspondingly lower confidence of some in teaching maths, have contributed to often lower achievement in the subject at state and national levels compared with literacy in recent years. The national accreditation system being developed for pre-service teacher education programs should help remedy this achievement gap. Furthermore, in its 2008 *Blueprint for Education and Early Childhood Development* the Victorian Government has committed to negotiating with universities and the Commonwealth to improve pre-service teacher training, including targeting shortage areas such as mathematics.

The *Blueprint* also outlined plans for government partnerships with companies and businesses to prepare young people for careers in priority industries, including mathematics.

6.3.4 Future actions needed to strengthen support

The audit analysis indicated that DEECD's programs and initiatives appear to have had a statewide impact on teaching and learning in the Number skills area of numeracy, but at the cost of falling performance in other numeracy skills. Primary school students consistently perform better in Number than in the other areas of numeracy.

Number is a focus area for maths teachers as the concepts learnt in Number are foundational to the development of concepts in other areas of numeracy. This focus needs to be maintained, and a similar level of focus needs to be adopted for the other areas of numeracy to reverse declining performance.

Declining enrolment in the two advanced Victorian Certificate of Education (VCE) maths studies is also concerning. DEECD needs to investigate the cause and consider any policy implications.

Teachers have a very strong influence on student achievement. This influence is more critical for numeracy than for literacy, because literacy skills are developed through everyday activities as well as schooling, but numeracy skills are harder to learn outside of the classroom.

With the likely ongoing shortage of specialist maths teachers in schools, there is a need to strengthen support for teachers to further develop their knowledge and teaching strategies for maths and to select the right strategies to use. This work should focus on improving teachers' knowledge of the maths discipline, particularly in areas other than Number and be appropriate to the different stages in the development of students' mathematical understanding as they progress through school. DEECD needs to evaluate the effectiveness of its professional development in this area.

The declining numeracy results at several year levels point to an urgent need for early intervention followed by sustained support for students who need it.

6.4 Support to address social disadvantage

6.4.1 Initiatives since 1998 to reduce the influence of social disadvantage

DEECD's support over the last 10 years targeted at improving the literacy and numeracy achievements of students from low-socio-economic status (SES) schools has had a small positive effect on literacy and no effect on numeracy. Support for low-SES schools was primarily provided in the form of an equity funding component in the annual school funding package. Funding levels since 2003 are identified in Figure 6A.

Figure 6A
Funding for schools with low SES, 2003–2008
($million)

Funding source	2003	2004	2005	2006	2007	2008
Equity funding *(a)*	33.6	33.0	40.2	80.2	86.0	86.8
Primary Welfare Officers	0.2	6.2	13.5	15.9	16.4	18.4
Total	**33.8**	**39.2**	**53.7**	**96.1**	**102.4**	**105.2**

Note: (a) Funding is allocated through the Student Resource Package and schools have discretion over how best to use this funding to meet their needs.

Source: Victorian Auditor-General's Office, from DEECD data.

Funding is provided for Primary Welfare Officers who help schools respond to the wellbeing of students and their families. While funding to schools for the Restart literacy initiative was provided based on SES status as well as student achievement levels, it has been included as a component of the funding targeted to schools with lower achievement (Figure 6B).

The funding provided for schools with low SES represents around 3 per cent of the total core funding provided to government schools annually. Around half of the 1 500 government schools, excluding special and language schools, receive equity funding.

6.4.2 Impact of initiatives

DEECD's 2007 review of *The Use of Equity Funding to Improve Outcomes* found that almost twice as much equity funding was distributed to secondary students ($388 each) than to primary students ($215 each) in 2006. This is despite strong international evidence that, for students from disadvantaged backgrounds, the earlier the intervention, the greater the benefit.

DEECD's 2007 review also found that, of schools receiving equity funding, the most commonly reported use of funds was for literacy (74 per cent of schools). Use of equity funds to support numeracy improvement was the fourth most common strategy (63 per cent of schools), behind reducing student/teacher ratios and providing student welfare and support. Low-SES schools often found it difficult to target literacy assistance to particular students when so many in the cohort were struggling.

6.4.3 New initiatives

In 2008 DEECD addressed the influence of social disadvantage on student achievement by:

- providing 300 teaching assistants in low-SES secondary schools from 2008 (90 for three years and 210 for two years)
- extending the Primary Welfare Officer initiative by a further four years and employing 123 additional officers for three years.

DEECD needs to generate improvements across almost all regions to reduce regional variations in student performance. In 2008 DEECD began an investigation into how regions supported schools to implement literacy programs and initiatives with a view to building on the more effective practices. Similar work is needed for numeracy.

The 2008 *Blueprint* outlined plans for improving the achievements of disadvantaged groups in Victoria over the next five years. These include:

- establishing new partnerships with non-government schools to increase access to government support and resources, especially in school communities in low-SES areas
- engaging the support of companies and businesses with DEECD's current program for building new schools, merging schools and renewing existing schools in disadvantaged areas.

The OECD's 2007 report, *No More Failures—Ten Steps to Equity in Education*, acknowledged that interventions were important to compensate for the effects of social disadvantage. The report encouraged the use of concrete targets for equity and monitoring the progress of students involved in interventions. The new unique student number that DEECD plans to introduce in 2009 will enable individual students' progress to be monitored. There are, however, still no state targets for reducing social inequity in student learning achievements.

6.4.4 Future actions needed to address the influence of disadvantage

There is a significant need to improve the literacy and numeracy achievements of students from low-SES schools. Funding for initiatives to address social inequity in literacy and numeracy achievement is around 3 per cent of the total schools budget. This is very low in light of the large achievement deficit of students from low-SES schools. Some of DEECD's low-SES regions have shown that the achievement of students from low-SES schools can be improved. The challenge now is to expand this work effectively across all low-SES schools, and to set targets for reducing the SES gap.

6.5 Support for low-achieving students

6.5.1 Initiatives since 1998 to support low-achieving schools and students

Of the $3.2 billion funding to schools in 2008, $20.3 million, or 0.6 per cent of the total, was for literacy and numeracy programs targeted at schools with low achievement. Targeted funding for literacy and numeracy from 2003 to 2008 is shown in Figure 6B.

Figure 6B
Funding for literacy and numeracy initiatives in targeted schools 2003–2008 ($million)

Funding source	2003	2004	2005	2006	2007	2008
Literacy						
Restart	5.1	5.3	5.4	–	–	–
Literacy Improvement Teams	–	–	–	1.5	4.4	5.8
Sub-total	**5.1**	**5.3**	**5.4**	**1.5**	**4.4**	**5.8**
Numeracy						
Teaching and Learning Coaches (Maths and Science)	–	–	–	–	–	14.5
Sub-total	**–**	**–**	**–**	**–**	**–**	**14.5**
Total	**5.1**	**5.3**	**5.4**	**1.5**	**4.4**	**20.3**

Source: Victorian Auditor-General's Office, from DEECD data.

In addition to the funding targeted specifically at schools with low literacy and numeracy achievement, three other initiatives targeted schools with low student outcomes more broadly, which could include literacy and/or numeracy: the Middle Years Reform Program ($63 million between 2001 and 2003); Access to Excellence ($81.6 million between 2003 and 2005); and Targeted School Improvement ($7.6 million since 2004).

Despite DEECD indicating in its response to our 2003 audit that it would consider the need to target Early Years funding, nothing has changed.

There is no funding targeted directly at students with low literacy and/or numeracy achievements.

A range of programs and initiatives have been targeted at schools with low literacy and numeracy performance since 1998. Two of these, Restart and Literacy Improvement Teams, had a dedicated literacy focus:

- Restart operated from 2002 to 2004 to improve the literacy of Year 7 students in schools with poor literacy achievements
- Literacy Improvement Teams commenced in 2007 to support the professional development of teachers of students in Years 3 to 8 in schools with low literacy achievements.

There were no similar programs with a dedicated numeracy focus.

Other programs were directed to schools with a mix of performance issues that could include poor performance in literacy and numeracy as well as poor performance in other areas such as attendance and retention rates. Examples of these programs were Access to Excellence (2003–2005) and the Targeted School Improvement initiative (2004–present).

There were fewer programs and initiatives targeted at students with low literacy and numeracy performance. They were:

- Reading Recovery, to help Year 1 students with low literacy levels
- Mathematics Online Interview, to help primary school teachers identify their students' maths knowledge and skills.

6.5.2 Impact of the initiatives

While DEECD's evaluations showed there had been some improvements for students with the lowest achievement, the Access to Excellence evaluation identified that without planned data collection, learning outcomes were difficult to identify. The Targeted School Improvement interim evaluation concluded that it was too early to identify student learning outcomes from that initiative.

Interim evaluations of the Literacy Improvement Teams initiative showed improved results at Years 3 and 5 but no impact yet on students with lowest achievement. The number of students from Years 6 and 8 participating in the initiative was too small to produce conclusive results.

6.5.3 New initiatives

The most recent addition to the programs addressing schools with low literacy and/or numeracy achievement was the teacher coaching initiative for maths and science, introduced in 2008.

The Fractions and Decimals Online Interview also became available to schools in 2008 and is designed to improve middle years teachers' understanding of their students' knowledge and skills in this area of maths.

The 2008 *Blueprint* proposes employing new regional network leaders, within the next five years, to support low-performing schools more intensively.

6.5.4 Future actions needed to improve support

The challenge for DEECD is to build on the work that produced the small improvements in literacy and generate greater improvement in a larger number of students for both literacy and numeracy. There are two shortcomings in the current approach:

- Programs that target low literacy and numeracy achievement usually target schools with lower achievement, not individual students with lower achievement.
- There is no systematic approach to providing sustained support for students with low literacy or numeracy achievement, even when these students have participated in system-wide interventions such as the Year 1 one-on-one intervention for literacy.

High achievers also need to be better supported to sustain their high performance as they progress through school.

Programs that counter the influence of social disadvantage on student achievement should also help reduce the number of low-achieving students, given that low-SES students are over-represented amongst the lowest-achieving students.

6.6 Conclusion

The small scale of most of the improvements in student literacy and numeracy achievement over the last decade is a strong indicator that substantial change to the way literacy and numeracy improvement is supported is needed to make a real difference.

The new initiatives commenced in 2008 to improve student literacy and numeracy achievement do not represent a significant change in direction, nor a significantly amplified effort, relative to the various initiatives implemented over the past decade.

DEECD needs to make sure that its sizeable investment in literacy support is used more effectively, particularly in sustaining support for low- and high-achieving students and through a better program of continuous improvement. This is discussed further in part 7 of this report.

For numeracy, the achievements of a substantial number of students are well below the expected level. The shortcomings in support include the absence of evidence-based numeracy intervention programs for students and of effective programs for teaching maths, particularly in areas other than Number.

There is a great need to bridge the gap between the performance of students from low-SES schools and those from high-SES schools, and to stop the gap from widening as students progress through school. DEECD needs to set targets for reducing the influence of school social disadvantage on student literacy and numeracy achievement, and boost efforts to meet the targets.

The literacy and numeracy issues confronting some non-metropolitan regions need to be identified and addressed. Of equal importance, the practices that have produced good literacy results in some of DEECD's low-SES metropolitan school regions should be identified and shared across the state.

The audit highlighted the need to improve targeting of the large numbers of students who were achieving well below the expected level in literacy and numeracy. The small 'lifting the tail' effect observed recently for the lowest-achieving literacy students suggests that progress is possible but a system-wide teaching and intervention approach will be needed. Any effort to improve the performance of low-achieving students should not come at the expense of high-achieving students.

There is a need to focus effort early and on those students who need it and to sustain support for those students as they progress through school.

Recommendations

DEECD should:

6.1 adopt a stronger focus on numeracy, by:

- developing and implementing an early intervention strategy for students struggling with numeracy
- strengthening support provided to teachers to further develop their knowledge of, and teaching strategies for, maths, and to select and implement the appropriate strategies

6.2 address the performance gap between high- and low-SES schools, including setting targets for reducing the influence that school socio-economic disadvantage has on student literacy and numeracy achievement

6.3 identify and address the issues contributing to the declining literacy and numeracy achievement in some non-metropolitan regions, and identify and share across regions the successful approaches underlying the good results achieved by the low-SES metropolitan regions

6.4 improve identification and targeting of students achieving well below the expected level in literacy and numeracy in the early years of schooling in all schools, and sustain support for those who need it as they progress through school.

7 Continuous improvement

At a glance

Background

This part of the report examines the adequacy of the continuous improvement approaches underpinning the Department of Education and Early Childhood Development's (DEECD) and the Victorian Curriculum and Assessment Authority's (VCAA) support for literacy and numeracy. It also addresses the actions we consider now need to be taken to improve their approaches.

Key findings

- DEECD does not consistently use monitoring, program reviews and evaluations to inform its system-wide approach to improving its literacy and numeracy programs.
- DEECD has not set challenging longer-term targets to drive improvement.
- There are critical deficiencies in the suite of literacy and numeracy assessments used by DEECD and VCAA to measure student achievement in that:
  - students still have no unique identification numbers. DEECD started developing such a system in 2006 and plans to introduce it in 2009
  - there is no standardised assessment of numeracy for all students in the early years of school, although such an assessment is now being planned
  - there is no assessment of the literacy and numeracy skills each student starts school with, against which their progress in learning can be measured.
- The use of the curriculum progression points and associated standards does not accurately accommodate the range of student achievement that is assessed through teacher judgments.

Key recommendations

- DEECD should implement a consistent and evidence-based continuous improvement approach to improving student literacy and numeracy achievement **(Recommendation 7.1)**.
- DEECD should improve the value of the student literacy and numeracy achievement data for monitoring student progress, including promptly introducing the Victorian Student Number and assessing the literacy and numeracy skills of all students starting Prep **(Recommendation 7.2)**.

7.1 Introduction

This part of the report examines the continuous improvement approaches of the Department of Education and Early Childhood Development (DEECD) and the Victorian Curriculum and Assessment Authority (VCAA) that underpin their support for literacy and numeracy, their response to our 2003 literacy audit recommendations and the assessments they use to measure student literacy and numeracy achievement.

7.2 Monitoring and continuous improvement

7.2.1 Current approach

DEECD and VCAA assess student achievement using a range of data sets, including those analysed for this audit. DEECD uses this data to monitor:

- government school performance and outcomes, including student literacy and numeracy achievement
- the performance of different student cohort groups (e.g., Indigenous students,) and genders.

DEECD conducts specific monitoring, research and analysis to support departmental policy and program development and conducts program reviews and evaluations to inform program delivery. Schools and the regional offices of DEECD also monitor and review their performance as part of their accountability and improvement processes.

For much of the last 10 years, DEECD's key target has been to have the literacy and numeracy achievement of primary school students at or above national benchmarks. This target has been met over much of the period, but it related only to the minimum standards measured by the national benchmarks.

DEECD's June 2008 *Interim Corporate Plan 2008–09 to 2010–11* identified expected outcomes for literacy and numeracy over this period that are based on the national testing results and therefore still do not relate to the standards expected of students under the Victorian curriculum. Nor did the plan specify the level of achievement desired, the proportion of students who should be achieving it or the time frame over which it should be achieved.

7.2.2 Use of program reviews and evaluation results

The audit found that the extent to which DEECD used the results of program reviews and evaluation data to inform its system-wide approach to improving its literacy and numeracy programs varied. For example, some were planned approaches that laid the foundations for continuous improvement as part of program design and implementation (e.g., the recent teacher coaching initiatives), while other approaches were much more ad hoc (e.g., the Early Years programs).

Figure 7A shows the differing continuous improvement approaches taken by DEECD for the Early Years programs, the Middle Years programs and the recent teacher coaching initiatives.

Figure 7A
Continuous improvement, literacy and numeracy

The **Early Years literacy and numeracy programs** for students in Prep to Year 2 were based on findings from research programs and implemented across all government schools in 1997 (literacy) and 2001 (numeracy). A 2004 review of the programs identified that they were not yet fully implemented in all schools and made a number of recommendations for improving the programs. While some of these recommendations were adopted, the effectiveness and ongoing relevance of the programs has not been evaluated.

The **Middle Years programs** (Middle Years Reform Program, Restart, Access to Excellence and Schools for Innovation and Excellence) for students in Years 3 to 10 were based on the findings of a middle years research project and each generally operated for a three-year period between 2001 and 2007. All included a literacy and/or numeracy focus as part of a broader set of aims for these students. Post-hoc evaluations of the programs indicated some improvements in literacy and numeracy achievement and in student performance more generally. Some also concluded that it was too early for impacts to be evident but the programs were not always continued. Evaluation results were used to guide subsequent middle years support.

The **teacher coaching initiatives** (Literacy Improvement Teams and Teaching and Learning Coaches for Maths and Science) are for students in Years 3 to 8 (literacy) and Prep to Year 10 (maths and science). The literacy initiative was introduced in 2007 based on a similar, successful program in Western Australia and in response to recommendations from the evaluations of the Middle Years programs. The maths and science version was introduced in 2008 following interim signs of success with the literacy initiative. The continuous improvement of these initiatives was planned and evaluations commenced when the initiatives started. Interim evaluation results from the literacy initiative informed the decision to extend its funding.

Source: Victorian Auditor-General's Office.

DEECD's 2004 review of the Early Years programs found that 20 per cent of eligible students were missing out on Reading Recovery and 25 per cent of those who did receive it were not getting the recommended amount of one-on-one attention. Despite this, no further evaluation of the effectiveness of the Reading Recovery intervention program has been undertaken.

Participation in Reading Recovery has dropped from 76 per cent to 61 per cent of primary schools since it was introduced, meaning that more than 3 500 Year 1 students with poor literacy skills are not participating in that program. DEECD has not identified what other one-on-one intervention programs these students are receiving and whether these alternatives are effective.

For numeracy, DEECD's 2004 review recommended that a one-on-one intervention be developed for students with poor numeracy skills. This recommendation has not been adopted, even though the Early Numeracy Research Project (ENRP) in 1999–2001 provided a starting point. The Mathematics Online Interview, which was also developed through the ENRP as a tool for diagnosing students with poor numeracy and assessing their progress, is being used only by around 60 per cent of primary schools (700 schools).

The extent to which DEECD has monitored the impact of its support for teacher professional development in teaching literacy and numeracy has also varied.

7.2.3 Future actions needed for better continuous improvement

DEECD needs to underpin its support for improving student literacy and numeracy achievement with a consistent and evidence-based continuous improvement approach. Continuing successful initiatives for as long as feedback and evaluations indicate they are needed should be fundamental to this approach.

Clear long-term targets for improvement would give literacy and numeracy a stronger continuous improvement focus. Targets that are not sufficiently challenging may encourage complacency rather than drive improved performance.

7.3 Student achievement data

7.3.1 Initiatives since 1998

Since 1998 there have been two key improvements to the student achievement data for literacy and numeracy. First, VCAA expanded the Achievement Improvement Monitor (AIM) testing to include Year 7 students in 2001 and then Year 9 students in 2006.

Second, the introduction of the Victorian Essential Learning Standards (VELS) in 2006 was accompanied by an increase in the number of progression points between the curriculum standards for describing the expected progress of student learning. This gave teachers an additional progression point against which they could judge student progress.

Our 2003 literacy audit recommended that DEECD and VCAA develop a system of unique student numbers to better monitor student achievement and program effectiveness. DEECD started developing the Victorian Student Number system in 2006 and plans to introduce the system in 2009. Assessment and administration systems will need to be configured to capture the new data. In the interim, the VCAA has made progress in linking the results for individual students across the statewide testing at Years 3, 5, 7 and 9, and with Victorian Certificate of Education results.

7.3.2 New initiatives

DEECD has recognised the limitations of the Assessment of Reading and is developing a new assessment of English for students in Prep to Year 2 which will:

- be standardised and online
- assess comprehension and other aspects of reading as well as writing, speaking and listening
- relate to the curriculum standards and the national testing at Year 3
- be compulsory for students entering school.

DEECD advised that it plans to introduce this new assessment into schools in 2009.

In 2008 DEECD commenced a project to develop the existing numeracy online interviews into standardised numeracy assessments and align them with the new Assessment of English being developed for the early years. DEECD plans to introduce these new assessments in 2009 and to monitor and analyse the system-level data collected from both assessments.

7.3.3 Future actions needed to improve achievement data

The teacher judgment data are the only centrally collected record of student achievement available for all students from Prep all the way up to Year 10, and the main source of information for reporting student progress to parents. The usefulness of the teacher judgments for accurately differentiating the range in student progress that is assessed through teacher judgments could be improved, for example by increasing the number of progression points against which the judgments are reported.

With the new Assessment of English and the early years numeracy assessments now in development, the critical deficiency remaining is the need to assess the literacy and numeracy skills of all students when they start school, against which their progress through school can be monitored.

While these statewide assessments fulfil certain monitoring and accountability needs, they are not designed to provide teachers and schools with all the information they need to identify student progress and diagnose student learning needs in literacy and numeracy. The additional assessment and monitoring that schools do is therefore invaluable.

VCAA's AIM On Demand online assessment program is used by schools for diagnosing student learning needs in literacy and numeracy and is being used by DEECD to evaluate the progress of students in teacher coaching initiatives for literacy and maths. AIM On Demand has great value for these purposes but as it was developed 10 years ago for a different purpose its usefulness would be improved by a review and upgrade of its purpose, content and software.

7.4 Conclusion

Improved monitoring and a greater commitment to continuous improvement are needed to make better use of literacy and numeracy resources. This means identifying whether programs and initiatives, including teacher professional development, are achieving the desired outcomes. Evidence about what works should be used in a planned way to adapt the support as needed to ensure the outcomes are reached.

The suite of assessments is valuable for monitoring student literacy and numeracy achievement, but the limitations and deficiencies that relate to monitoring long-term trends and the progress of individual students should be addressed.

Most importantly, the Victorian Student Number project should proceed without delay. DEECD will need to ensure that assessment and administration systems are altered to enable the data to be captured.

Schools should assess the literacy and numeracy skills of all students when they start school, against which their progress can be measured over time. The potential for the more effective use of the teacher judgment assessments and the AIM On Demand assessment program for monitoring student progress should be investigated. Addressing teacher judgment assessments is an important issue because in the absence of a national curriculum, they provide the only statewide assessment of student achievement against the challenging standards of learning set for Victorian students.

Recommendations

DEECD should:

7.1 implement a consistent and evidence-based continuous improvement approach to improving student literacy and numeracy achievement through:

- setting challenging long-term achievement targets
- identifying and addressing any issues that may limit the effectiveness of the Early Years programs and one-on-one literacy interventions in schools
- continuing successful initiatives for as long as feedback and evaluations indicate they are needed

7.2 improve the value of the student literacy and numeracy achievement data for monitoring student progress, by:

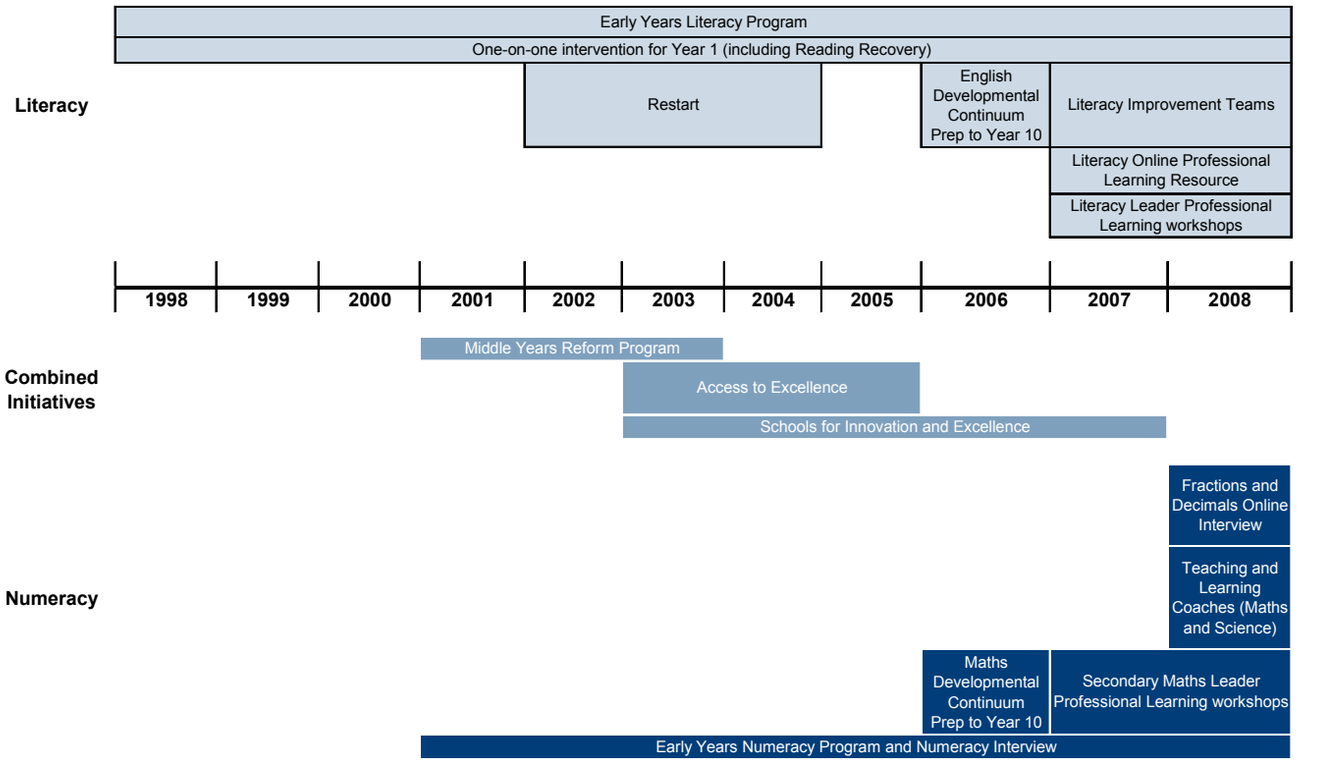
- promptly introducing the Victorian Student Number and using it to monitor the progress of individual students and student cohorts, and to evaluate the impact of improvement initiatives
- assessing the literacy and numeracy skills of all students starting Prep
- improving the usefulness of the teacher judgment assessments, in conjunction with VCAA, by more accurately differentiating the range in student progress that is assessed through these judgments
- working with VCAA to review and upgrade the AIM On Demand student assessment system.

Appendix A.

Initiatives since 1998 to improve literacy and numeracy

Timeline of key initiatives

Figure A1
Timeline of key DEECD initiatives for literacy and numeracy, 1998–2008



Source: Victorian Auditor-General's Office.

Appendix B.
Audit conduct

Objective

The objective of the audit was to determine whether student literacy and numeracy achievements are improving in Victoria's government schools.

Scope

The audit examined the activities of the Department of Education and Early Childhood Development (DEECD) since 2003 to improve literacy in government schools, and the impact of these activities. The audit also reviewed the actions taken by DEECD and the Victorian Curriculum and Assessment Authority (VCAA) in response to the recommendations of the Auditor-General's 2003 audit of student literacy, and the results achieved.

In concentrating on student average achievement, the audit did not examine the performance of special cohorts such as students from language backgrounds other than English, Indigenous students, students with disabilities or the influence of gender.

The audit collected information on the support provided for improving student literacy and numeracy but did not examine DEECD's specific literacy or numeracy initiatives or programs, or their individual impacts on student achievement. The audit did examine the results of DEECD's reviews and evaluations of these initiatives and programs.

Method

To identify progress in student literacy and numeracy achievement and the impact of activities to improve student literacy and numeracy, the audit:

- analysed student literacy and numeracy achievement data from 1998 to 2007
- identified how DEECD has supported schools to improve student literacy and numeracy achievement over this period
- identified how DEECD and VCAA have implemented the recommendations of our 2003 literacy audit.

To identify progress in student literacy and numeracy between 1998 and 2007 the audit collated the statewide student achievement data and analysed:

- the trends over time in state average achievement, Prep to Year 12
- the trends over time for students from different socio-economic backgrounds, different DEECD regions, and different performance groups (lowest-achieving compared with highest-achieving students).

Document reviews and interviews were used to examine the actions of DEECD since 2003 to improve literacy and numeracy outcomes across the state.

The audit was performed in accordance with the Australian Auditing Standards applicable to performance audits, and included tests and procedures sufficient to enable audit conclusions to be reached.

The total cost was $325 000 and included staff time, overheads and printing.

Acknowledgments

The audit team consulted with the following organisations as part of this audit:

- DEECD
- VCAA
- Association of School Councils in Victoria
- Parents Victoria
- Victorian Association of Secondary School Principals
- Victorian Council of School Organisations
- Victorian Principals Association.

The audit team particularly thanks the DEECD and VCAA head office staff who provided information for the audit.

Appendix C.
Trends in student achievement

Introduction

The audit analysis of student numeracy and literacy achievement from 1998 to 2007 used the statewide data sets collected by the Department of Education and Early Childhood Development (DEECD) and the Victorian Curriculum and Assessment Authority (VCAA).

The analysis relied primarily on the results of the:

- Achievement Improvement Monitor (AIM) testing at Years 3, 5, 7 and 9
- Victorian Certificate of Education (VCE) adjusted scores at Years 11 and 12.

As these data sets did not capture student achievement in the early years of schooling (Prep to Year 2), the audit also analysed:

- teacher judgments of student achievement for Prep to Year 2
- Assessment of Reading (AoR) results for Prep to Year 2.

The analysis was broken into the following components:

- trends in average literacy and numeracy achievement
- the extent to which trends in achievement differed depending on the socio-economic status (SES) of a student's school, the DEECD region that school is in, and whether the student was at the low or high end of the achievement spectrum.

When the achievement of an individual student is reported to parents it is compared to the range of achievement that is expected for students at the end of that year level. This range usually covers half a year of learning behind and ahead of the achievement expected at the end of that year of school.

However when the statewide data are reported, as in this analysis, average (mean) student achievement at any year level is compared to the median level of achievement that is expected across all students at that year level, under both the current Victorian Essential Learning Standards (VELS) curriculum and the former Curriculum and Standards Framework (CSF). This expected state median level of achievement is referred to as the 'expected level' for the statewide data set. In the case of AIM, as testing was conducted in August the 'expected level' was set at a VELS/CSF level equivalent to one term less learning. The confidence intervals around the state means were very small, at around ± 0.025 VELS/CSF levels or less.

As the change from the CSF to the VELS curriculum represented a significant change in the skills and knowledge expected of students at the different standards, the data are presented as two separate series (1998–2005 and 2006–2007). The curriculum also changed when CSFII replaced CSF in 2000 but these data sets have been treated as continuous as the changes had less impact.

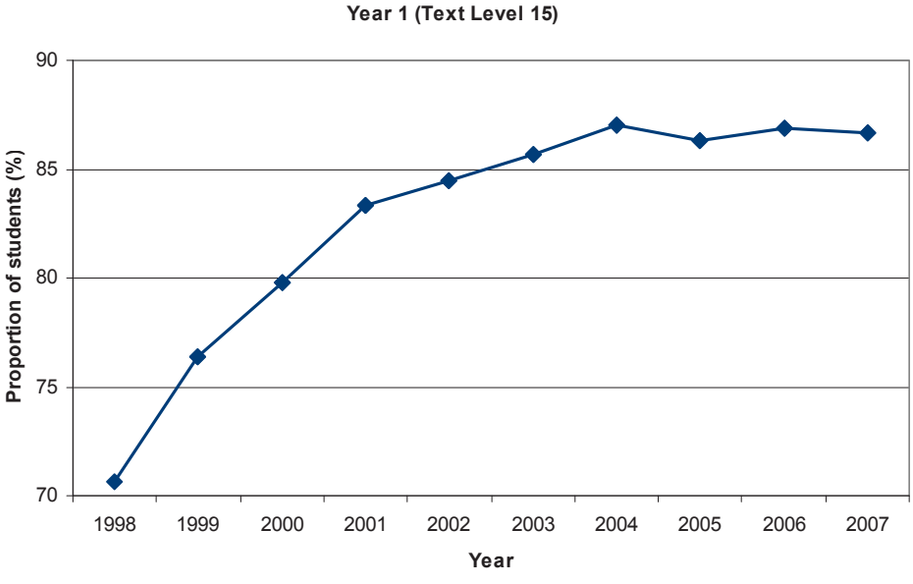
Where assessments produced similar patterns for literacy or numeracy for a given year level, usually only one assessment was used to illustrate the pattern.

Trends in literacy and numeracy achievement

Prep to Year 2

Considerable improvements were made in the percentage of students reading at the expected level for the AoR (i.e., reading with 90 per cent or greater accuracy) between 1998 and around 2003, as illustrated for Year 1 students in Figure C1. These improvements followed the introduction of the Early Years Literacy Program and the AoR in 1997. There was little further improvement after 2003 at any year level.

Figure C1
Percentage of students reading with 90 per cent or greater accuracy (assessed by AoR) Year 1, 1998–2007



Source: Victorian Auditor-General's Office, from DEECD data.

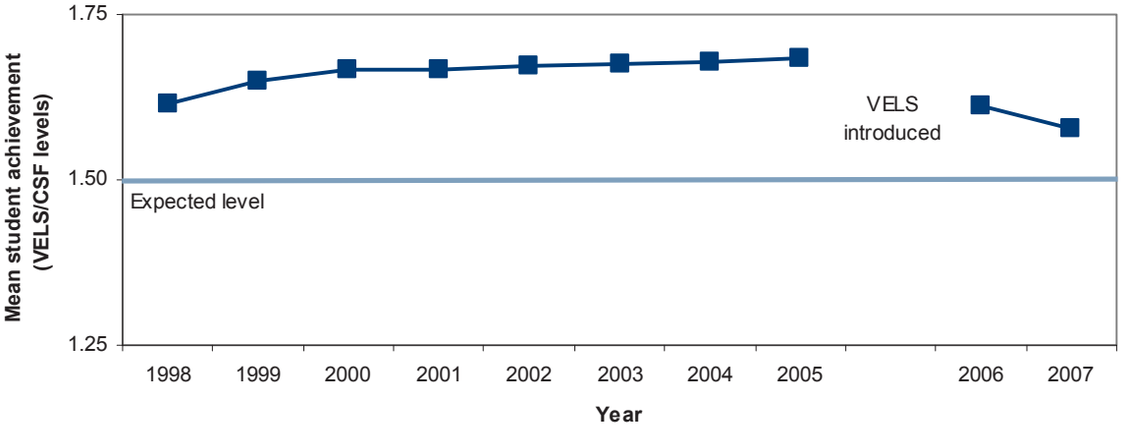
These results show the success of the Early Years Literacy Program and the use of the AoR in assisting teachers across the state to improve the ability of their students to 'decode text' (recognise written words).

DEECD is developing a new and more comprehensive assessment of English for students in Prep to Year 2 that will assess not just decoding text, but also comprehension and other areas of literacy, such as Writing, Speaking and Listening.

In contrast to the AoR, teacher judgments of student progress in Reading assess student ability against the curriculum and therefore assess a broader range of skills, including comprehension, than does AoR. The teacher judgment data also give the only indication of numeracy achievement, as there is no standardised test for numeracy in these early years.

Student literacy achievement from 1998 to 2005, as measured by teacher judgments, showed a moderate improvement of around 0.1 VELS/CSF levels, or almost one term of learning (illustrated for Year 1 Reading in Figure C2). It was consistently above the expected level of achievement.

Figure C2
Mean student achievement in Reading (assessed by teacher judgments)
Year 1, 1998–2007



Source: Victorian Auditor-General's Office, from DEECD data.

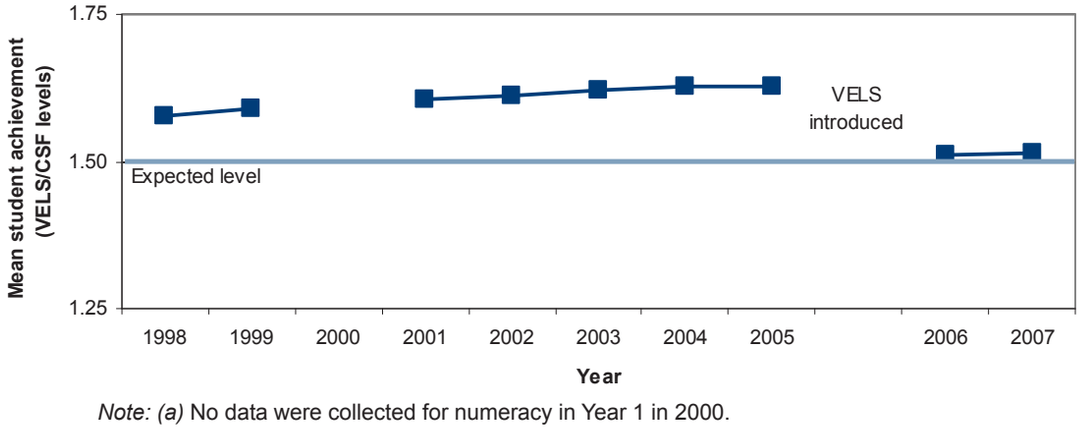
The lower achievement recorded from 2006 onwards most likely reflects the impact of the change in curriculum from the CSF to the VELS, which introduced higher standards of learning for students and a new curriculum and assessment system for teachers.

The considerable improvements made by students between 1998 and 2003 that are apparent in the AoR data (Figure C1) do not show up in the teacher judgment data (Figure C2). The reason for this may be that AoR assesses only one component of literacy (decoding) whereas teachers judgments assess several; or that limitations in the assessment scale for teacher judgments (too few progression points) restrict a teacher's scope for differentiating students' performance. Another possible reason is that teachers are fairly conservative in their assessments, so a large improvement in AoR is likely to be much smaller according to teacher judgments.

Student progress in the other literacy areas assessed by teacher judgment (Writing, Speaking and Listening) showed similar patterns to those demonstrated for Reading although with less improvement over time, particularly for Speaking and Listening.

For numeracy, the trend for teacher judgment data (assessed as Number and Measurement) was similar to that shown for Reading, with gradual improvement between 1998 and 2005 of between 0.04 and 0.08 VELS/CSF levels, or averaging half a term of learning. The Year 1 numeracy teacher judgment data for Number are presented in Figure C3.

Figure C3
Mean student achievement in Number (assessed by teacher judgments)
Year 1, 1998–2007*(a)*



Note: (a) No data were collected for numeracy in Year 1 in 2000.
Source: Victorian Auditor-General's Office, from DEECD data.

The teacher judgment data for literacy and numeracy (Figures C2 and C3) show that literacy performance in Year 1 was further above the expected level than numeracy performance.

Years 3 to 10

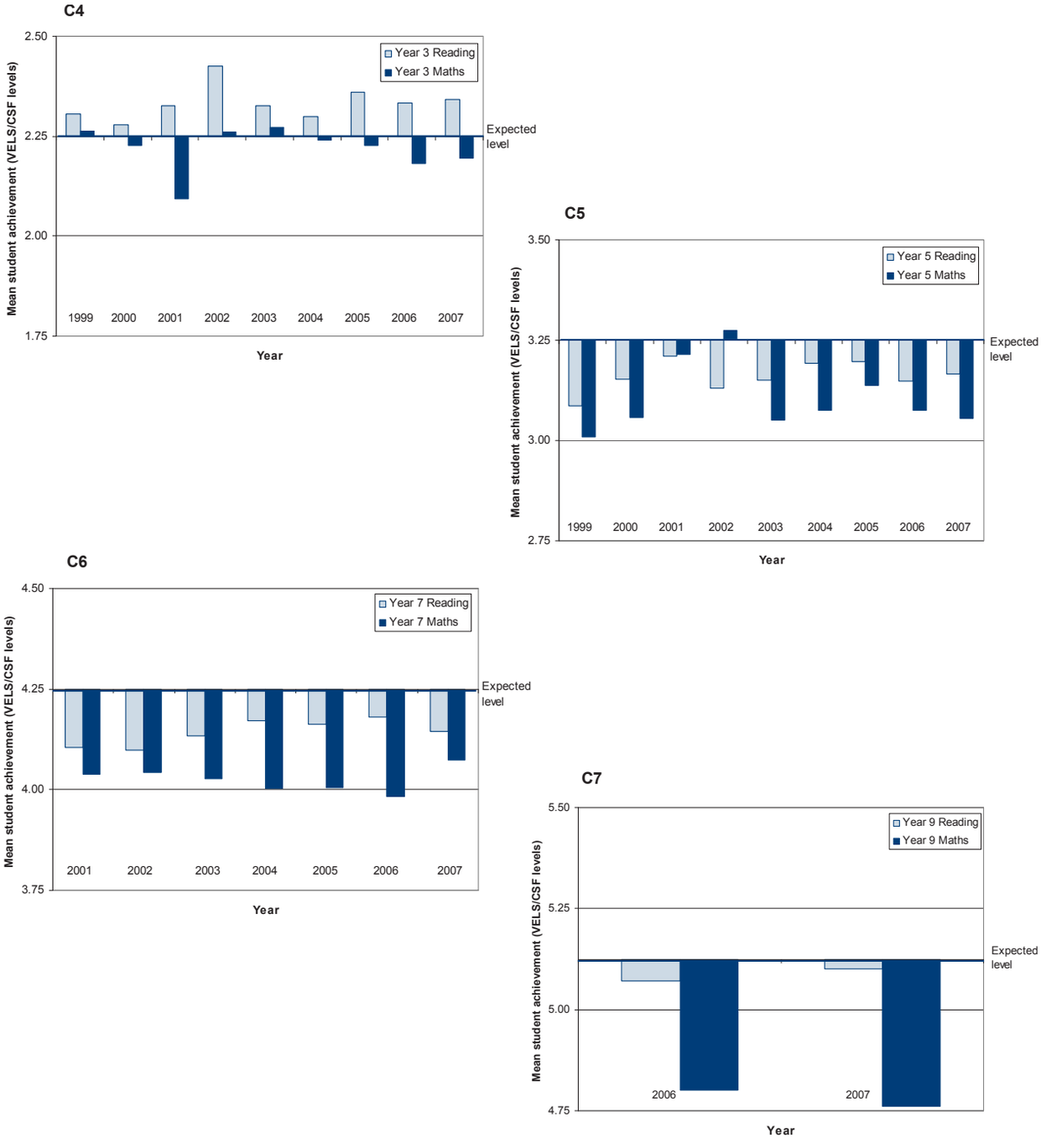
Between Years 3 and 10, both teacher judgment data and AIM data are collected. The results from the two data sets sometimes differ, which is not unexpected given that the AIM test has a limited set of questions and so can only assess key parts of the curriculum whereas teacher judgments consider student progress across the full curriculum and over a whole year. Also, the teacher judgment data are based on a changing curriculum over the years and a changing scale, whereas the AIM scale has remained unchanged and DEECD adjusts the scores each year by a process called 'equating', which accommodates changes of curriculum. The audit analysis relied more on the results from the AIM test because:

- it was consistent
- it was a standardised assessment method that assessed students in exactly the same way in every school
- it was designed to measure average student achievement across the state, which was the focus of this audit.

Trends in achievement at each year level

Figures C4 to C7 show the differences between mean student achievement and the expected level for AIM Reading and Mathematics, for Years 3, 5, 7 and 9 from 1999 to 2007.

Figures C4 to C7
Mean student achievement in Reading and Mathematics (assessed by AIM) relative to the expected level for Years 3, 5, 7 and 9, 1999–2007*(a)*



Note: (a) AIM Year 9 (2006 and 2007) expected level is set at 5.125 rather than 5.25 because students were tested in May rather than in August, when all other AIM testing was conducted.

Source: Victorian Auditor-General's Office, from VCAA data.

Average student achievement in literacy (assessed as AIM Reading) improved only slightly between 1999 and 2007, and was below the expected level for all year levels except Year 3.

At Year 3, the state average for literacy achievement increased very slightly by 0.04 VELS/CSF levels and was above the expected level. Results in Years 5 and 7 also improved slightly but remained below the expected level. Further, the gap between the expected level and actual achievement widened each year from Year 3 (0.1 VELS/CSF levels above) to Year 7 (0.1 VELS/CSF levels below). For Year 9 there was not enough data to show trends over time, but average achievement was 0.05 VELS/CSF levels, or less than half a term of learning, below the expected level.

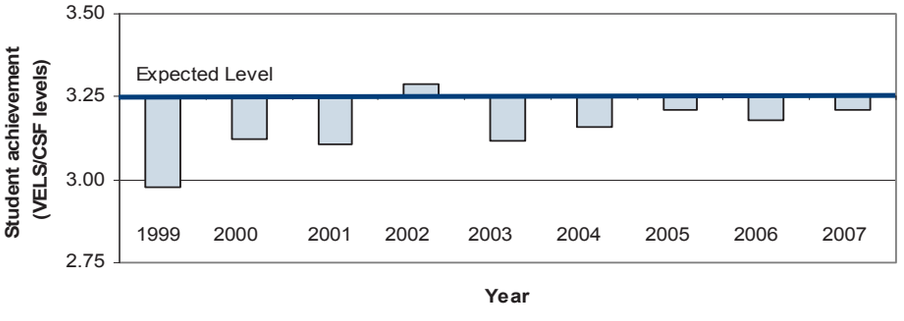
The trends in AIM Writing and Spelling from 1999 to 2007 were fairly similar to the Reading results, with the following patterns evident:

- at Year 3, Spelling was marginally better than Writing, and the results for both were better than for Reading
- at Years 5, 7 and 9, Reading was better than Writing, and the results for both were better than for Spelling.

Average student achievement in numeracy (assessed as AIM Mathematics) declined at all year levels in recent years. As for literacy, the gap between the expected level for numeracy and actual results increased each year from Year 3 to Year 9. By Year 9 the state average for numeracy was 0.37 VELS/CSF levels below the expected level, representing about three terms of learning.

In contrast to the AIM Mathematics data, the AIM Number data (only available for Years 3 and 5) showed improvements in student achievement over time. The achievements of Year 5 students in AIM Number from 1999 to 2007 are presented in Figure C8.

Figure C8
Mean student achievement in Number (assessed by AIM) relative to the expected level, Year 5, 1999–2007

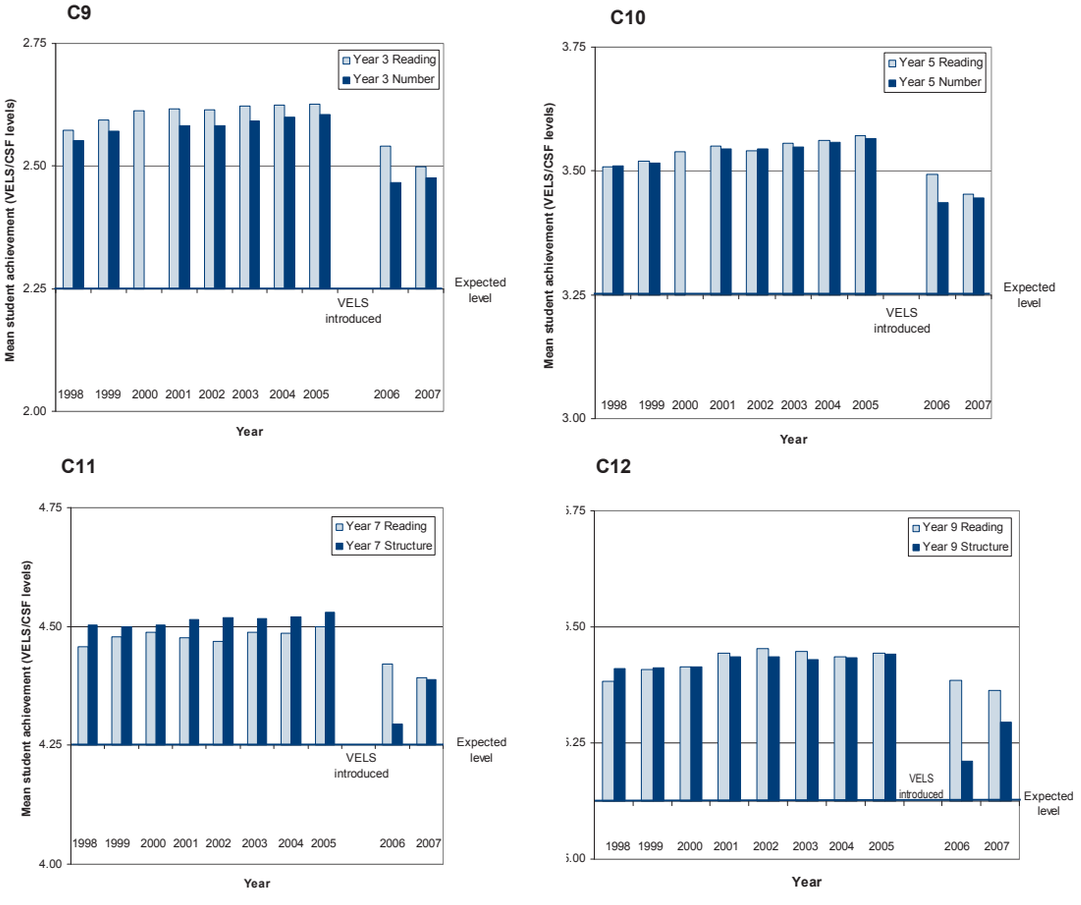


Source: Victorian Auditor-General's Office, from VCAA data.

The AIM results indicate that students were getting better at Number over time, but performance was sliding in the other aspects of numeracy measured by the AIM Mathematics test—Space; Measurement, Chance and Data; Structure; and Working Mathematically.

The teacher judgment data available from 1998 showed a gradual improvement of around 0.05 to 0.1 VELS/CSF levels for both literacy and numeracy since 1998, for almost all years from Prep to Year 10, with negligible fluctuation in the data. The differences between actual achievement and the expected level at Years 3 and 5 (Reading and Number) and Years 7 and 9 (Reading and Structure) are illustrated in Figures C9 to C12.

Figures C9 to C12
Mean student achievement in literacy *(a)* and numeracy *(b)* (assessed by teacher judgments) relative to the expected level for Years 3, 5, 7 and 9, 1998–2007



Note: *(a)* The Reading assessment for each year level.
(b) The Number assessment at Years 3 and 5 and the Structure assessment at Years 7 and 9.

Source: Victorian Auditor-General's Office, from DEECD data.

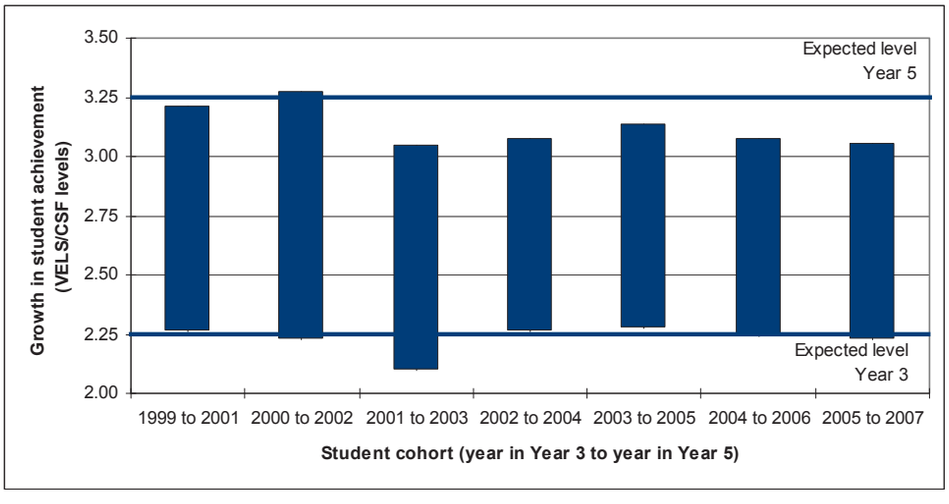
A comparison of the AIM results with teacher judgment results[1] showed that for literacy, the patterns in the two data sets were similar, although the teacher judgment results generally showed student achievement to be above the expected level and steady over time. For numeracy, the patterns in the two data sets were often contradictory, with the exception of the Number results. Again the teacher judgment data showed better student progress in reaching the expected level than did the AIM data.

Progress of students between year levels

The best measure of the progress of individual students readily available for the audit was the growth in student achievement from Year 3 to Year 5, and from Year 7 to Year 9, measured by comparing their AIM results between these years.[2] This comparison indicates the extent to which students had learnt the new literacy and numeracy skills expected to be acquired over this two-year period.

The audit found the growth in literacy and numeracy achievement that occurred for students in the two years between their Year 3 and Year 5 AIM assessments was consistently below the 1.0 VELS/CSF level of growth (representing two years of learning) that would be expected. For AIM Mathematics, the amount of growth achieved by students between Years 3 and 5 decreased in recent years. This is illustrated for AIM Mathematics in Figure C13.

Figure C13
Average growth in student Mathematics achievement (assessed by AIM) between Years 3 and 5, 1999–2007



Source: Victorian Auditor-General's Office, from VCAA data.

[1] To compare teacher judgment and AIM data, 0.25 VELS/CSF levels or around half a year's growth was added to the AIM data to better align the results of this August testing with the end-of-year teacher judgment assessments.

[2] Progress from Year 5 to Year 7 cannot be assessed using AIM data due to a discontinuity in the assessment scales between these years.

Figure C13 shows that numeracy achievement for students between Year 3 and Year 5 grew around 0.96 VELS/CSF levels (close to the two years of learning expected) for the student cohort that did Year 3 in 1999 and Year 5 in 2001. Figure C13 also shows growth was only 0.84 VELS/CSF levels for those who did Year 3 in 2005 and Year 5 in 2007. This means that on average, the degree by which students grew in numeracy achievement between Year 3 and Year 5 decreased by 0.12 VELS/CSF levels over six years. That is, they trailed expectations by almost a term.

The same comparisons were made for students between Years 7 and 9. Due to the limited Year 9 data set, growth in achievement could only be calculated for two cohorts (Year 7, 2004 to Year 9, 2006 and Year 7, 2005 to Year 9, 2007). The analysis found that it was below the expected level for both literacy and numeracy, with slightly better growth achieved for literacy.

Changes in literacy achievement since our 2003 literacy audit

The audit looked for any differences between the trend in literacy achievement for Years 3, 5, 7, 9, 11 and 12 from 1998 to 2002 and the trend for the period 2003 to 2007, to identify any changes in achievements since the Victorian Auditor-General's 2003 literacy audit. The most common pattern identified was a slight increase pre-2003 that slowed down or even declined from 2003 onwards. Year 7 Reading and Year 5 Spelling were the main exceptions to this pattern, with achievement declining before 2003 and then increasing.

Years 11 and 12

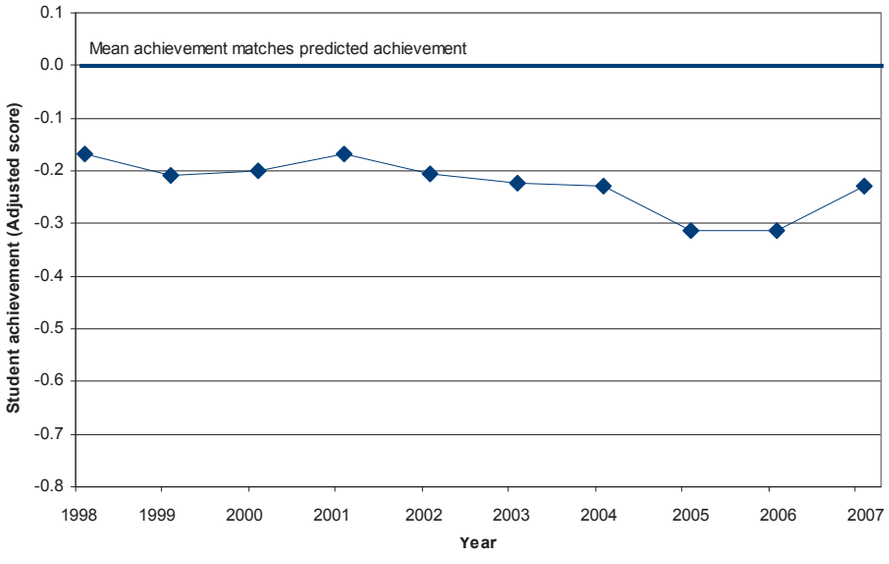
All VCE students are required to do an English study, but it is not compulsory to do a maths study.

The mean VCE English results from 1998 to 2007 showed very little change over time and were consistently below the state average study score of 30 that represents the standardised mean for both the government and non-government sectors.

However, as the standardisation of the VCE scores limits their value for analysing trends in student achievement over time, this audit also analysed the 'adjusted score' that the VCAA calculates for each VCE student. The adjusted score compares the student's actual performance with what would be expected given their general ability, the performance of all students in their class at school and their gender.

The adjusted score results indicated that the mean achievement of government school students for English was slightly below the level predicted (Figure C14).

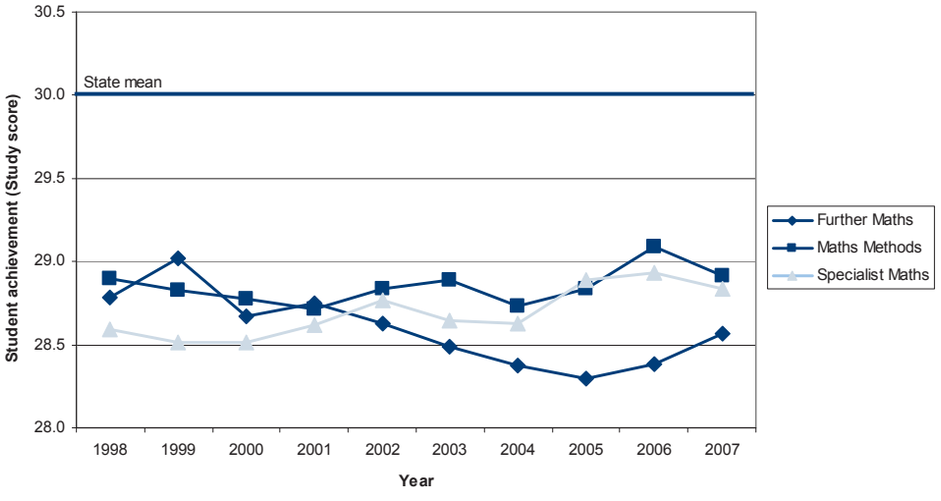
Figure C14
Mean student achievement in VCE English compared with predicted achievement, 1998–2007



Source: Victorian Auditor-General's Office, from VCAA data.

The mean VCE maths results were consistently below the state average (standardised mean) and showed an overall slight decline (Figure C15).

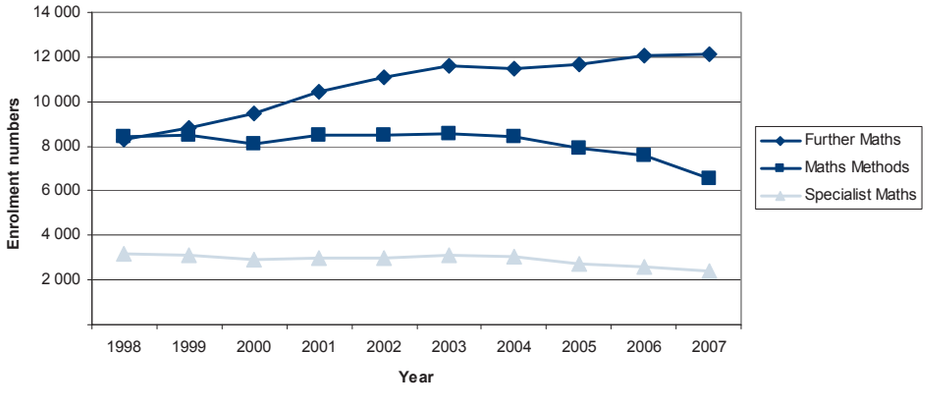
Figure C15
Mean student achievement in VCE maths, 1998–2007



Source: Victorian Auditor-General's Office, from VCAA data.

Student achievement in the two advanced maths studies (Maths Methods and Specialist Maths) improved in the face of declining enrolments in these studies (Figures C15 and C16). In contrast, student achievement for Further Maths declined during a period of increasing enrolments in this subject between 1998 and 2007 (Figures C15 and C16).

Figure C16
VCE maths enrolments by study, 1998–2007

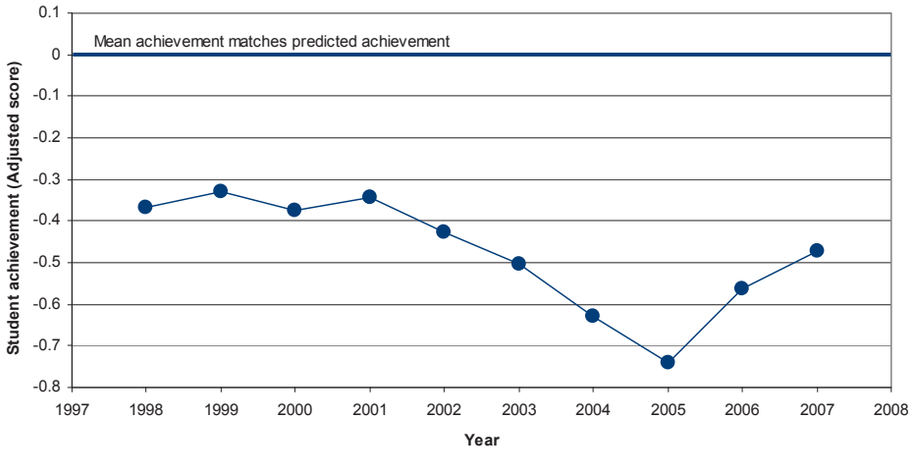


Source: Victorian Auditor-General's Office, from VCAA data.

It is difficult to gauge the reasons for these trends in student achievement and enrolments, particularly without comparable data from the Catholic and independent sectors.

The adjusted score results showed that the mean achievement of government school students declined relative to predicted achievement between 2001 and 2005 but has subsequently increased, although not to the level it was at prior to 2002 (Figure C17).

Figure C17
Mean student achievement in VCE maths (all studies) compared with predicted achievement, 1998–2007



Source: Victorian Auditor-General's Office, from VCAA data.

For both VCE English and maths, the adjusted scores analysed by audit indicated that students consistently did not perform as well as their general ability would predict, and that the gap between predicted and actual achievement had been widening since around 2001. The better results in 2006 and 2007 may signal a reversal of these trends.

Sub-group trends (socio-economic status, DEECD regions and performance groups)

The audit further analysed the statewide data to examine student achievement trends in terms of their schools' socio-economic status (SES), the DEECD region where students' schools are located, and compared the performance of the highest- and lowest-achieving students. The definitions of the sub-groups are provided in Figure C18.

Figure C18
Sub-groups and definitions used for this audit

Sub-group	Definition used for this report
SES	The four Student Family Occupation index (SFO) quartiles were calculated for each calendar year using the average SFO quartiles between 1998 and 2007, to accommodate changes in the SFO distribution over time. DEECD uses SFO as an indicator of SES.
Region	The nine DEECD regions were used. Each region's average SES was calculated based on the SFOs of the schools in that region.
Performance Group	For Years 3 to 9, the low group consisted of the students one or more years behind the expected level and the high group was those one or more years above the expected level. For VCE, the low group was the students with achievement one or more standard deviations below the state mean achievement and the high group was those one or more standard deviations above the state mean.

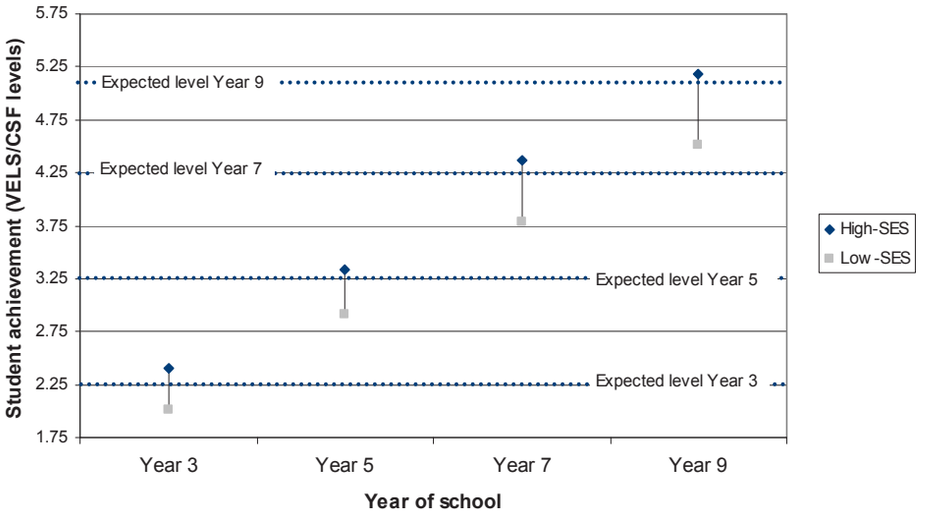
Source: Victorian Auditor-General's Office.

Performance of students from high- and low-socio-economic status schools

Analysis of the SES groups from Prep to Year 2 using teacher judgment data and AoR data showed that in literacy the gap between low- and high-socio-economic groups did not narrow. The numeracy teacher judgments data showed similar results.

AIM results for Years 3, 5, 7 and 9 showed a substantial gap between the lowest and highest SES groups for both literacy and numeracy that increased through each year level (illustrated for numeracy in Figure C19).

Figure C19
Student achievement in AIM Mathematics by SES group, Years 3, 5, 7 and 9, 2007



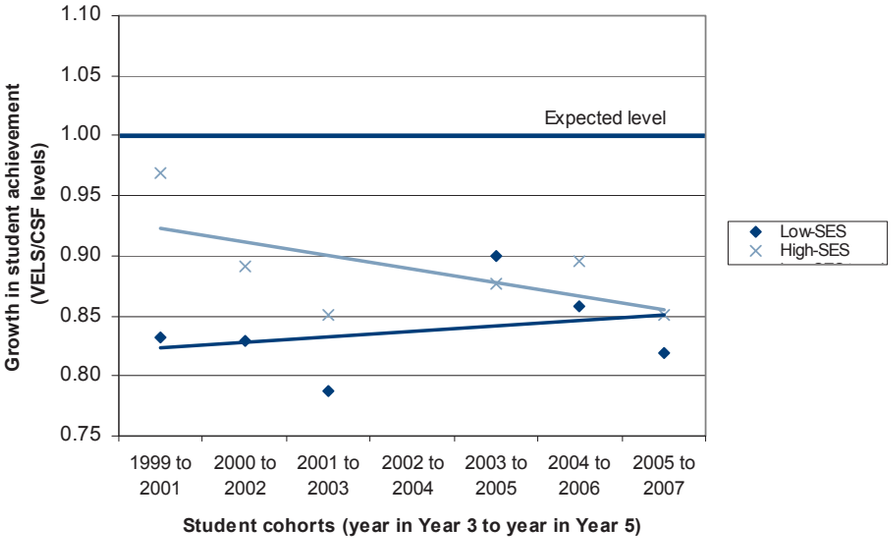
Source: Victorian Auditor-General's Office, from VCAA data.

By Year 9, the mean literacy level of the low-SES group trailed the high-SES group by over three terms, or 0.37 VELS/CSF levels (as assessed by AIM Reading). For numeracy (as assessed by AIM Mathematics), the difference was even greater, with the low-SES students trailing by more than a whole year of learning or 0.5 VELS/CSF levels.

Compared to the AIM data, the teacher judgment data at the same year levels showed smaller gaps between the high- and low-SES groups, but again with the gap widening between Years 3 and 9. The gap also increased for Years 7 and 9 over time, between 1998 and 2005.

The Year 3 to 5 growth data for AIM Reading showed that the growth achieved by the low-SES group improved whereas the high-SES groups' growth declined (Figure C20; with linear trends shown).

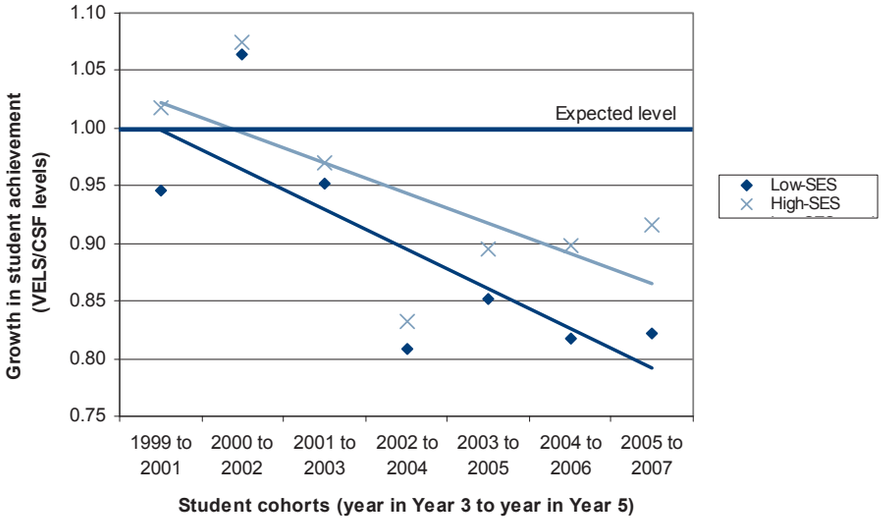
Figure C20
Mean growth in student achievement in Reading (assessed by AIM) between Years 3 and 5, by SES group, 1999–2007



Source: Victorian Auditor-General's Office, from VCAA data.

The Year 3 to 5 growth data for numeracy (as assessed by AIM Mathematics) showed that the gap in growth between the low- and high-SES groups widened in recent years (Figure C21, with linear trend shown).

Figure C21
Mean growth in student achievement in Mathematics (assessed by AIM) between Years 3 and 5, by SES group, 1999–2007



Source: Victorian Auditor-General's Office, from VCAA data.

For the VCE English, the difference between the high- and low-SES groups was very large (between 4.5 and 5.6 study scores), although the achievement of both the low- and high-SES students was around what would be predicted based on their ability.

For VCE maths, there was a similar difference between the high- and low-SES groups but whereas the high-SES group achieved better than predicted, the low-SES group achieved below what was predicted. However, the low-SES group showed improvements in 2006 and 2007 for Specialist Maths.

Differences in student achievement between DEECD regions

There were significant differences across the nine DEECD regions in achievement levels of students from Prep all the way to VCE. The Eastern Metropolitan Region (Eastern) was generally well ahead of the others and above the expected level at each year level. This difference was strongly linked to the higher SES of Eastern compared to the other regions, and the difference was generally greatest at higher year levels.

While the achievement of students in Eastern improved to a small extent over time for both literacy and numeracy (by just under half a term of learning for many of the AIM data sets), some of the low-SES regions produced larger improvements. For example:

- Western Metropolitan Region (Western) steadily closed the gap with other regions in literacy and numeracy achievement, improving by over one term of learning, based on AIM Reading data
- the growth in literacy achievement experienced by students between Years 3 and 5 improved over time for students from Western and Northern Metropolitan Region (Northern), from being at or near the lowest to being at or near the highest growth levels in the state
- Southern Metropolitan Region had better student achievement in VCE English and the advanced VCE maths studies than all other regions except Eastern
- recent improvements in the more advanced VCE maths studies in Western and VCE English in Northern brought average student achievement above the level of many other regions.

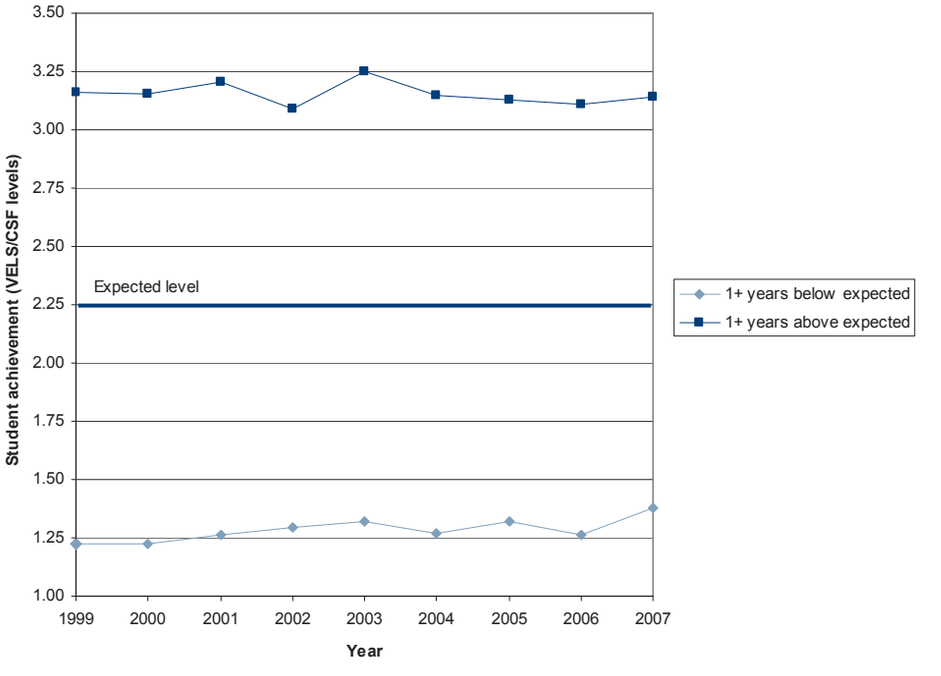
The data for some non-metropolitan regions indicated declining achievement, a pattern that has been observed in other jurisdictions as well (notably NSW).

Performance of high- and low-achieving students

The AIM Reading and Mathematics data showed that the literacy and numeracy skills of the low-achieving students in Years 3 to 9 were around two years below that of their high-achieving counterparts. For students in Years 3, 5 and 7, between 1999 and 2007:

- the literacy skills of the low-achieving students improved by close to one term of learning at Year 3 (0.1 VELS/CSF levels), and by around half as much at Years 5 and 7, compared to no improvement for the high-achieving students over the same period (illustrated for Year 3 in Figure C22)
- the numeracy skills of the low-achieving students did not change, whereas the skills of the high-achieving students improved by around half a year (0.28 VELS/CSF levels) at Year 5 and one term (0.1 VELS/CSF levels) at Year 3 but with no change at Year 7.

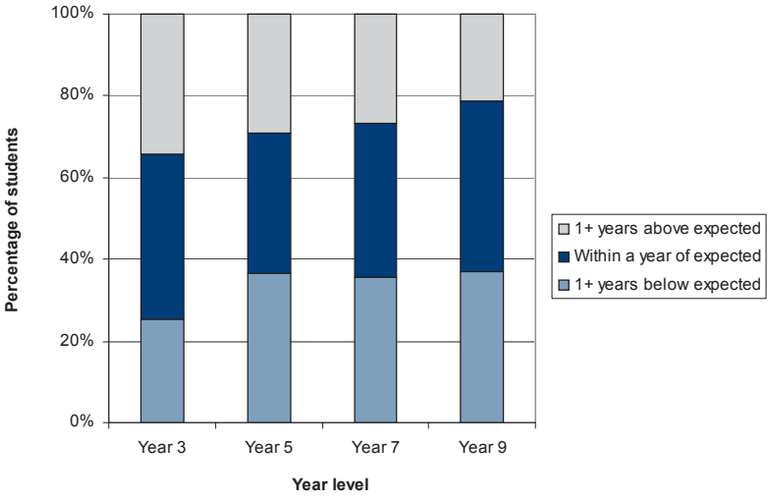
Figure C22
Literacy achievements of high- and low-achieving Year 3 students (assessed by AIM Reading) relative to the expected level, 1999–2007



Source: Victorian Auditor-General's Office, from VCAA data.

The proportion of high-achieving students (those one or more years above the expected level) decreases with increasing year level from Year 3 to Year 9 and the proportion of low-achieving students (one or more years below the expected level) increases. This is illustrated for literacy in Figure C23 using the AIM Reading results from 2007.

Figure C23
Proportions of high- and low-achieving students in literacy (assessed by AIM Reading) for Years 3, 5, 7 and 9, 2007

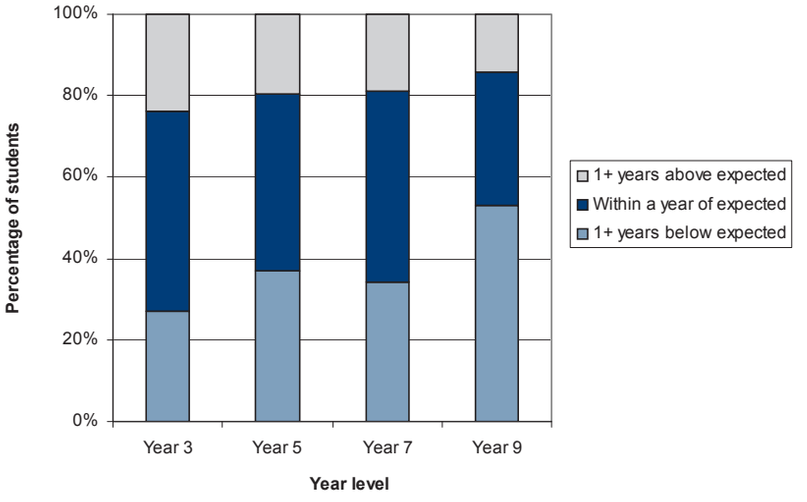


Source: Victorian Auditor-General's Office, from VCAA data.

In 2007, 25 per cent of Year 3 students (11 000 students) were a year or more below the expected level for literacy. Thirty-five per cent of Year 5 students (15 000 students) were below the expected level and this was the same for Year 7. Thirty-seven per cent of Year 9 students (14 800 students) were below the expected literacy level.

For numeracy, about 50 per cent of Year 9 students (20 000) were a year or more below the expected level (Figure C24, as assessed by AIM Mathematics in 2007).

Figure C24
Proportions of high- and low-achieving students in numeracy (assessed by AIM Mathematics), Years 3, 5, 7 and 9, 2007



Source: Victorian Auditor-General's Office, from VCAA data.

The proportion of students in the high-achieving group decreased between Year 3 and Year 9 for both literacy and numeracy. This pattern is common in other jurisdictions and may at least partly be related to the maturation that students experience during these years.

Whether the performance group data were analysed for an individual year (as shown in Figures C23 and C24), or for a particular cohort of students as it moved through school (e.g., following the students in Year 3 in 2001 to Year 5 in 2003, Year 7 in 2005 and Year 9 in 2007), the same pattern emerged.

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