



**Gender Differences in Years 6-7 Literacy
and Numeracy Transition Outcomes**

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Introduction

The DET project, *Gender Based Differences in Year 6-7 Transition Outcomes* is focussed on examining gender-based differences in literacy and numeracy achievement in school, with a particular focus on the middle years of schooling, particularly the transition from primary to secondary school.

The origin of the research is the Victorian Auditor General's Office (VAGO) (2015) *Performance Audit: Education Transitions*, Victoria where gender differences and their consequences are highlighted – particularly boys' lower performance in literacy. The methodology comprises a review of related research (see Research Overview); refinement of research questions (see Data Collection Framework June 2016); design of questionnaires and consultation (see Appendix one); and data analysis and verification. The research questions are

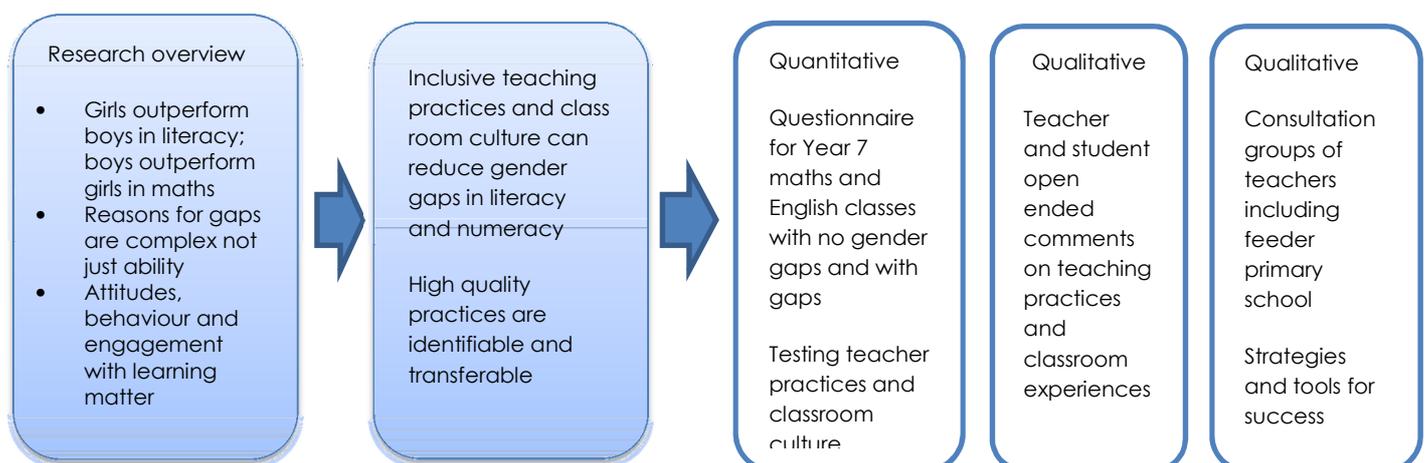
- What is the problem? Are there school factors, classroom cultures and teaching practices that appear to be contributing to gender differences in learning outcomes in Mathematics and English in Year 7?
- Are there school factors, classroom cultures and teaching practices that appear to be reducing or ameliorating gender differences in Year 7 learning outcomes in Mathematics and English?
- What transferrable evidence-based practices appear to be most successful in addressing gender based differences in Year 6-7 transition outcomes?

Methodology¹

Evidence

Hypotheses

Data sources



¹ See Appendices for methodology in detail

Summary: Key findings

Findings from English students and teachers

Student perceptions of their English classes

We found the following.

1. In classes where there is no significant gender gap in English outcomes there is also no significant gap in the ratings between boys and girls in relation to the practices adopted by their English teachers and the nature of the work (i.e. the difference was less than 0.2 for the seven *Feedback on Teaching and Learning* scales and for all but one of the items in the scales).

This finding:

- confirms the assumption that learning environments with high quality teaching and classroom practices would optimise the learning opportunities of all students regardless of gender.
- reveals those attitudes and practices at the school and classroom level that appear to have the greatest effect on reducing gender learning differences in relation to English.
- suggests that supporting teachers to adopt the evidence based teaching and classroom practices that underpin the questionnaire scales will not only have a positive impact on the overall level of student attainment in English, it will also make a positive contribution to reducing (or eliminating) any gaps between the outcomes of boys and girls in English.

2. In classes where there is a significant gender gap in English outcomes (girls were achieving higher outcomes than boys) there is a significant gap in the ratings between boys and girls (girls are significantly more positive) in relation to the practices adopted by their English teachers and the nature of the work (i.e. the difference was more than 0.2 for six of the seven *Feedback on Teaching and Learning* scales and for twenty-one of the items in the scales).

This finding

- confirms the assumption that in schools where there is a significant gender gap in English outcomes that favoured girls, there would also be significant gender differences in the way that boys and girls view the practices adopted by their English teachers and the nature of the work they are asked to complete with girls viewing these practices more positively.
- reveals those classroom practices that are experienced differently by girls and boys and for which girls have a significantly more positive view than do boys
- reveals there is a range of practices that are not meeting boys' needs and are contributing to them being less engaged than girls in English classes
- reveals that boys are much more likely than girls to:
 - view their English classes as being monotonous and boring (Work Interest gap of 0.3)
 - consider that their teachers reward or value ability rather than effort (Learning Values gap of 0.3)
 - have a poor rapport with or view of their teacher (Teacher Knowledge & Engagement gap of 0.3).

Teacher perceptions of their practices

We found that:

3. teachers regardless of whether they are in schools where the gender gap in English outcomes is large or small generally have a good awareness of how their Year 7 students view the classroom and teaching practices they experience.

Teacher perceptions of efficacy

We found that:

4. teachers regardless of whether they are in schools where the gender gap in English outcomes is large or small generally rate their efficacy highly, the exception being that both groups of teachers registered a low rating for the item 'I am able to get through to unmotivated students in this class'

This finding suggests that supporting teachers to become highly proficient at engaging and motivating disengaged students will not only have a positive impact on the overall level of student attainment in English, it will also make a positive contribution to reducing (or eliminating) any gaps between the outcomes of boys and girls in English.

Teacher perceptions of transitions

We found the following.

5. Teachers in schools where the gender gap in English outcomes is relatively small registered a significantly higher rating than teachers in schools with a relatively high gender gap for the item Q48: 'Year 7 teachers ran transition support programs/activities that were specifically targeted at supporting students to quickly adjust to teaching and learning in this class'.
6. Teachers in both school types rated the following items lowly
 - The student transition information provided by feeder primary schools covers all the information that I consider to be essential for guiding decisions about students' learning plans in this class
 - Opportunities are provided for me to share understandings about teaching and assessment practices for this class with Year 6 teachers in feeder schools

This finding:

- suggests that transition processes (other than Q48) may not contribute to closing the gender gap (but may contribute to reducing the dip in performance when students transition to Year 7)
- suggest that transition support programs/activities that are specifically targeted at supporting students to quickly adjust to teaching and learning will help to close the gender gap in English
- suggests that renewed effort may be needed to promote DET's resources to support cluster transitions strategies (e.g. the Transition Toolkit, network meetings) as these supports provide a means for schools to develop processes to support transitioning students to quickly adjust to Year 7 teaching and learning.

Findings from mathematics students and teachers

Student perceptions of their mathematics classes

We found the following.

7. In classes where there is no significant gender gap in mathematics outcomes there is also no significant gap in the ratings between boys and girls in relation to the practices

adopted by their mathematics teachers and the nature of the work (i.e. the difference was less than 0.2 for the seven *Feedback on Teaching and Learning* scales and for all but one of the items in the scales).

8. In classes where there is a significant gender gap in mathematics outcomes (boys were achieving higher outcomes than girls) there is no significant gap in the ratings between boys and girls in relation to the practices adopted by their mathematics teachers and the nature of the work (i.e. the difference was less than 0.2 for six of the seven *Feedback on Teaching and Learning* scales).

These two findings

- contradict the assumption that in schools where there is a significant gender gap in Mathematics outcomes that favoured boys, there would also be significant gender differences in the way that boys and girls view the practices adopted by their mathematics teachers and the nature of the work they are asked to complete with girls viewing these practices more positively
- appears to give weight to views expressed in the research literature that the most influential factors on girls' mathematics learning are external and are only marginally related to classroom practices. These external factors include family attitudes and community norms about girls' roles and interests which impact on girls' perceptions of their capability in mathematics and undermine their confidence to continue mathematics studies. (A possible exception to this supposition is the importance that teachers in no-gap schools placed on providing transitioning students with a program that supported them to quickly adjust to the different 'academic' practices in their Year 7 mathematics classes.)
- may also be a reflection of the findings in TIMMS that there are no significant or minimal gender differences in mathematics results at Year 4 and Year 8 and that it is only in the upper bands of achievement and in higher socio-economic groups where differences become evident

Teacher perceptions of their practices

We found that:

9. teachers regardless of whether they are in schools where the gender gap in mathematics outcomes is large or small generally rate their school practices highly
10. teachers in schools where the gender gap in mathematics outcomes is relatively low rated three of the five questions significantly higher than teachers in schools with a relatively high gender gap. These Type A no-gap school results placed greater emphasis on the expectation that all students can learn, will work hard and will strive to understand their work.

Teacher perceptions of efficacy

We found that:

11. teachers regardless of whether they are in schools where the gender gap in mathematics outcomes is large or small generally rate their efficacy highly
12. teachers in schools where the gender gap in mathematics outcomes is large registered a significantly higher rating for the item 'I am able to get through to unmotivated students in this class' than did teachers in schools with a relatively low gender gap and both teacher groups rated this item lower than any other items

This finding:

- suggests that supporting teachers to become highly proficient at engaging and motivating disengaged students will not only have a positive impact on the overall level of student attainment in mathematics, it will also make a positive contribution to reducing (or eliminating) any gaps between the outcomes of boys and girls in mathematics.

Teacher perceptions of transitions

We found that:

13. teachers in both school types rated the following items lowly

- The student transition information provided by feeder primary schools covers all the information that I consider to be essential for guiding decisions about students' learning plans in this class
- Transition processes include activities that have been specifically designed to help build continuity between Year 6 and 7 curriculum and pedagogy
- Opportunities are provided for me to share understandings about teaching and assessment practices for this class with Year 6 teachers in feeder schools.

This finding:

- suggests that renewed effort may be needed to promote DET's resources to support cluster transitions strategies (e.g. the Transition Toolkit, network meetings) as these supports address the transition concerns expressed by teachers

1. Past evidence: informing the conceptual framework

Performance differences

A meta-analysis of past research findings (see separate report *Performance and Past Research*) shows that gender differences in performance cannot be described in unequivocal terms. While there are accepted national and international patterns observable at a high level, where boys tend to perform better in mathematics and girls are better in English, there is also wide variation across stages of schooling, performance levels, nature of tasks, and socio-economic status.

In English, gender differences in favour of girls are greater for the expressive modes of literacy (writing and speaking) than for the receptive modes (reading and listening and viewing). The greatest gender difference occurs in writing and the least for viewing. A higher proportion of females than male students perform at the highest levels. This gender difference in achievement does not widen significantly between Year 3 and Year 5 or between Year 5 and Year 7.

In mathematics, Australian female students are more likely to be outperformed by their male peers in the higher performing bands but it is the reverse at the lower performance levels where the proportion of girls at or above the minimum standard is higher than boys. There are only slight gender differences in mathematics at commencement of school and at Year 3 (where boys of a higher SES perform higher SES girls) but in some assessments a gap becomes evident by Year 8 and beyond. What is apparent in Australia and internationally is that girls are generally less engaged with mathematics, less likely to pursue studies in mathematics, and less likely to choose career pathways that involve mathematics and science.

Explanations of the gaps

The explanations for these gender differences are complex and varied. The OECD concluded from their analysis of 2012 PISA data that gender disparities do not stem from innate differences in aptitude but rather from student attitudes to learning, their behaviours for learning, including use of their leisure time, and the confidence they have in their abilities as students.

Factors other than gender and outside the immediate impact of classroom and school (e.g. socio-economic background, ethnicity, location, social expectations) may be equally or more important in explaining the gaps in performance

Explanations for boys' (relatively poorer) performance in English are not the same as the explanations for girls' (relatively poorer) performance in mathematics.

Explanations includes that boys and girls place difference value on the importance of learning mathematics and reading; which in turn produces differences in the levels of boys' and girls' engagement with learning, motivation to learn and belief in success.

For boys and literacy – their capacities may not be sufficiently engaged in learning and they do not consistently have opportunities for building a positive self-belief

For girls and numeracy – they tend to be more afraid of mathematics as they move through school, see less intrinsic value in it and actually prefer other activities.

Strategies that work

The strength of the evidence base for proven education strategies is similarly variable. Empirically tested strategies tend to be only moderate to weak in the strength of their evidence. While evidence consistently refers to the role of family and the wider social context in shaping attitudes and behaviours to school and learning, the focus of concrete strategies to address gender gaps are directed more to school or classroom level changes and what can be regarded as generally inclusive and effective teaching.

Conceptual framework

The research overview has informed the assumptions to be explored in this project. The core assumptions are:

- school factors, classroom cultures and teaching practices appear to contribute to gender differences in learning outcomes in Mathematics and English
- school factors, classroom cultures and teaching practices appear to reduce or ameliorate gender differences in learning outcomes in Mathematics and English
- evidence-based teaching practices are evident that assist in addressing gender based differences in Year 6-7 transition and are transferable.

2. School selection strategy

Project Schools

Sixteen secondary schools agreed to participate in the Gender-based Differences in Years 6 and 7 Transition Outcomes project. Where possible schools that met the criteria and could provide the project with data from both English and mathematics classes (because their gender gaps were 'atypically' small or 'atypically' large) were selected for the project as this optimised the number of students and teachers within the school that could be registered to complete the teacher and student questionnaires. Nine schools met the criteria for both their mathematics and English classes to be included in the project.

School selection and categorisation

Following advice from the VCAA it was determined that for this research project the most apt proxy for determining schools' English outcomes was Year 7 NAPLAN reading assessment scores. These scores were analysed by DET Research Branch (?) to identify the cohort of schools that should be invited to participate in the research.

This process identified those schools where the gap between boys and girl's reading scores were least evident (Type A1 schools) and most evident (Type B1 schools).

Numeracy scores from Year 7 NAPLAN tests were analysed by DET Research Branch (?) to identify the cohort of schools that should be invited to participate in the research. This process identified those schools where the gap between boys' and girls' numeracy scores was least evident (Type A2 schools) and most evident (Type B2 schools).

Type A schools are those where the gender gap is smallest.

Type B schools are those where the gender gap is largest.

Type 1 schools are schools where their English classes met the selection criteria.

Type 2 schools are schools where their mathematics classes met the selection criteria.

Schools where English scores met the selection criteria

School	English School Type
Ballarat High School	A1
Bundoora Secondary College	A1
Geelong High School	A1
Upwey High School	A1
Oberon High School	A1
Sunbury College	A1
Elisabeth Murdoch College	A1
Eaglehawk Secondary College	B1
Mornington Secondary College	B1
Warragul Regional College	B1
Melba Secondary College	B1
Tallangatta Secondary College	B1

Schools where Mathematics scores met the selection criteria

School	Maths School Type
Eaglehawk Secondary College	A2
Mornington Secondary College	A2
Warragul Regional College	A2
Ballarat High School	B2
Bundoora Secondary College	B2
Geelong High School	B2
Upwey High School	B2
Elisabeth Murdoch College	B2
Essendon East Keilor District College	B2
Grovedale College	B2
Heathmont College	B2
Lara Secondary College	B2

Number of classes and students

Eighty nine English classes and 2,075 English students and 83 mathematics classes and 2,019 mathematics students were enrolled in the research project.

English and mathematics class and student numbers per school

English classes were	Number of English Classes	Number of Registered English Students	Number of Maths Classes	Number of Registered Maths Students
Ballarat High School	10	251	10	251
Bundoora Secondary College	3	60	3	60
Eaglehawk Secondary College	6	137	6	137

Elisabeth Murdoch College	14	243	14	243
Essendon East Keilor District College			4	80
Geelong High School	7	164	7	164
Grovedale College			7	172
Heathmont College	4	97	4	97
Lara Secondary College			5	115
Melba Secondary College	4	90		
Mornington Secondary College	12	311	12	311
Oberon High School	4	90		
Sunbury College	7	164		
Tallangatta Secondary College	7	79		
Upwey High School	5	121	5	121
Warragul Regional College	6	268	6	268
	89	2075	83	2019

3. Data gathering strategy

Questionnaire design

The core questionnaire items in the *Transition Years Feedback Questionnaires* (TYFQs) were extracted from the validated *Feedback on Teaching and Learning Questionnaires*.

The *Feedback on Teaching and Learning Questionnaire* (FTLQ) was designed by Dr Jean Russell as an instrument that collects feedback about students' and teachers' experience in the individual classroom. This questionnaire is based on the major constructs found in the research literature to be important to pedagogy and learning.

The questionnaire is designed to be completed by the students within a particular class and also by the teacher of that class. Responses on items in the questionnaires are grouped as scales for reporting purposes. The results illuminate two perspectives: the students' experience of the teaching and learning in that class, as well as the teacher's perception of the students' experience.

Access to the questionnaires and reports is via an online system. Each teacher and student was issued a username/password to login and complete their questionnaire.

The teacher of each class is provided a confidential online summary report of the survey findings.

PTR selected 7 of the 12 *TFLQ* scales to be the core of the *Transition Years Feedback Questionnaire* (TYFQ). These scales require 39 questions to be responded to. The 7 scales focus on those attitudes and practices that most relate to the classroom factors identified in the literature as being significant for strengthening girls' outcomes in mathematics and boys' outcomes in English. The seven scales are as follows:

- *Value of Work* scale: Work is seen to be important, meaningful and worth doing.
- *Collaborative Skills* scale: Through practice in collaborative learning, students develop a range of associated skills.

- *Learning Values* scale: Students understand that the values emphasized in their class are depth of understanding and effortful learning for all students.
- *Positive Attitude* scale: The teacher encourages student self-confidence, perseverance and efficacy.
- *Feedback* scale: Feedback is frequent, prompt, individual and formative.
- *Teacher Knowledge and Engagement* scale: Students see the teacher as knowledgeable about content and process, as well as being someone who enjoys teaching the students in the class and the subject being taught.
- *Work Interest* scale: Work is experienced as interesting and absorbing rather than monotonous and boring.

These scales are based on the concept that two global aspects of school life affect student engagement in learning: the culture of work and learning offered to students and the culture of relationships and interactions they experience².

Further questions were derived from OECD PISA indices for mathematics and literacy classroom practices (see research overview p. 17). They have been designed to identify the school level culture and gender specific subject practices and teacher beliefs.

Qualitative data collection

A series of open ended questions are included in the surveys for teachers and students. To supplement the teacher comments, teachers in schools that have no or minimal gaps in gender performance for English and Mathematics have been engaged in group interviews to delve further into their teaching practices and to explore any particular issues they raised in the open ended questions.

An invitation was also issued to teachers in their main feeder primary schools to explore in discussion their transition practices in relation to social /emotional issues and curriculum and teaching practices.

Themes include:

- Primary and secondary teachers' capacity and willingness to co-operate in facilitating transitions, particularly to share curriculum and pedagogical practices in literacy and numeracy – are there gender specific aspects; what is done; advice for others?
- Classrooms practices in more detail in 'no gap' schools and any explicit variations in boys and girls learning – is there an active focus on boys' and girls' needs; what forms does it take?
- Teachers' professional practices and the extent to which they relate and plan professionally, document their curriculum and practices, engage in professional learning teams on literacy and/or numeracy – do you work as a team in maths; do you have a written program or tools you could share?

Quantitative data interpretation

As mentioned above, the survey items and scales are based on those attitudes and practices that most relate to the classroom factors identified in the literature as being significant for strengthening girls' outcomes in mathematics and boys' outcomes in English.

² Newmann, F., Wehlage, G. and Lamborn, S. (1992). The significance and sources of student engagement. In F. M. Newmann (Ed.), *Student engagement and achievement in American schools* (pp. 11-39). New York: Teachers College Press.

Thirty-nine of the items in the student questionnaire are not subject specific or gender specific. These items describe the practices that contribute to quality teaching and contribute to more inclusive teaching when they are equally applied to boys and girls. For example, if the item 'The work the teacher gives us is worth doing' is rated highly by both boys and girls this indicates all students regardless of gender consider the work that they are doing is worthwhile. Providing students with work that they consider being worthwhile is a factor that contributes to high achievement.

The questionnaire items are rated on a five-point scale where a score of 3.5 would be considered a medium to high level of agreement and signal that the item is likely to be a fairly common feature of students' classroom experience. A gap of 0.2 or above between the ratings of boys and girls is a significant difference. (As the ratings and the identified gaps between boys and girls are calculated to the fifth decimal point and the scores in the report's tables have been 'rounded up' to only one decimal point, sometimes the gender difference calculations appear to be incorrect. This is not the case. The gap calculations are an accurate representation of actual differences.

The patterns of findings arising from analysing various data sets do not establish causal relationships but they identify a high correspondence or low correspondence between particular classroom and teaching practices and a high or low gender gap in performance.

If there was a significant gap between the agreement scores of girls and boys with boys scoring the item higher then this would suggest that girls' are likely to be less motivated to learn than boys because they do not think the work they are being asked to do is important.

If students are in classes where there is no gap between the outcomes of boys and girls, and yet there is a gap between boys and girls on the 'value of work' item above, implementing strategies to lift girls' perceptions of the value of work is likely to lift overall performance but as there is no gender gap has no relevance or importance when seeking to explain what has contributed to the class having no performance gender gap.

However, in a class where there is a gender gap in performance and a significant gap between the agreement scores of girls and boys with boys scoring the value of work item significantly higher, then implementing strategies to lift girls' perceptions of the value of work is likely to lift girls' performance and close the gap between gender outcomes.

As improvement is about both 'lifting the bar' and 'closing the gap' (e.g. between boys and girls and between students from low and socio-economic backgrounds), in some instances the findings from the various analyses of the questionnaire data reveal items where particular strategies are likely to play a role in reducing gender performance gaps and particular strategies are likely to play a role in lifting all students' performance.

Most observations made above also apply to the teachers' questionnaire and how the data from teachers' responses is to be interpreted. Whist the main question to answer is are teachers in classes where there is no gender gap consistently using particular classroom and teaching practices that are not being used by teachers in classes with a high gender gap.

The items in the questionnaires have been included because they are proxies for evidence-based 'quality practices' that interact with each other to produce high learning outcomes and proxies for English and mathematics specific practices that complement these more general practices. Consequently, if a range of items is rated significantly higher by teachers in classes where there is no significant gender gap (i.e. a 0.2 or greater difference between no gap and high gap teacher ratings) it can be assumed that the adoption of these practices is likely to assist schools with a large gender gap to reduce this gap.

It is also the case that responses to particular questionnaire items may not reveal any gender gap between the scores of teachers in classes with a high or low gap yet the items have scores below 3.5. Scores of this nature reveal that some evidence-based practices represented in the questionnaire are not a strong feature of these classes. It could be worthwhile considering these low scoring items even though their adoption might not contribute to closing a gender gap, it might contribute to lifting overall performance outcomes.

4. Questionnaire participation rates

Questionnaire participation rates were 55% for students in English classes, 51% for students in mathematics classes, 75% for English teachers and 81% for mathematics teachers.

Student participation rates

Thirteen schools that met the criteria for English had their students registered to participate in the student questionnaire. This amounted to 2,075 Year 7 English students from 89 different classes. Of these registered students, 1,149 (55%) participated in the questionnaire.

Twelve schools that met the criteria for mathematics had their students registered to participate in the student questionnaire. This amounted to 2,019 Year 7 mathematics students from 83 different classes. Of these registered students, 1,028 (51%) participated in the questionnaire.

Student questionnaire participation rates

English	Schools	Classes	Registered Students	Students Attempted Questionnaire	% Questionnaire Attempted
English Type A schools	7	50	1093	625	57%
English Type B schools	6	39	982	524	53%
Total	13	89	2075	1149	55%

Mathematics	Schools	Classes	Registered Students	Students Attempted Questionnaire	% Questionnaire Attempted
Maths Type A schools	3	24	716	368	51%
Maths Type B schools	9	59	1303	660	51%
Total	12	83	2019	1028	51%

Teacher participation rates

Eighty nine teachers of Year 7 English from 13 schools registered to participate in the teacher questionnaire. Sixty-seven (75%) of these registered teachers participated in the questionnaire

Eighty three teachers of Year 7 mathematics from 12 schools registered to participate in the teacher questionnaire. Sixty-seven (81%) of these registered teachers participated in the questionnaire

Teacher questionnaire participation rates

English	Schools	Classes	Registered Class Teachers	Teachers Attempted Questionnaire	% Teacher Questionnaires Attempted
Type A schools	7	50	50	41	82%
Type B schools	6	39	39	26	67%
Total	13	89	89	67	75%

Mathematics	Schools	Classes	Registered Class Teachers	Teachers Attempted Questionnaire	% Teacher Questionnaires Attempted
Type A schools	3	24	24	20	83%
Type B schools	9	59	59	47	80%
Total	12	83	83	67	81%

5. Quantitative findings in relation to gender outcomes in English

Following advice from the VCAA, it was determined that for this research project the most apt proxy for determining schools' English outcomes was Year 7 NAPLAN reading assessment scores. These scores were analysed by DET to identify the cohort of schools that should be invited to participate in the research. This process identified those schools where the gap between boys and girls' reading scores were least evident (Type A1 schools) and most evident (Type B1 schools).

Student feedback on Teaching and Learning Scales by English School Type

Questionnaire scale scores in schools with small gender outcome differences in English

One of the assumptions underpinning the research design was that in School Type A1 schools (i.e. those schools that were selected because there was no significant gender difference in their Year 7 NAPLAN reading results) was that there would be very little difference between boys' and girls' mean scores for the seven questionnaire scales related to 'good instructional practice and a positive classroom culture'. This assumption was based on the expectation that high quality teaching and classroom practices would optimise the learning opportunities of all students regardless of gender.

An analysis of the data derived from English Type A schools (i.e. schools where there was no significant gender gap in NAPLAN reading outcomes) revealed that there was very little difference (i.e. the difference was less than 0.2) in the ratings of boys and girls for the seven *Feedback on Teaching and Learning* (FTLQ) scales.

This finding confirms the assumption that in schools where there is no significant gender gap in English outcomes there would be no (or insignificant) gender differences in the way that boys and girls view the practices adopted by their English teachers and the nature of the work they are asked to complete.

Scale score differences in schools with small gender outcome differences in English

English	School Type A1-Female	School Type A1-Male	School Type A1-Gender Diff (Female vs Male)
N	275	291	
SD	0.7	0.8	
Value of Work Scale	3.8	3.7	0.1
N	279	287	
SD	0.8	0.9	
Work Interest Scale	3.3	3.2	0.1
N	276	293	
SD	0.6	0.7	
Collaborative Skills Scale	3.7	3.6	0.0
N	273	285	
SD	0.7	0.7	
Positive Attitude scale	3.8	3.7	0.0
N	275	287	
SD	0.6	0.7	
Feedback Scale	3.9	3.8	0.0

N	274	278	
SD	0.6	0.6	
Learning Values Scale	4.1	4.1	0.1
N	278	293	
SD	0.7	0.8	
Teacher Knowledge & Engagement Scale	4.0	3.9	0.1

These findings reveal that in these schools both boys and girls have similar views about the following factors:

- *Value of Work*: Work is seen to be important, meaningful and worth doing.
- *Work Interest*: Work is experienced as interesting and absorbing rather than monotonous and boring.
- *Collaborative Skills*: Through practice in collaborative learning, students develop a range of associated skills.
- *Positive Attitude*: The teacher encourages student self-confidence, perseverance and efficacy.
- *Feedback*: Feedback is frequent, prompt, individual and formative.
- *Learning Values*: Students understand that the values emphasized in their class are depth of understanding and effortful learning for all students.
- *Teacher Knowledge and Engagement*: Students see the teacher as knowledgeable about content and process, as well as being someone who enjoys teaching the students in the class and the subject being taught.

This is a particularly powerful finding.

It reveals those attitudes and practices at the school and classroom level that appear to have the greatest effect on reducing gender learning differences in relation to English.

It suggests that supporting teachers to adopt the evidence based teaching and classroom practices that underpin the questionnaire scales will help to lift the overall level of student attainment by closing the performance gap between boys and girls in English.

Questionnaire scale scores in schools with large gender outcome differences in English

One of the assumptions underpinning the research design was that in School Type B1 schools (i.e. those schools that were selected because there was a significant gender gap in their Year 7 NAPLAN reading results) was that there would be a significant difference between boys' and girls' mean scores for the seven questionnaire scales related to 'good instructional practice and a positive classroom culture'. This assumption was based on the expectation that the perceptions of boys and girls would be different (i.e. boys would produce lower ratings than girls) in relation to the teaching and classroom practices they experienced.

An analysis of the data derived from English Type B schools (i.e. schools where girls perform significantly better than boys in NAPLAN reading outcomes) revealed that there are significant differences (i.e. the difference was 0.2 or greater) in the ratings of boys and girls for six of the seven *Feedback on Teaching and Learning* (FTLQ) scales and that in each case, female students scored higher than male students on the scale. The biggest difference was for *Work Interest*, *Learning Values* and the *Teacher Knowledge & Engagement* scales.

This finding confirms the assumption that in schools where there is a significant gender gap in English outcomes that favoured girls, there would also be significant gender differences in the way that boys and girls view the practices adopted by their English teachers and the nature of the work they are asked to complete with girls viewing these practices more positively.

Scale score differences in schools with large gender outcome differences in English

English	School Type B1- Female	School Type B1- Male	School Type B1- Gender Diff (Female vs Male)
N	232	255	
SD	0.8	0.9	
Value of Work Scale	3.7	3.5	0.2
N	236	254	
SD	0.9	0.9	
Work Interest Scale	3.3	3.0	0.3
N	239	255	
SD	0.7	0.8	
Collaborative Skills Scale	3.5	3.4	0.1
N	237	254	
SD	0.7	0.8	
Positive Attitude scale	3.8	3.6	0.2
N	235	249	
SD	0.7	0.7	
Feedback Scale	3.8	3.6	0.2
N	231	254	
SD	0.7	0.7	
Learning Values Scale	4.1	3.9	0.3
N	238	256	
SD	0.7	0.9	
Teacher Knowledge & Engagement Scale	4.0	3.7	0.3

These findings reveal that in these schools girls have a significantly more positive view than do boys about the following factors:

- *Value of Work*: Work is seen to be important, meaningful and worth doing.
- *Work Interest*: Work is experienced as interesting and absorbing rather than monotonous and boring.
- *Positive Attitude*: The teacher encourages student self-confidence, perseverance and efficacy.
- *Feedback*: Feedback is frequent, prompt, individual and formative.
- *Learning Values*: Students understand that the values emphasized in their class are depth of understanding and effortful learning for all students.
- *Teacher Knowledge and Engagement*: Students see the teacher as knowledgeable about content and process, as well as being someone who enjoys teaching the students in the class and the subject being taught.

Most tellingly boys are much more likely than girls to:

- view their English classes as being monotonous and boring (Work Interest gap of 0.3)
- consider that their teachers reward or value ability rather than effort (Learning Values gap of 0.3)
- have a poor rapport with or view of their teacher (Teacher Knowledge & Engagement gap of 0.3).

This is a particularly powerful finding.

It reinforces the previous finding in relation to schools where there is no significant gap in the outcomes and perceptions of girls and boys in English classes and the suggested action that in order to reduce the gender gap teachers need to be supported to implement those instructional and classroom practices that are most likely to increase boys' engagement and success in English. The answer to appears to lie

Or to express this finding another way, it reveals that in schools where there is a significant gap between boys and girls English outcomes there is a range of practices that are not meeting boys' needs and are contributing to them being less engaged than girls in English classes.

The following section provides a deeper analysis of the questionnaire responses and discusses findings in relation to the respective items in the questionnaire scales.

Student feedback on Teaching and Learning Scale Items by English School Type

One of the assumptions underpinning the research design was that the scores for each of the items/statements making up the seven scales are likely to reveal practices that are strongly associated with classes where the gender gap is least evident or most evident.

Questionnaire scale item scores in schools with small gender outcome differences in English

For English Type A schools, where scale scores for boys and girls were similar, there was only one question where the absolute difference between the average item scores for females and males was greater the 0.2. Whilst both boys and girls scored the item 'Our teacher believes all of us are able to learn' highly (≥ 4), girls' responses were more positive than those for boys.

	Question	Type A1- Female	Type A1- Male	Gender Diff (>0.2)
Q36	Our teacher believes all of us are able to learn.	4.3	4.1	0.2

The comments provided above in relation to the positive scale findings in English Type A schools also apply to these findings.

Questionnaire scale item scores in schools with large gender outcome differences in English

For English B schools, there were twenty-one questions where the absolute difference between the average item scores for females and males was greater the 0.2 and 10 questions where the absolute difference between the average item scores for females and males was greater the 0.3.

In all cases except for Q43, female students were more positive than male students. Female students were more positive than male students for the transition question 40:

"The support I received when moving from Grade 6 to Year 7 helped me to really understand what this class would be like."

For the domain specific classroom activity questions, female students were more positive than male students for question 45: "My teacher gives me advice, tips and good ideas to help improve my writing"; while male students were more positive than female students for question 43: "My teacher asks me questions about what I'm reading to help me understand difficult words or sentences".

	Question	School Type B1- Female	School Type B1- Male	Gender Diff (>0.2)
FTLQ Items				
Q3	The teacher expects us to gain a thorough understanding of our work in this class.	4.2	4.0	0.2
Q5	At times I become so absorbed by what we're doing in this class that time flies by.	3.4	3.1	0.3
Q16	Our teacher enjoys working with students.	3.9	3.5	0.3
Q18	Our teacher wants to help us understand our work as fully as possible.	4.2	3.9	0.3
Q19	Our teacher organises assessment of work so we get prompt feedback on what we've done.	3.8	3.6	0.2
Q20	The teacher is an expert in this subject.	4.0	3.7	0.2
Q21	The teacher appreciates students who try hard in this class.	4.2	4.0	0.2
Q22	This class is not boring.	3.2	2.9	0.3
Q25	Our teacher believes learning is about depth of understanding rather than doing better than others.	3.9	3.6	0.3
Q26	Our teacher likes being with the students in this class.	3.8	3.5	0.3
Q27	The teacher gets us to explore one another's answers to questions.	3.5	3.3	0.2
Q30	Our teacher enjoys teaching this subject to our class.	3.9	3.6	0.3
Q31	Time doesn't drag by in this class.	3.1	2.9	0.2
Q34	Our teacher shows us where we could have detected errors in our work ourselves.	3.8	3.6	0.2
Q36	Our teacher believes all of us are able to learn.	4.2	3.9	0.3
Q37	The topics I study in this class are ones that interest me.	3.3	3.0	0.3
Q38	Our teacher knows greater effort means improved learning in this class.	4.0	3.7	0.2
Q39	The teacher encourages us to persist with work in spite of difficulties.	3.9	3.7	0.2
Transition				
Q40	The support I received when moving from Grade 6 to Year 7 helped me to really understand what this class would be like.	3.6	3.3	0.3
Domain specific classroom activities				
Q43	My teacher asks me questions about what I'm reading to help me understand difficult words or sentences	2.6	2.9	-0.2
Q45	My teacher gives me advice, tips and good ideas to help improve my writing	3.6	3.4	0.2

This is a particularly powerful finding as it reveals ten items where there is a large difference (0.3) between how girls and boys experience their English classes.

It reveals those attitudes and practices at the school and classroom level that appear to have the greatest effect on reducing gender learning differences in relation to English.

Several items where boys' ratings were significantly lower than girls suggest that boys are bored by or uninterested in the work they are expected to do and feel that their teachers

are not giving them positive reinforcement and are not doing enough to assist them to improve.

Teacher feedback

Teacher efficacy, school practices and belief, gender, and transition in English classes

The teacher questionnaire included 13 questions about teacher efficacy, school practices and belief, gender, and transition.

Average ratings for three of the four teacher efficacy questions were very high (>4) in both schools where there is no significant gender gap (Type A schools) and where there is a significant gap in gender outcomes (Type B schools).

There was no significant difference between English Type A schools and English Type B schools for three of the four questions. There was a difference of 0.2 for question 50 but as both Type A schools and Type B schools rated this question very highly it is concluded that teachers in both settings have high expectations of their students' learning.

Teachers in both settings registered their lowest score for the item 'I am able to get through to unmotivated students'.

Teacher efficacy score differences in English Type A and Type B schools

Teacher efficacy		Average: English Type A Schools	Average: English Type B Schools	Difference
Q50	I have high expectations of my Year 7 students' learning.	4.4	4.6	-0.2
Q52	I take responsibility for sustaining my Year 7 students' engagement in learning.	4.4	4.3	0.1
Q46	I feel good about my Year 7 teaching style and strategies because they are successful.	4.1	4.1	0.0
Q51	I am able to get through to unmotivated students in this class.	3.5	3.6	-0.1

In terms of school practices, the ratings on the five questions about school practices were medium to high.

Teachers' ratings in English Type B (gender gap) schools were significantly higher than teacher ratings English Type A (no gender gap) schools in four of the five questions. This is an unexpected outcome in relation to items 43, 44 and 55 which are items that mirror questions in the students' questionnaire. Whilst teachers in classes where there is no significant gender gap in English outcomes rated these three items highly (4.0 and above), teachers in classes with a significant gender gap rated two of these items significantly higher than teachers in Type A schools.

This suggests that in general Type B teachers are not estimating student perceptions accurately which could result in them overestimating the extent to which these desired school practices are permeating classes.

School Practices score differences in English Type A and Type B schools

School Practices		Average: English Type A Schools	Average: English Type B Schools	Difference
Q55	In this school, teachers believe all students can learn.	4.3	4.3	0.0
Q44	In this school the importance of trying hard is stressed to students.	4.1	4.4	-0.2
Q43	In this school the emphasis is placed on students really understanding their work.	4.0	4.2	-0.2
Q47	Detailed frameworks are available to assist Year 7 literacy and numeracy teachers at our school, including intervention strategies to support both highly capable and struggling students.	3.3	3.7	-0.4
Q54	My school supports me to be aware of strategies to address gender differences in this class.	3.1	3.4	-0.3

In terms of transition, although all teachers rated question 48 highly, teachers in English Type A schools (no gap) registered significantly higher scores than teachers in English Type B schools for this question:

Year 7 teachers ran transition support programs/activities that were specifically targeted at supporting students to quickly adjust to teaching and learning in this class.

Indeed, of all the questionnaire items, this item had the largest gap (0.5) between Group A and Group B schools. This finding indicates that Group A teachers believe that it is really important to provide incoming Year 7 students with of a good start to their schooling year.

It suggest that Year 7 teachers in schools with a significant gender gap would be assisted to close this gap if they were supported to design and implement activities that enable transitioning students to quickly adjust to the teaching and learning practices in their new school.

Transition		Average: English Type A Schools	Average: English Type B Schools	Difference
Q48	Year 7 teachers ran transition support programs/activities that were specifically targeted at supporting students to quickly adjust to teaching and learning in this class.	4.2	3.7	0.5
Q53	Transition processes include activities that have been specifically designed to help build continuity between Year 6 and 7 curriculum and pedagogy.	3.3	3.3	0.1
Q45	The student transition information provided by feeder primary schools covers all the information that I consider to be essential for guiding decisions about students' learning plans in this class.	2.8	3.0	-0.3
Q49	Opportunities are provided for me to share understandings about teaching and assessment practices for this class with Year 6 teachers in feeder schools.	2.3	2.5	-0.2

Teachers in both types of schools rated questions 45 and 49 poorly with English Type B schools significantly higher than English Type A schools for these questions.

Research by Vinson (2006)³ indicates that transition processes are generally effective for students' social and emotional adjustment but less effective for their academic adjustment. This is because transition processes usually do not adequately address how to ameliorate the disjuncture between Year 6 and Year 7 curriculum, pedagogy and assessment practices. This 'academic' disjuncture contributes to the dip in learning when students transfer from Year 6 to Year 7.

The very low ratings for items 45 and 49 and the significantly stronger rating in the Type B schools indicate that these items have no bearing on closing the gender gap. However, the low scores could also indicate, as Vinson has found, that even though these practices may be important for reducing the dip in student outcomes between years 6 and 7 they are either not valued by schools or not available to schools. Often they are perceived as being too difficult to implement.

These findings reinforce the need to promote DET's resources to support cluster transitions strategies (e.g. the Transition Toolkit, network meetings) as they provide strategies for addressing 'academic' adjustment needs that should have a positive outcome on Year 7 learning outcomes.

6. Qualitative findings in relation to gender outcomes in English

Teachers' strategies in schools with no gender gap

The teachers' questionnaire contained two open-ended questions on type of classroom activities that address gender differences.

Question 57a: Describe some of the gender based specific strategies you adopt to engage students in this English class.

Question 58a: Describe other strategies that could be adopted or used more frequently to ensure that Year 7 girls and boys maximise their English learning outcomes

The comments provided in response to these questions are summarised below in the questionnaire scale categories. In hindsight, and after consultations with teachers in schools without a gender gap, the questions are possibly too narrow. Most of the teachers subsequently interviewed did not see that they were addressing gender differences but were catering to a wide spectrum of difference.

In no gender gap schools responses fall into four clear categories from the teacher practices and classroom culture scales. The four categories below are in order of frequency and comments are summarised. The most referred to is work interest and the need to consider diversity in themes and types of work to cater for difference, followed by the importance of collaboration and teamwork.

³ Vinson, T. (2006) Good Transitions: Through the Eyes of Primary and Secondary Principals http://ses.library.usyd.edu.au/bitstream/2123/1916/1/Good_Transitions_Paper.pdf

Teacher practice and classroom culture categories	Current strategies	Future options
1. Work interest – e.g. making lessons interesting and absorbing; diverse activities	<ul style="list-style-type: none"> Expand choice of texts Topics that engage Allow boys to move around in classrooms Allow for different responses – diverse forms e.g. verbal, visual 	<ul style="list-style-type: none"> Practical project work with a more diverse range of tasks Provide a lot more choice and tailored activities Kinaesthetic, interactive and multi-modal tasks Build wider awareness of gender biases through activities and reflection
2. Collaboration – e.g. working in groups, listening to others	<ul style="list-style-type: none"> Group work Open and closed questioning Active learning versus passive 	<ul style="list-style-type: none"> Jigsaw activities – groups and sharing tasks More peer-to-peer assessment and feedback
3. Feedback - clear advice on how to improve	<ul style="list-style-type: none"> Supported learning Scaffolding and support tools 	<ul style="list-style-type: none"> More formative assessment to be positive and support progress Sharing what have been gains for each student Looking more carefully and responding to different learning patterns
4. Attitudes and relationships – helping me to feel more confident	?	<ul style="list-style-type: none"> Better understanding of students socio-cultural context Stronger identification of learning likes and dispositions Identify and avoid gendered language Encouraging student leadership
<i>Teachers in schools with no gender gap in English</i>	<i>N=12</i>	<i>N=21</i>

Teacher future options in schools with a gender gap

In schools with a gender gap teachers indicated options for the future to close the gap. The three categories below are in order of frequency and comments are summarised. Again, work interest is the most mentioned strategy, the second most common set of comments focus on increasing student appreciation of the value of effort and deep understanding and the third concerned with positive relations in a classroom. These are important factors as each is apparent in the characteristics of no-gap classroom.

Teacher practice and classroom culture	English: options for the future
1. Work interest – e.g. making lessons interesting and absorbing; diverse activities	<ul style="list-style-type: none"> More hands on learning tasks Test whether gender tailored structures and options would assist
2. Learning values – e.g. understand work really well; effort matters	<ul style="list-style-type: none"> Encourage effort and working harder Recognition of different learning styles in how work is discussed Encourage students to complete class work and homework

3. Attitudes and relationships – e.g. help to be more confident; strong support to learn; teacher really listens	<ul style="list-style-type: none"> Discuss the need for fairness and equity more often
<i>Teachers in schools with a gender gap in English</i>	N=13

The four scales for which there were no suggested strategies were Value of Work, Feedback, Teacher Knowledge and Engagement and Collaboration.

Student open ended comments: boys with no gender gap in English

The box below summarises the main themes in student open ended comments in English. The questions were

Q55 were the biggest differences between Year 6 and Year 7 English classes?

Q57 What can be done to really help Year 6 students be prepared for this English class?

These are the boys' answers in Year 7 English in schools where there is not a gender gap; we can assume the transition from Year 6 to Year 7 has been relatively successful. The main themes in column two are in order of frequency and the comments are illustrative of those themes.

They are intended to convey in their own terms boys 'top of mind' perceptions around transitions. The comments contain strong messages about different ways of learning in class; the importance of trying harder in writing and reading; and the value of choice and interest.

All themes that feature in past research and this study of boys and improving literacy

Boys Year 7 English – no-gap schools	Student open-ended comments	Sample comments
1. Biggest differences between years 6 and 7	Main themes <ul style="list-style-type: none"> I like that the way we learn is different Teachers want us to improve We have more independence and choice We do more writing; different work; more demanding 	Positives <i>I learn more and I can ask more questions than grade 6 and that's why I found this year easier</i> <i>I had a lot of work sheets in primary school and we read books more and wrote books but in year 7 we don't do that.</i> <i>The teacher makes things more fun than it was back in primary school</i> <i>I had a lot of work sheets in primary school and we read books more and wrote books but in year 7 we don't do that.</i>
2 How to assist Year 6 students prepare	Main themes <ul style="list-style-type: none"> You need to know that Year 7 involves different work Need to show the nature of the Year 7 tasks – provide more opportunities to practice Be prepared for homework 	<i>Read bigger books and write a lot</i> <i>Listen to your teacher</i> <i>You can ask and tell the teachers if you're scared</i> <i>Start to learn different techniques and don't just use old ideas but use your own mates.</i>

7. Quantitative findings in relation to gender outcomes in Mathematics

Following advice from the VCAA, it was determined that for this research project the most apt proxy for determining schools' mathematics outcomes was Year 7 NAPLAN Numeracy assessment scores. These scores were analysed by DET to identify the cohort of schools that should be invited to participate in the research.

This process identified those schools where the gap between boys' and girls' numeracy scores was least evident (Type A2 schools) and most evident (Type B2 schools).

Student feedback on Teaching and Learning Scales by School Type

Questionnaire scale scores in schools with small gender outcome differences in mathematics

One of the assumptions underpinning the research design was that in School Type A2 schools (i.e. those schools that were selected because there was a pattern of no significant gender difference in their Year 7 NAPLAN numeracy results) was that there would be very little difference between boys' and girls' mean scores for the seven questionnaire scales related to 'good instructional practice and a positive classroom culture'. This assumption was based on the expectation that high quality teaching and classroom practices would optimise the learning opportunities of all students regardless of gender. In one sense this was confirmed.

An analysis of the data derived from mathematics Type A schools (i.e. schools where there was no significant gender gap in NAPLAN numeracy outcomes) revealed that there was no significant difference (i.e. the difference was less than 0.2) in the ratings of boys and girls for the seven *Feedback on Teaching and Learning* (FTLQ) scales.

This finding confirms the assumption that in schools where there is no significant gender gap in mathematics outcomes there would be no (or insignificant) gender differences in the way that boys and girls view the practices adopted by their Mathematics teachers and the nature of the work they are asked to complete.

Scale score differences in schools with small gender outcome differences in mathematics

Mathematics	School Type A2-Female	School Type A2-Male	School Type A2-Gender Diff (Female vs Male)
N	153	187	
SD	0.8	0.9	
Value of Work Scale	3.7	3.6	0.1
N	154	182	
SD	0.9	0.9	
Work Interest Scale	3.0	3.0	-0.1
N	153	191	
SD	0.7	0.8	
Collaborative Skills Scale	3.4	3.4	0.0
N	154	183	
SD	0.8	0.8	
Positive Attitude scale	3.8	3.6	0.1
N	153	187	
SD	0.7	0.7	
Feedback Scale	3.7	3.6	0.1

N	150	180	
SD	0.7	0.7	
Learning Values Scale	4.0	3.9	0.1
N	156	189	
SD	0.8	0.8	
Teacher Knowledge & Engagement Scale	3.8	3.7	0.1

These findings reveal that in these schools both boys and girls have similar views about the following factors as they relate to their mathematics classes:

- *Value of Work*: Work is seen to be important, meaningful and worth doing.
- *Work Interest*: Work is experienced as interesting and absorbing rather than monotonous and boring.
- *Collaborative Skills*: Through practice in collaborative learning, students develop a range of associated skills.
- *Positive Attitude*: The teacher encourages student self-confidence, perseverance and efficacy.
- *Feedback*: Feedback is frequent, prompt, individual and formative.
- *Learning Values*: Students understand that the values emphasized in their class are depth of understanding and effortful learning for all students.
- *Teacher Knowledge and Engagement*: Students see the teacher as knowledgeable about content and process, as well as being someone who enjoys teaching the students in the class and the subject being taught.

Questionnaire scale scores in schools with large gender outcome differences in mathematics

A further assumption was that in School Type B2 schools (i.e. those schools that were selected because there was a significant gender gap in their Year 7 NAPLAN numeracy results) was that there would be a significant difference between boys' and girls' mean scores for the seven questionnaire scales related to 'good instructional practice and a positive classroom culture'. This assumption was based on the expectation that the perceptions of boys and girls would be different (i.e. boys would produce lower ratings than girls) in relation to the teaching and classroom practices they experienced. This assumption was not confirmed.

An analysis of the data derived from Mathematics Type B schools (i.e. schools where girls perform significantly better than boys in NAPLAN numeracy outcomes) revealed that there are no significant differences (i.e. the difference was less than 0.2) in the ratings of boys and girls for the seven *Feedback on Teaching and Learning* (FTLQ) scales.

This finding runs counter to the findings for English.

We anticipated there would also be significant gender differences in Year 7 mathematics in the way that boys and girls view the practices adopted by their mathematics teachers and the nature of the work they are asked to complete.

Scale score differences in schools with large gender outcome differences in mathematics

Mathematics	School Type B2-Female	School Type B2-Male	School Type B2-Gender Diff (Female vs Male)
N	282	326	
SD	0.8	0.8	
Value of Work Scale	3.9	3.9	0.0

N	283	330	
SD	0.9	0.9	
Work Interest Scale	3.2	3.3	-0.1
N	289	318	
SD	0.8	0.7	
Collaborative Skills Scale	3.5	3.7	-0.1
N	282	327	
SD	0.7	0.7	
Positive Attitude scale	3.8	3.9	0.0
N	283	325	
SD	0.7	0.7	
Feedback Scale	3.8	3.9	-0.1
N	279	327	
SD	0.6	0.6	
Learning Values Scale	4.2	4.1	0.0
N	290	328	
SD	0.8	0.7	
Teacher Knowledge & Engagement Scale	4.1	4.1	0.0

This is an intriguing finding.

It appears to give weight to views expressed in some of the research literature that the most influential factors on girls' mathematics learning are external and are only marginally related to classroom practices. These external factors include family attitudes and community norms about girls' roles and interests which impact on girls' perceptions of their capability in mathematics and undermine their confidence to continue mathematics studies. (An exception to this supposition is the importance that that teachers in Type A no-gap schools placed on providing transitioning students with a program that supported them to quickly adjust to the different 'academic' practices in their Year 7 mathematics classes.)

This result may also be a reflection of the findings in TIMMS that there are no significant or minimal gender differences in mathematics results at Year 4 and Year 8 and that it is only in the upper bands of achievement and at higher socio-economic levels where differences become evident.

But these possible interpretations of the results do not adequately explain why girls who registered similar perceptions to boys about the teaching practices and classroom culture would do so when they are in schools/classes where boys are outperforming them in mathematics. It would be expected that if they value their mathematics work and find it as interesting as boys and if they are equally satisfied with their teacher's instructional practices as boys then they would be achieving outcomes similar to boys.

Student feedback on Teaching and Learning Scale Items by Mathematics School Type

One of the assumptions underpinning the research design was that the scores for each of the items/statements making up the seven scales are likely to reveal practices that are strongly associated with classes where the gender gap is least evident or most evident.

Questionnaire scale item scores in schools with small gender outcome differences in mathematics

For Mathematics A schools, there were two questions where the absolute difference between the average item scores for females and males was greater the 0.2.

	Question	Type A2- Female	Type A2- Male	Gender Diff (>0.2)
FTLQ Items				
Q28	We get practice at working out disagreements between students through doing tasks in groups.	3.0	3.3	-0.3
Q37	The topics I study in this class are ones that interest me.	2.9	3.1	-0.2

Responses to Q28 and Q37 indicate that the boys are more positive than the girls for both questions even though these are Type A students where there is little difference in Numeracy NAPLAN results.

Questionnaire scale item scores in schools with large gender outcome differences in mathematics

Mathematics B schools had a difference of -0.2 for Q28 but no significant difference for Q37. In all these cases, male students were more positive than female students. This pattern of significantly higher responses from the boys is as expected as the gender gap is an outcome of boys achieving higher outcomes than girls.

For Mathematics B schools, there were four questions (three of which were questions relating to Domain specific classroom activities) where the absolute difference between the average item scores for females and males was greater the 0.2. The responses to these questions indicate that boys are more engaged than girls; feel more supported than girls and have more opportunities to work with others. These findings are as expected.

The findings in relation to Q28 in Type B schools were the same at the findings for Q28 in Type A schools.

	Question	School Type B2- Female	School Type B2- Male	Gender Diff (>0.2)
FTLQ Items				
Q28	We get practice at working out disagreements between students through doing tasks in groups.	3.3	3.5	-0.2
Domain specific classroom activities				
Q51	My teacher encourages me to work with others to think my way through a maths problem	3.3	3.6	-0.3
Q53	My teacher explains why learning maths is important	3.5	3.8	-0.3
Q54	My teacher chooses everyday problems when setting tasks to do in maths	3.5	3.7	-0.3

Significantly, there was no significant gender difference in mathematics Type B schools on the transition question 40:

"The support I received when moving from Grade 6 to Year 7 helped me to really understand what this class would be like."

Teacher feedback on questionnaire items

Teacher efficacy

The teacher questionnaire included 13 questions about teacher efficacy, school practices and belief, gender, and transition.

Average ratings for teacher efficacy were very high (>4) for three of the four questions. There was significant difference between Maths Type A schools and Maths Type B schools for Q46 and Q51. Surprisingly, Maths Type A schools rated Q51 less than Maths Type B schools.

Teacher efficacy score differences in Mathematics Type A2 and Type B2 schools

Teacher efficacy		Average: maths Type A Schools	Average: maths Type B Schools	Difference
Q50	I have high expectations of my Year 7 students' learning.	4.4	4.4	0.1
Q52	I take responsibility for sustaining my Year 7 students' engagement in learning.	4.3	4.2	0.0
Q46	I feel good about my Year 7 teaching style and strategies because they are successful.	4.0	3.8	0.2
Q51	I am able to get through to unmotivated students in this class.	3.3	3.6	-0.3

Teachers in Type A schools were less confident in their ability to 'get through to unmotivated students' than teachers in Type B schools and scored this item lowly. This is contrary to expectations.

Teacher views of school practices and beliefs

In terms of school practices, the ratings on the five questions about school practices were medium to high. Maths Type A schools were significantly higher than Maths Type B schools in three of the five questions. As expected teachers in Type A schools rated the importance of student effort higher than teachers in Type B schools and they were more aware of strategies to address gender differences.

School practices		Average: Maths Type A Schools	Average: Maths Type B Schools	Difference
Q55	In this school, teachers believe all students can learn.	4.4	4.2	0.2
Q44	In this school the importance of trying hard is stressed to students.	4.4	4.0	0.3
Q43	In this school the emphasis is placed on students really understanding their work.	3.9	3.9	0.1
Q47	Detailed frameworks are available to assist Year 7 literacy and numeracy teachers at our school, including intervention strategies to support both highly capable and struggling students.	3.3	3.2	0.1
Q54	My school supports me to be aware of strategies to address gender differences in this class.	3.2	3.1	0.2

Teacher views of transition arrangements

Teachers in both types of schools rated questions 45 and 49 poorly with Maths Type B schools significantly higher than Maths Type A schools for these questions.

This was the same pattern displayed by English classes. However a difference between mathematics and English teachers' responses was the importance English Type A teachers placed on Q48 when compared to Type B teachers. This difference is not evident in the mathematics data.

Transition		Average: Maths Type A Schools	Average: Maths Type B Schools	Difference
Q48	Year 7 teachers ran transition support programs/activities that were specifically targeted at supporting students to quickly adjust to teaching and learning in this class.	3.8	3.6	0.1
Q53	Transition processes include activities that have been specifically designed to help build continuity between Year 6 and 7 curriculum and pedagogy.	3.0	3.2	-0.2
Q45	The student transition information provided by feeder primary schools covers all the information that I consider to be essential for guiding decisions about students' learning plans in this class.	2.8	3.0	-0.2
Q49	Opportunities are provided for me to share understandings about teaching and assessment practices for this class with Year 6 teachers in feeder schools.	2.2	2.4	-0.2

The commentary accompanying the transition item findings of English teachers referred to the work of Vinson (2006) who observed that transition processes usually do not adequately address how to ameliorate the disjuncture between Year 6 and Year 7 curriculum, pedagogy and assessment practices. This 'academic' disjuncture contributes to the dip in learning when students transfer from Year 6 to Year 7.

As with English teachers, the very low ratings for items 45 and 49 and the significantly stronger rating in the Type B schools indicate that these items have no bearing on closing the gender gap. Nevertheless, these items appear to be important for reducing the dip in student outcomes between years 6 and 7.

8. Qualitative findings in relation to gender outcomes in mathematics

Teacher strategies in schools with no gender gap

The teachers' questionnaire contained the following two open-ended questions: the comments provided in response to these questions are summarised below.

Question 57a: Describe some of the gender based specific strategies you adopt to engage students in this mathematics class.

Question 58a: Describe other strategies that could be adopted or used more frequently to ensure that Year 7 girls and boys maximise their mathematics learning outcomes

Responses to these questions fall into four categories from the teacher practices and classroom culture scales. The four categories below are in order of frequency and comments are summarised.

TEACHER PRACTICE AND CLASSROOM CULTURE	CURRENT STRATEGIES	FUTURE OPTIONS
1. Work interest – e.g. making lessons interesting and absorbing; diverse activities	<ul style="list-style-type: none"> Developed tasks to suit students interests Chose examples of interest to boys and girls for students who are struggling More tactile activities for boys 	<ul style="list-style-type: none"> Greater breadth of tasks PD for teachers to open up possibilities for greater breadth
2. Attitudes and relationships – e.g. help to be more confident, strong support to learn, teacher really listens	<ul style="list-style-type: none"> Limiting favouritism to boys over girls 	<ul style="list-style-type: none"> Ensure more questions are asked Tasks to be more suited to different learning styles Handle misconceptions quickly to support students making steady progress Eliminate idea of boys being the naughty ones and deserving attention versus girls
3. Value of work – e.g. work is worth doing, its useful in everyday life		<ul style="list-style-type: none"> Relate learning to the real world More breadth of tasks for wider success
4. Collaboration – e.g. working in groups, listening to others	<ul style="list-style-type: none"> Working in small groups Encouraging small discussion groups 	
<i>Teachers from schools with no gender gap in Mathematics</i>	N=8	N=13

The questionnaire scales encompassed seven scales. The three scales for which there were no suggested strategies were Learning Values, Feedback, Teacher Knowledge and Engagement.

Teacher future options in schools with a gender gap

Responses to these questions by teachers in schools where there is a gender gap in Mathematics fall into three categories from the teacher practices and classroom culture scales. The three categories below are in order of frequency and comments are summarised

TEACHER PRACTICE AND CLASSROOM CULTURE	MATHEMATICS: OPTIONS FOR THE FUTURE
1. Work interest – e.g. making lessons interesting and absorbing; diverse activities	Delivery in a variety of formats for different interests More student choice in units around student interests Integrate different areas like sport and music to expand relevance mathematics

2. Learning values – e.g. understand work really well; effort matters	Recognition of different learning styles Improve students attitudes to learning – need to develop the high achievers More help for teachers to differentiate how they teach to suit different needs Build higher expectations for success Develop sense of the value of a strong foundation in numbers Support primaries in preparing students for a different style of learning
3. Collaboration – e.g. working in groups, listening to others	Work in friendship groups – structure it well Expand ways that group work can be conducted
<i>Teachers from schools with a gender gap in mathematics</i>	N= 28

The four scales for which there were no suggested strategies were Value of Work, Feedback, Teacher Knowledge and Engagement and Collaboration.

Student open ended comments: girls with no gender gap in mathematics

The box below summarises the main themes in student open ended comments in mathematics. The questions were

Q55 were the biggest differences between Year 6 and Year 7 mathematics classes?

Q56 When moving from Year 6 to Year 7 the best help I had from my teachers to prepare us for this maths class was...

Q57 What can be done to really help Year 6 students be prepared for this mathematics class?

These are the girls' answers in Year 7 mathematics in schools where there is not a gender gap; we can assume the transition from Year 6 to Year 7 has been relatively successful. The main themes in column two are in order of frequency and the comments are illustrative of those themes.

They are intended to convey students 'top of mind' perceptions around transitions in their own terms.

Strong messages about differentiation in what the class is asked to do; students have a sense their effort is seen and rewarded; the relationships are positive

Girls Year 7 maths – no-gap schools	Student open-ended comments	Sample comments
1. Biggest differences between years 6 and 7	Main themes <ul style="list-style-type: none"> • We work in groups of a similar ability level • Teachers are stricter but encourage / help us • The maths is more difficult • We do more work / we work harder • I am experiencing success - we have goals • Grade 6 was more fun / better 	Positives <i>In my grade 6 class we just had to stay in one group but here we separate so the kids who are not as smart can learn and understand'</i> <i>My year 7 teacher is the best maths teacher I've got and she is always there when i need her</i> <i>Teachers are better at teaching</i>

		<p>Negatives</p> <p><i>I hate it. It's boring and makes me bored. Simply I hate maths</i></p> <p><i>My teacher doesn't explain things as well as in primary school</i></p>
<p>2. The best help I had moving from Year 6 to year 7</p>	<p>Main themes</p> <ul style="list-style-type: none"> • We were told what to expect • Our teachers encouraged us; were friendly • Teacher was supportive • Teachers helped to prepare us academically 	<p><i>Explaining what we would be learning and taking us through the process of everything.</i></p> <p><i>Was that she was saying to me that I could do it and not to give up</i></p> <p><i>My teacher was very, very nice to me. He was explaining things easier and made work much, much more enjoyable</i></p> <p><i>The transition days were very helpful and to start to know who is in your class or some old friends are to meet up on the first day</i></p>
<p>3. How to assist Year 6 students prepare</p>	<p>Main themes</p> <ul style="list-style-type: none"> • Have groups of similar ability • Fewer teachers to deal with • Increase the work and homework load • Show them what is expected • Support friendship groups 	<p><i>Have tests and AusVELS groups to help them move into their comfortable areas of maths.</i></p> <p><i>Get them to get the hang of being in different groups and not just with friends and the one group</i></p> <p><i>You should not have so many teachers for us to go to.</i></p>

Student open ended comments: boys with no gender gap in mathematics

Comments from Year 7 boys in schools without a gender gap focused far more on the differences in the nature of the actual mathematics tasks and the resources they had and on how they have to work harder. The frequency of comments on different instructional models was different from the girls' comments. For example:

- *In year six we would get sheets after sheets after sheets of maths to do but now we just follow the textbooks at our own pace*
- *There is a lot more variety of things to be doing if you are ahead or behind in your class*
- *There is definitely more of an opportunity to engage with my teacher about how my work is going.*
- *In primary school we were given sheet and games that were more hands on to help us learn and this we just take notes and work from text book that doesn't always help*
- *This class is very more professional and more organised. they take it a lot more seriously in high school*

Appendix 1: Mapping the research findings to the Evaluation Framework

The meta-analysis of data and research findings indicate that gender differences in learning outcomes between boys and girls in mathematics and English relate closely to:

- differences in attitudes and behaviours
- the value placed on the learning mathematics and reading
- differences in engagement in learning and beliefs about ability

The centrepiece of the Evaluation Framework for analysing gender differences in mathematics and English was a *Transition Years Feedback Questionnaire* (TYFQ) which included seven scales from the *Feedback on Teaching and Learning Questionnaire* (FTLQ) designed by Dr Jean Russell⁴. This is an instrument to collect feedback about students' and teachers' experiences in the individual classroom.

The empirical evidence underpinning the design of the FTLQ included research about student motivation and engagement, self-regulated learning, achievement goal theory, interest, thinking and learning, constructivism, authentic pedagogy, teacher professional learning, teacher-student relationships and classroom effects on learning, and school leadership influences on teaching and learning.

1. Classroom factors

The 7 scales selected from the FTLQ focus on those attitudes and practices that most relate to the *classroom factors* identified in the literature as being significant for strengthening, or through their absence, inhibiting girls' outcomes in mathematics and boys' outcomes in English.

The seven scales were as follows:

- *Value of Work* scale: Work is seen to be important, meaningful and worth doing.
- *Collaborative Skills* scale: Through practice in collaborative learning, students develop a range of associated skills.
- *Learning Values* scale: Students understand that the values emphasized in their class are depth of understanding and effortful learning for all students.
- *Positive Attitude* scale: The teacher encourages student self-confidence, perseverance and efficacy.
- *Feedback* scale: Feedback is frequent, prompt, individual and formative.
- *Teacher Knowledge and Engagement* scale: Students see the teacher as knowledgeable about content and process, as well as being someone who enjoys teaching the students in the class and the subject being taught.
- *Work Interest* scale: Work is experienced as interesting and absorbing rather than monotonous and boring.

Other questions were designed to identify the *school level culture and factors* and *gender specific* practices, teacher beliefs and practices at the *transition point* that address other aspects of the evidence that explains gender based differences.

⁴ Dr Jean Russell is a Principal Fellow and Associate Professor at the *Centre for Post-compulsory Education and Life-long Learning*, of the Education Faculty at The University of Melbourne. She has played an important role in Australian and overseas research and development projects concerned with a range of aspects of school and educational improvement.

These scales and questions have a close correspondence with the items identified in the evidence on gender outcomes and differences in mathematics and English.

2. Linking evidence with data gathering instruments

The evidence of associated factors and causes of gender inequalities in literacy and numeracy and the data collection for this project were aligned as follows.

- Differences in attitudes and behaviours – girls enjoy reading more than boys and boys are less confident readers, girls find maths boring
 - classroom and teaching practices related to these factors will be measured by the Work Interest and Attitudes and Relationships scale
- Gender differences relate to the value placed on the learning mathematics and reading
 - classroom and teaching practices related to this factor will be measured by the Value of Work scale
- Differences in engagement in learning and beliefs about ability - e.g. reluctant performers tend to believe ability is fixed and do not see the connect between ability and effort in learning
 - classroom and teaching practices related to this factor will be measured by the Feedback and Learning Values scale

3. Identification of the prevalence of strategies to address the gender gaps

Proposed strategies to redress gender inequalities in literacy and numeracy were aligned with the data collection for this project, for example

- Explicitly teaching students that academic abilities are expandable
 - Feedback and Learning Values address this
- Exposing girls to female role models who have achieved in maths
 - School factor and culture questions address this
- Giving prescriptive, informational feedback is important
 - Feedback and Learning Values address this
- Providing boys with classrooms that are designed to promote an active, hands-on, purposeful and democratic learning environment
 - Collaboration and Work Interest address this
- Constructing a classroom environment where boys' knowledge and skills are valued and respected
 - Attitudes and Relationships addresses this
- Supportive teacher-student relationships
 - Attitudes and Relationships / Teacher Knowledge & Engagement address this

Appendix 2: How have schools been selected?

Several criteria were used to identify the pool of schools for the research. These included:

- schools within the median band range of achievement in reading and numeracy in Year 7 as assessed by NAPLAN – so that the influence of factors that are usually associated with 'outlier' schools were reduced
- schools within the median range band where the pattern of gender results have been broadly consistent for at least three years - so that the selection of schools was not based on an atypical pattern of gender results but one that was at least evident over a minimum of three years
- schools where the differences between boys' and girls' results in reading and numeracy in Year 7 were the most pronounced and schools where the gender gap in reading and numeracy results were the least pronounced (or reversed) – so that the teaching practices and classroom cultures in these different school settings could be contrasted to see if there are any significant differences in classroom practices that might help to account for differences in gender outcomes
- schools that are providing multiple English and Mathematics classes in Year 7 – so that opinions could be gained from more than one class setting
- schools in different geographic settings – so that perspectives could be gained from schools in the metropolitan area, provincial cities, and rural centres.

Some schools met these criteria for reading only, some for numeracy only and some for both reading and numeracy. Schools that best met these criteria were invited to participate in the research.

Appendix 3: Questionnaire scales and items

The questions that contribute to the seven scale scores are indicated in the chart below.

Value of work	Collaboration	Learning Values	Attitudes and Relationships	Feedback	Teach knowledge and Engagement	Work Interest
The work our teacher gives us is worth doing.	We're learning how to work well together in small groups.	Our teacher wants us to really understand what we learn in maths ⁵ .	My teacher is helping me feel more confident about my maths learning.	We are given lots of feedback about our work in this maths class	The teacher is an expert in the things s/he teaches to our maths class	There's always something interesting to work on in our class.
The things I learn in our maths * class are valuable for my future.	We get practice at working in groups with other students.	Our teacher says learning isn't about doing better than others.	Our teacher tells us not to give up when we have problems with our maths work.	Our teacher shows us how to go about finding errors in our work for ourselves.	Our teacher is good at helping us improve our maths	I can choose to work on things that interest me.
It's important for us to know the things our teacher teaches us.	Our teacher helps us say what we mean clearly, so others can understand.	Our teacher wants to help us understand our work completely.	The teacher treats us as people who matter.	The teacher writes clear comments on our work to show us how to improve it.	The teacher knows what to do if one of us has a problem with the work.	We don't spend all our time in class sitting at our desks.
The things I learn in my maths class are useful in my everyday life.	We practise listening carefully to what others in the class say.	The teacher says we learn better when we put effort into our work.	Our teacher really listens to what students want to say.	The teacher's comments on my past work help me improve what I do next.	Our teacher likes learning new things	Our teacher gives us different kinds of activities to do.
In our maths class we work on things that matter to us.	We practise how to sort out disagreements when we work with one another.	Our teacher wants us all to do the best work we can.	The decisions our teacher makes are fair.	Our teacher tells each one of us whether we're putting enough effort into our work.	Our teacher likes being with the students in this class.	We do a lot of active, hands-on work in our class.
	My teacher is teaching me how to go about learning on my own.	Our teacher is always telling us it's important to try hard.	Teacher and students along well together in this class.		Our teacher puts a lot of time and effort into teaching our maths class.	

⁵ Respondents selected the class type (i.e. mathematics or English) for which they were being surveyed and the online survey modified the questions so they matched the class type