

## The Importance of Teacher Quality

Kenneth J. Rowe

### EXECUTIVE SUMMARY

Much of the prevailing public discussion and media 'hype' surrounding gender issues in education—especially differences in the experiences and outcomes of schooling for girls and boys—amount to little more than anecdotal rhetoric and opinion.

- The evidence indicating that boys, on average, achieve at significantly lower levels than girls on all areas of the assessed cognitive curriculum throughout their primary and secondary schooling is not in dispute. Indeed, there is a widening gap between the academic performances of girls and boys here in Australia, as well as in English-speaking countries worldwide.
- A key reason for the observed gender differences in performance, attitudes and behaviours, is that since the early 1990s there has been a notable increase in the demand for higher levels of operational literacy and especially, verbal reasoning and written communication skills in school education—areas in which girls, on average, have distinct maturational and socialisation advantages.
- Of the predictors of student literacy achievement, the most salient was students' attentiveness in the classroom. By far the major proportion of the variance in student attentiveness was found to be at the student level, and the most influential predictor of attentiveness was gender, with female students being significantly more attentive than male students.
- **When all other sources of variation are taken into account, including gender, social backgrounds of students and differences between schools, the largest differences in student achievement are between classes. That is, by far the most important source of variation in student achievement is teacher quality.**
- It is vital that curriculum planners, designers and teachers do not 'dumb-down' the curriculum or its assessment to meet the differential needs of boys—or indeed, any other sub-group of students. Rather, the provision of quality teaching and learning in literacy, supported by on-going, evidence-based, teacher professional development, must be given the highest priority.

**Dr Kenneth J. Rowe** is Principal Research Fellow at the Australian Council for Educational Research. This paper is a version of an invited submission to the parliamentary *Inquiry Into the Education of Boys* by Rowe and Rowe (2000a), and a subsequent invited address (Rowe 2000a). The views expressed here are those of the author and are not necessarily those held by the Australian Council for Educational Research or by The Centre for Independent Studies. Correspondence should be addressed to Dr Ken Rowe, Principal Research Fellow, Australian Council for Educational Research, Private Bag 55, Camberwell, Victoria 3124, Australia; Tel: +61 3 9277 5584; Email: rowek@acer.edu.au.

Please note references for this paper can be downloaded from the *Issue Analysis* webpage on the CIS website: [www.cis.org.au](http://www.cis.org.au).

**In the 2000  
NSW HSC  
there was not  
one subject out  
of 66 in which  
boys' average  
performance  
was better  
than girls'.**

## PREFACE

Despite the growing awareness of the educational problems facing boys, the latest statistics on school performance in final year exams and assessments indicate that the recent emphasis on boys' education is yet to have an impact. In the 2000 NSW Higher School Certificate, for the first time ever, there was not one subject out of 66 in which boys' average performance was better than girls'. The pattern is similar in other states, if slightly less dramatic.

Gender differences in student achievement are small compared with those related to family background, but girls outperform boys at every socioeconomic level. The question is, why? This question is yet to be answered, but there is new evidence that both gender and socioeconomic status are less important than quality of teaching.

The most important finding of Dr Ken Rowe's work, presented in the following pages, is that the greatest amount of variation in student achievement is found at the classroom level. This is true even when the gender and family backgrounds of the students are taken into account, demonstrating that what goes on in the classroom has a greater effect on how much students learn than the characteristics of the students themselves. Quality of teaching, therefore, is the single most important determinant of student achievement.

This finding raises a question: If teaching quality has the greatest effect on student achievement, why is there still a gender gap? There are two answers. First, boys are more likely to be inattentive in class, which impedes their learning. Second, there have been changes to teaching curricula and assessment that have, if unintentionally, favoured girls and overlooked boys' natural capacities and interests.

If boys are more likely than girls to be inattentive in class, which impedes their learning, and, in turn, leads them to behave more disruptively, the impact of ineffective teaching and unsuitable curricula will be disproportionately great for boys. If this is then compounded by assessment that is generally more suited to the capacities of girls, the pieces of the puzzle of boys' educational decline begin to fall into place.

The finding that teacher quality has the greatest effect on student achievement, above and beyond differences between boys and girls, between students of low and high socioeconomic status, and between schools, does not mean that such differences do not exist. The evidence is clear that they do. It does, however, recommend that the best strategy to enhance educational quality and student achievement is to ensure that all students receive the best possible quality of teaching.

Teacher training and professional development need to be enhanced. There must also be flexibility for teachers to use their knowledge and experience to provide the classroom environment and instruction that meets the particular needs of their students. Parents must be informed about their children's progress and encouraged to participate in their schooling. Finally, there must be high academic standards and high expectations.

The following pages provide evidence that good teaching is the key to success for all students, regardless of gender or socioeconomic status. This report therefore builds on earlier work on boys' educational disadvantage published by The Centre for Independent Studies—*Boy Troubles* (2000)—and is also relevant to the Centre's publications on school reform—*Taking Education Seriously* (1997), and the recent *Families, Freedom and Education: Why School Choice Makes Sense* (2001).

**Jennifer Buckingham**  
*Policy Analyst*

**The Centre for Independent Studies**

## Introduction

Issues related to 'problems' in the education of boys have considerable international and local currency. In Australia, such issues have come into sharper focus with the recent call for submissions to the federal government's *Inquiry Into the Education of Boys* by the Australian House of Representatives Standing Committee on Employment, Education and Workplace Relations. At the centre of these issues are concerns about the relative underachievement of boys (compared with girls) and their poorer attitudes, behaviours and experiences of schooling. Unfortunately, much of the public discussion of the related issues, and the media hype that surrounds it, has little basis in findings from recent and emerging evidence-based research.

By drawing on key findings from the existing and emerging research in this area, this paper focuses on:

- The differential schooling performances and experiences of boys and girls throughout their primary and secondary schooling in terms of academic outcomes, attitudes and behaviours;
- Identifying the major sources of variation in students' achievements and discussing their implications;
- Barriers to reform; and
- Suggested strategies for supporting the learning needs of boys.

Since most of the empirical evidence in support of the findings summarised here is already published, the source references are given for the related technical detail. In the case of yet to be published evidence, graphs of the relevant data are provided.

## **Differential schooling performances and experiences of boys and girls**

The evidence indicating that boys, on average, achieve at significantly lower levels than girls on all areas of the assessed cognitive curriculum throughout their primary and secondary schooling is not in dispute (Arnold 1997; Carvel 1997; Collins et al. 2000; Dean 1998; Masters & Forster 1997a,b; Millard 1997; Rowe 2000a,b,c; Sukhnamdan et al. 2000). Indeed, there is a widening gap between the academic performances of girls and boys here in Australia, as well as in English-speaking countries worldwide (Ainley 1999; Buckingham 2000; Cassidy 1999; DETYA 2000; MacCann 1995; MacDonald et al. 1999; McGaw 1996; West 1999). Furthermore, compared with girls, findings from the emerging evidence-based research consistently indicates:

- Boys are significantly more 'disengaged' with schooling and more likely to be at 'risk' of academic underachievement—especially in literacy (Browne & Fletcher 1995; Epstein et al. 1998; Fletcher et al. 1999; Hinshaw 1992a,b; Irvine 1992, 1999; MacDonald et al. 1999; McGee et al. 1988; McGee & Share 1988; Rowe 1997, 1998, 1999a, 2000b,c);
- Boys exhibit significantly greater externalising behaviour problems in the classroom and at home; that is, anti-social behaviour, restlessness and particularly inattention problems (Barkley 1996; Collins et al. 1996; Hill & Rowe 1996, 1998; Hill et al. 1996a,b; Hinshaw 1992a,b, 1994; Rowe 1991; Rowe & Hill 1998; Rowe & Rowe 1992a,b, 1997a,b, 1998, 1999, 2000b,c,d; Sawyer et al. 2000);
- Fifty per cent of consultations to paediatricians at tertiary referral hospitals relate to behavioural problems, including Attention-Deficit Disorder (ADD) and Attention-Deficit/ Hyperactivity Disorder (AD/HD), with a ratio of boys 9: girls 1. Further, 20% of referrals relate to learning difficulties—predominantly boys demonstrating poor progress in literacy (Rowe & Rowe 1998, 2000b);
- In the early years of schooling, boys constitute between 75-85% of those children identified at 'risk' of poor progress in literacy, and selected for participation in a *Reading Recovery* intervention programme (Rowe 1998, 1999a, 2000d).
- Boys have a higher prevalence of auditory processing problems. Unless appropriate classroom management strategies are put in place, these problems impact negatively on their early literacy achievement and subsequent progress, as well as their behaviours (Rowe, Pollard, Tan & Rowe 2000; Rowe & Rowe 2000e; Rowe, Rowe & Pollard 2001);
- Boys report significantly less positive experiences of schooling in terms of enjoyment of school, perceived curriculum usefulness and teacher responsiveness (Hill et al. 1996a,b; MacDonald et al. 1999; Rowe 2000b,c; Rowe & Hill 1998; Rowe & Rowe 1999);
- Recent national estimates indicate that between 1994 and 1998, 30% of boys failed to complete their secondary schooling, compared with 20% girls (Marks et al. 2000). This results in reduced employment opportunities and general quality of life chances;
- Along with underachievement, boys are subject to more disciplinary actions during schooling (including bullying and expulsions), are more likely to participate in subsequent delinquent behaviours, such as alcohol and substance abuse, and during

**Boys are significantly more 'disengaged' with schooling and more likely to be at 'risk' of academic underachievement.**

**Girls  
outperform boys  
on all areas of  
the assessed  
cognitive  
curriculum.**

adolescence, are four to five times more likely than girls to suffer from depression and commit suicide (Buckingham 2000; Collins et al. 1996; McGee et al. 1988; Mitchell 2000; Sawyer, et al. 2000; Toppin 1999; Zubrick et al. 1997).

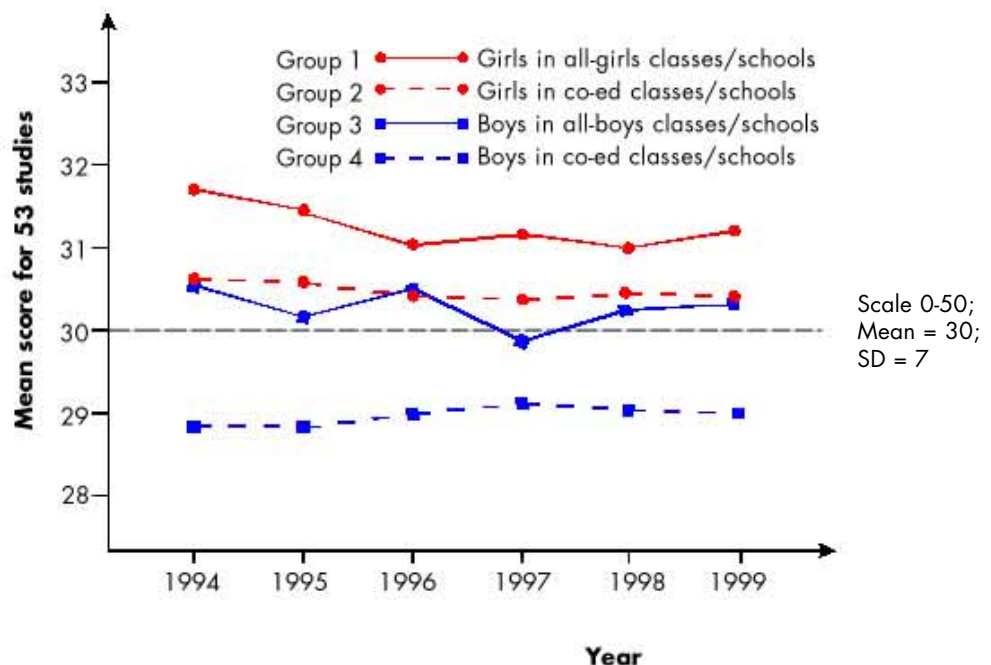
### Identifying the major sources of variation in student achievement

Before outlining suggested reasons underlying the research-based evidence accounting for the differential schooling performances and experiences of boys and girls, it is important to locate this evidence in context.

Over the last 25 years there has been a notable shift in the pattern of educational performance on achievement tests and public examinations to girls outperforming boys on all areas of the assessed cognitive curriculum (Arnot et al. 1998; Buckingham 2000; Gallagher 1997; Rowe 2000a; Warrington & Younger 1996). Consistent with international trends, this shift has been particularly marked over the last decade in Australia (MacCann 1995; McGaw 1996; Rowe & Hill 1996; Rowe, Turner & Lane 1999, 2002; Teese et al. 1995; West 1999).

Similarly, the gender effect in favour of females on achieved subject scores in the Year 12 *Victorian Certificate of Education* (VCE) between 1994 and 1999 was substantial (Rowe 1999b; Rowe, Turner & Lane 1999, 2002). Since the publication of 'league-table'-type rankings of schools' Year 12 results in major daily newspapers in several Australian states (see ACT 2000a; Rowe 1996, 2000e), senior staff of coeducational secondary schools have been acutely aware that their school average results are '... dependent on the relative size of the female/male enrolments in a given year's cohort' (Rowe 1999b: 14). This superior performance of girls is further underscored by the differential effects of gender/class/school groupings on students' 'ability'-adjusted mean scores for 53 VCE studies—as shown in Figure 1 below.

**Figure 1. Plot of mean 'ability-adjusted' VCE scores for 4 gender/school/class groupings of students on 53 studies (1994-1999)**  
[N = 270,000 students drawn from 600 VCE providers]



Source: Rowe 2000b, g.

Additional analyses of the data summarised in Figure 1 indicate that for those students taking five studies, females in all-female classes/schools achieved an average of 11.5 points more than their male counterparts in coeducational settings, yielding a mean difference of >20 percentile Tertiary Entrance Rank (TER) scores.

In response to this evidence, several former all-boys schools in Victoria have chosen to become coeducational, whereas some coeducational schools have adopted single-sex

class groupings.<sup>1</sup> However, it is important not to over-interpret the ‘importance’ of these gender and gender/class/school-grouping effects, since they pale into insignificance compared with class/teacher effects—regardless of student gender (see Figure 1).

### *1. The importance of literacy and particularly, verbal reasoning and written communication skills*

A key reason for the observed gender differences in performance, attitudes and behaviours is that since the early 1990s there has been a notable increase in the demand for higher levels of operational literacy, and especially verbal reasoning and written communication skills, in school education—areas in which girls, on average, have distinct maturational and socialisation advantages (Hill & Rowe 1998; MacDonald et al. 1999; Rowe 1999c,d, 2000b; Rowe & Rowe 1999). This demand is reflected in curriculum design and content, as well as teaching and assessment, at all stages of primary and secondary schooling. It is evident in school-based assessment and standardised, statewide testing in the early and middle years of schooling, as well as in certifying examination programmes at Year 12. MacDonald et al. (1999) observe: ‘... recent changes in curricular design and assessment practices tend to favour the traditional strengths of girls’ (p. 17).

Changes to the mathematics curriculum and its assessment since the early 1990s are illustrative. Due to shifts in pedagogical emphasis from *mathematics* to *numeracy* by mathematics educators, the demand for verbal reasoning and written communication skills continues to be a feature of curricular content and assessment in mathematics. New South Wales’ *4-Unit Mathematics* (now *Mathematics Extension 2*) and Victoria’s *Specialist Mathematics*, for example, require students to demonstrate high levels of literacy. The verbally presented, ‘in-context’ problems must be read, understood, translated into relevant algorithms, solved, then explicated and justified. Such a process requires sophisticated levels of both verbal reasoning and written communication skills, which are generally more ably handled by girls. Indeed, from Kindergarten to Year 12, girls, on average, consistently outperform their male counterparts in literacy, numeracy, and all other academic curriculum areas.

Consistent with a growing body of research, findings from a large-scale longitudinal study of factors affecting students’ achievement progress indicated large differences between male and female students’ literacy and the factors affecting their performance (see Hill & Rowe 1996, 1998; Hill et al. 1996a,b; Rowe & Hill 1996, 1998). Girls indicated significantly higher levels of achievement and rates of progress than males, and demonstrated more attentive behaviours in the classroom. Figure 2 (overleaf) summarises both the cross-sectional and longitudinal data for the achievement levels of boys and girls in each of Years K to 11 on the Reading strand of the Victorian *English Profiles* (Victoria 1991) in the form of ‘box-and-whisker’ plots used to describe the ‘shape’ of the distributions for each Year level.

The ‘boxes’ in Figure 2 (‘open’ for males and ‘shaded’ for females) describe the range of achievement of the middle 50% of students at those Year levels. The top of each ‘box’ indicates the level of students achieving at the 75th percentile, the bottom of the ‘box’ shows the 25th percentile, and the asterisk indicates the 50th percentile, or middle value. The top and bottom ‘whiskers’ indicate the 90th and 10th percentile levels of achievement respectively.

The distributions shown in Figure 2 for the Reading strand indicate a period of rapid growth in both girls’ and boys’ achievements during the first few years of schooling,

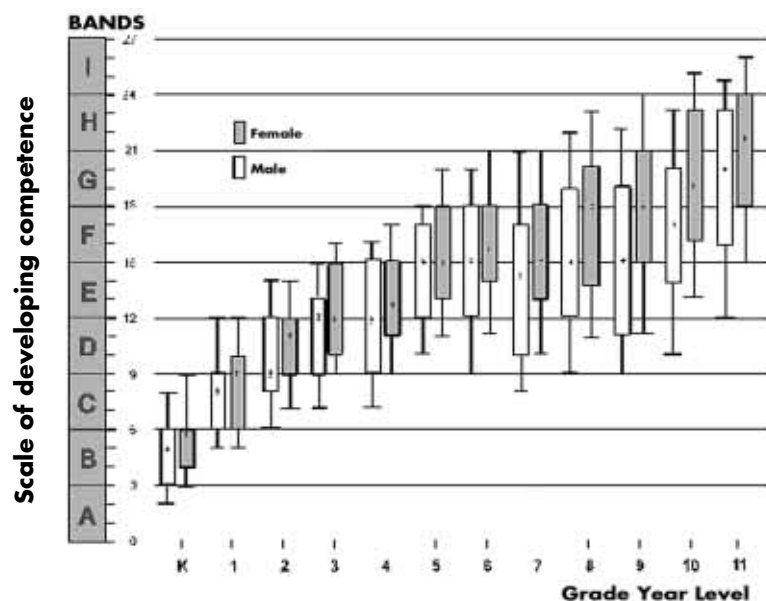
<sup>1</sup> Despite a serious lack of evidence-based findings for the effects of single-sex schooling, several studies are notable. For example, in a well-controlled study, Lee and Bryk (1986) found that in terms of academic achievement, aspirations, locus of control, attitudes and behaviours, single-sex schooling delivers specific advantages to both girls and boys. Lee and Bryk conclude: *What has been considered by some to be an anachronistic organizational feature of schools* (that is, single-sex) *may actually facilitate adolescent academic development by providing an environment where social and academic concerns are separated. Perhaps a second look at this disappearing school type is warranted* (p. 381). More recent evidence provides qualified support for Lee and Bryk’s contention (see Daly 1996; Elwood & Gipps 1999; Rowe 1988, 1999; Rowe & Rowe 1999; Rowe, Turner & Lane 1999, 2001; Woodward, Fergusson & Horwood 1999).

**The demand for verbal reasoning and written communication skills [which are generally more ably handled by girls] continues to be a feature of curricular content and assessment in mathematics.**



coinciding with the period during which students acquire basic skills, and thereafter show a consistent rate of growth to Year 9. In addition to the marked gender differences in achievement, it is noticeable that the range of achievement increases markedly over the years of schooling, with more than four band-widths separating Year 9 students at the 10th and 90th percentiles.

**Figure 2. Box plots showing distributions for male and female students' progress on the *English Profiles Reading Strand*, by grade/year level (n = 13,700)**



Source: Rowe and Hill (1996: 335).

Figure 2 also provides evidence of a discontinuity between primary and secondary schooling for Reading achievement, with a 'dip' in the rate of progress of students in the first year of secondary school. This pattern has been observed in several studies using common measures over primary and secondary schooling (e.g., Elly 1992; Lunberg & Linnakylä 1993; Purves 1973). An interesting feature of this pattern is its striking similarity with that shown by paediatric percentile growth-charts for height and weight during the pre-pubertal to early adolescent period of development. In commenting on this phenomenon Rowe (1995) notes: 'It is possible that what has become known as an "educational phenomenon" [i.e. "apparent dips" in literacy performance during the transition from primary to secondary schooling] may also have developmental psycho-physiological correlates' (p. 78).

Of particular concern is the flattening out of the 'growth trajectory' at the 10th percentile (particularly for boys), indicating a growth of less than one band-width from Year 4 to Year 9. There is also minimal growth between Years 9 and 10—especially for boys. It should be noted that while similar findings applied to the two additional measures of literacy in this study (namely, the Writing and Spoken Language strands), both the higher achievement levels and rate of growth for girls compared with boys were even more evident on these two strands.

## 2. Attentiveness

In reporting key findings from this study in terms of students' achievement progress in literacy, Hill and Rowe (1998: 326-27) note:

Of the predictors of student literacy achievement, the most salient was students' attentiveness in the classroom. By far the major proportion of the variance in student attentiveness was found to be at the student level, and the most influential predictor of attentiveness was gender, with female students being significantly

**'Apparent dips' in literacy performance during the transition from primary to secondary schooling may also have developmental psycho-physiological correlates.**

more attentive than male students. Whereas the higher attentiveness levels of girls are familiar to most teachers, the implications for literacy curriculum and its assessment may not always be recognized.

In recent years, there has been a greater emphasis within Australian elementary schools, both in approaches to teaching and learning and to assessment of student achievement, on activities that require high levels of sustained attention . . . It is possible that these changes in pedagogy may have placed, albeit inadvertently, a greater premium on attentiveness that have contributed to the phenomenon of substantial gender differences in students' literacy progress (see Rowe 1991; Rowe & Rowe 1992a,b).

More recently, in a report of key findings from the 1998 statewide Literacy and Numeracy Assessment Program for Year 3 and Year 7 students in Tasmanian schools, Rowe (1999c: 39) makes the following summary comments:

As already noted for the comparable Year 3 findings, it is important to emphasize that the 1998 Year 7 numeracy test items all had excessive requirements for high levels of verbal reasoning skills. As such, the composite constructs of *Literacy* and *Numeracy* are confounded—as evidenced by the strong positive correlation between the two variables . . . In such circumstances, it is vital that invalid inferences are not made about students' levels of achievement in *mathematics* (per se).

In respect of students' inattentive behaviours in the classroom, we know from large-scale, longitudinal research that students' early growth in reading skills have a strong and enduring effect on reducing their current and subsequent inattentive behaviours, and have positive impacts on their achievements in cognitive areas of the curriculum, as well as in affective and behavioural domains. The findings related to analyses of the Year 7 data have provided strong support for this proposition.

In brief, the research evidence suggests that throughout the entire duration of their schooling for a large proportion of boys, the verbal reasoning requirements and general literacy demands of school curricula and assessment are beyond both their developmental capacity and normative socialisation experiences to cope successfully.

This underachievement by boys and inability to 'cope' with the operational literacy demands of school curricula and assessment are frequently manifested in boys' 'acting-out' behaviours, chronic inattentiveness and lack of interest, low self-esteem, and disengagement or withdrawal from willing participation in schooling. However, the good news arising from findings based on statistical modelling of the relevant data (see Rowe & Hill 1998; Rowe & Rowe 1992b, 1997b, 1998, 1999, 2000c,d) is that while students' inattentive behaviours have negative effects on their literacy progress, the reverse effect is more powerful. Literacy achievement strongly reduces inattentive behaviours, and provides crucial support for improving both educational and behavioural outcomes of students—especially those for boys.

It has been noted elsewhere (Rowe & Rowe 2000c) that among the reasons for higher incidence of problem behaviours among boys in the middle and later years of schooling is that they frequently express feelings of alienation from a school curriculum that has become increasingly 'contextualised', and (in their words) 'feminised'. In interviews, for example, boys frequently express disenchantment about their academic progress, particularly in literacy, and following the transition from primary to secondary schooling. This is especially evident in coeducational secondary schools.

To compensate for this, many such boys place a premium on success in sport and some of the more macho (and often delinquent) activities that yield positive feedback from their peers, rather than recognition from school staff—most of whom (the boys note) are women.

### 3. Quality of teaching

It is now well documented that studies estimating the effects of schooling on student learning over time ' . . . share two key features: the fact that student growth is the object of inquiry, and the fact that such growth occurs in organizational settings' (Raudenbush & Bryk 1988: 424). Raudenbush and Bryk go on to note that these features correspond, in turn, to two of the most troublesome and enduring methodological problems in

**Boys in the middle and later years of schooling frequently express feelings of alienation from a school curriculum that has become increasingly (in their words) 'feminised'.**

**Much of the  
between-school  
variation in  
students'  
achievements is  
in fact due to  
variation among  
classes.**

educational research, namely: (1) the problem of measuring change, and (2) the problem of analysing multilevel data.

Unfortunately, relatively few studies have been undertaken that have accounted for the organisational structure of schooling, with students grouped into classes and taught by particular teachers, despite mounting evidence for the importance of instructional effects at the class/teacher-level (Hill et al. 1996a,b; Hill & Rowe 1996, 1998; Schaffer, Nesselrodt & Stringfield 1994; Scheerens & Bosker 1997; Rowe & Hill 1998; Rowe & Rowe 1999; Teddlie 1994).

Indeed, a powerful conclusion arising from this research is that much of the between-school variation in students' achievements is in fact due to variation among classes. That is, when the organisation of students in classes is taken into account, the unique variation due to differences between schools, over and above that due to class/teacher-differences, is very small indeed. This conclusion is exemplified in a comprehensive review of research into education production functions by Professor David Monk (1992), who cited a number of studies in support of the observation that:

One of the recurring and most compelling findings within the corpus of production function research is the demonstration that how much a student learns depends on the identity of the classroom to which that student is assigned (p. 320).

One of the more significant studies to provide evidence regarding the importance of class/ teacher effects was that of Scheerens et al. (1989). This study presented findings from a secondary analysis of data from the Second International Mathematics Study (SIMS). The findings indicated that for eight of the nine countries for which between-class/teacher information was available, estimates of the proportion of variance in students' achievements due to class/teacher effects ranged between 16% and 40%, while school effects were significantly smaller, ranging between 0 and 9%.

Further, based on multilevel analyses of students' results on the Year 10 *General Certificate of School Education* (GCSE) and final year *A-levels* assessments in the United Kingdom, Tymms (1993: 292-93) noted:

A general principle emerges from data such as these and that is that the smaller the unit of analysis and the closer one gets to the pupil's experience of education, the greater the proportion of variance explicable by that unit. In accountability terms the models indicate that teachers have the greatest influence.

Findings from the *Victorian Quality Schools Project* (VQSP) have confirmed this phenomenon (see Hill & Rowe 1996, 1998; Hill et al. 1996a; Rowe & Hill 1998; Rowe et al. 1993; Rowe & Rowe 1999). When the variance in student achievement data for English and mathematics was analysed by taking into account the organisation of students within classes within schools, estimates of the proportion of residual variance due to school and class/teacher differences were obtained, as summarised in Table 1 below. The residual variation at the class/teacher-level ranged from 38-45% for English and 53-55% for mathematics, whereas school effects *over and above* those due to differences at the class/teacher-level shrank to 4-9%. This is not to say that differences among schools were not substantial in terms of their effectiveness, but rather that these differences were largely accounted for by internal within-school variation among classes and teachers.

**Table 1. Proportional class/teacher and school effects for Victorian schools  
Achievement adjusted for prior achievement**

(13,700 students in 90 government, Catholic and independent primary and secondary schools)

	Class/Teacher Effects (%)	School Effects (%)
<b>English</b>		
Primary	45.4	8.6
Secondary	37.8	7.4
<b>Mathematics</b>		
Primary	54.7	4.1
Secondary	52.7	8.4



These findings of large class/student effects and small to insignificant school effects are primarily a reflection of variations in teaching quality, and point to the conclusion that it is through the quality of teaching and learning provision that 'effective' schools make a difference. In an early paper reporting these results from the VQSP, Rowe, Holmes-Smith and Hill (1993:15) suggested that: ' . . . on the basis of our findings to date it could be argued that effective schools are only *effective* to the extent that they have *effective teachers*'.

Similarly, Professor Linda Darling-Hammond of Stanford University has summarised research on the effects of teacher quality on student outcomes as follows:

The effect of poor quality teaching on student outcomes is debilitating and cumulative . . . The effects of quality teaching on educational outcomes are greater than those that arise from students' backgrounds . . . A reliance on curriculum standards and statewide assessment strategies without paying due attention to teacher quality appears to be insufficient to gain the improvements in student outcomes sought . . . The quality of teacher education and teaching appear to be more strongly related to student achievement than class sizes, overall spending levels or teacher salaries (Darling-Hammond 2000).

Even more compelling evidence for the influence of class/teacher-effects on students' achievements derive from the *VCE Data Project* (Rowe 2000f; Rowe, Turner & Lane 1999, 2002). This population study of 270,000 Year 12 students' achievements on 53 subjects over a six-year period (1994-1999) has yielded several findings of interest. While there were strong gender effects in favour of girls ( $- + 0.3$  standard deviation units), as well as gender/class/school-grouping effects in favour of single-sex classes/schools (see Fig. 1, p. 4), the magnitudes of these gender-related effects on students' achievements paled into insignificance compared with class/teacher effects. After adjusting for measures of students' abilities, gender and school sector (government, Catholic and independent), class/teacher effects consistently accounted for an average 59% of the residual variance in students' achievement outcomes, compared with a mere 5.5% at the school level.

That is, there was significantly more variation *within* schools than *between* schools, indicating that the quality of teaching and learning provision was by far the most salient factor accounting for variation in students' achievements at Year 12. Above all, such findings serve to emphasise that it is at the level of the classroom that learning takes place and that there can be very substantial differences in the progress made by students in different classes within the same school. Indeed, teachers make a difference—regardless of student gender, intake or other background characteristics.

In summarising key findings from a literature review of research related to boys' achievement progress, motivation and participation at school, MacDonald et al. (1999: 17) draw a similar conclusion:

The role of the teacher was particularly highlighted in influencing boys' propensity to read as well as their choice of reading. Teachers' attitudes more generally may diminish or increase the problem of underachievement. The role of the teacher is crucial in helping pupils develop a positive attitude to learning.

## Implications

There are three major implications arising from the evidence summarised above that warrant emphasis. These are:

1. The demand for enhanced operational literacy and related verbal reasoning and written communication skills by students throughout their schooling is consistent with that required for functional and effective participation in a postmodern, 'information-rich' society. It is vital, therefore, that curriculum planners, designers and teachers do not 'dumb-down' the curriculum or its assessment to meet the differential needs of boys—or indeed, any other sub-group of students. Rather, with consideration given to the particular interests and needs of such student sub-groups in an overcrowded curriculum (Hill, Hurworth & Rowe 1999), the provision of quality teaching and learning in literacy, supported by on-going teacher professional development, must be given the highest priority (see Ramsey 2000).

**The quality of teaching and learning provision was by far the most salient factor accounting for variation in students' achievements at Year 12.**

**Of crucial importance is the need to maximise the literacy skills of all students (boys and girls) as soon as possible.**

2. Of crucial importance is the need to maximise the literacy skills of all students (boys and girls) as early as possible, since what should be an education issue will become a major health issue—even more than is currently the case. The ever increasing number of anxious parents seeking help from paediatricians and other health professionals for their distressed children whose learning difficulties and behaviour problems have arisen as a consequence of (or are exacerbated by) failure to acquire literacy skills is a massive problem (Rowe & Rowe 1997b, 1998, 1999, 2000b).
3. It is now well established that strategically designed initial teacher training and subsequent professional development programmes in both early and later literacy teaching and learning have major positive impacts on both teacher competence and student performance (for example, the proven effectiveness of Professor Marie Clay's *Reading Recovery* programme for individuals and groups). This evidence suggests that unless resources are directed at targeted professional development (PD) programmes for teachers, the literacy priority will remain as mere rhetoric. Moreover, unless the content of this PD is informed by sound empirical research from cognitive and behavioural science, and transcends the crippling ideological partisanship that has for too long been endemic to teacher education in literacy (see Singer & Ruddell 1985; Stahl 1992; Stahl & Miller 1989), such PD will be a waste of time.

Fortunately, at least one Australian State government has recognised this problem (NSW 1997). In advocating that priority be given to a 'whole-school focus on literacy improvement', this government document (NSW 1997: 19) emphasises the crucial need for: (1) 'professional development on literacy teaching practice', (2) the importance of establishing and maintaining 'effective partnerships between teachers, parents and students', and (3) the implementation of 'appropriate intervention strategies' that 'recognise the links between poor literacy skills and inappropriate behaviour or poor attendance. . . '.

### **Barriers to reform**

There continue to be several barriers to reform that generate misinformed and misdirected rationalisations of students' differential educational outcomes.

#### *Biological and social determinism*

Perhaps the most notable of these barriers is a tendency to assume that individual children—whether they be boys or girls—will do poorly or well at school because of developmental differences, because they are 'dumb' or 'smart', or come from 'disadvantaged' or 'advantaged' backgrounds, and to see these differences as insurmountable (see Crévola & Hill 1998; Hill & Crévola 1999; Darling-Hammond 1996, 2000; Hill & Rowe 1996, 1998; Rowe & Hill 1998; Rowe & Rowe 1999; Slavin 1996; Willms 2000). As Slavin and colleagues' evaluations of the 'Success for All' programme among low SES schools in Baltimore and Philadelphia have shown, students who, regardless of their gender, socioeconomic or ethnic backgrounds, are taught by well-trained, strategically focussed, energetic and enthusiastic teachers, have overcome such perceived impediments (see Slavin 1996; Slavin et al. 1994, 1997).

Indeed, the empirical evidence suggests that the proportion of variation in students' achievement progress due to differences in student background and ability (~ 9-15%) is considerably less important than variation associated with class/teacher membership (~ 30-60%). Rather, the key message to be gained from the school effectiveness research cited above, is that it is not so much what students bring with them but what they experience on a day-to-day basis in interaction with teachers and other students in classrooms that really matters (see Beare 2001; Darling-Hammond 2000; Rowe & Hill 1998; Willms 2000). While it may be difficult to legislate quality teaching into existence, this should provide impetus and encouragement to those concerned with the crucial issues of educational effectiveness to invest in quality teacher recruitment, initial training, and their on-going professional development.<sup>2</sup>

<sup>2</sup> In their longitudinal study, Hill et al. (1996a) showed strong direct effects (>+0.4 standard deviations) of teacher participation in literacy in-service, professional development programs on students' *progress in literacy*. By any criterion, these are large effects.

### *Untested interventions*

Another barrier to reform is the persistent tendency for national and statewide curricula to treat learning as continuous and cumulative, rather than recognising the different interests and learning needs of students—especially during the ‘middle’ years of schooling (that is, Years 5-10)—for both girls and boys. In this regard, MacDonald et al. (1999: 17) argue: ‘Too many strategies are put in place based on untested assumptions about what boys think, do and feel.’ This has led to a plethora of popular literature replete with lists of largely untested intervention techniques for dealing with the claimed educational interests and needs of boys (for example, Alloway & Gilbert 1997a,b; Frater 1997).

Research into educational effectiveness cannot be reduced to simple ‘blueprints’ or ‘recipes’ for improvement such as ‘checklists’ of strategies for enhancing the achievement progress of boys or girls. Nevertheless, there are some powerful messages for policymakers, school administrators and teachers seeking dramatic improvements in learning outcomes for both boys and girls. Foremost among those messages is that there are strong empirical grounds for believing that schools and teachers can and do make a difference and that consistent high-quality teaching, supported by on-going teacher professional development, can and does deliver dramatic improvements in student learning (Beare 2001; Crévola & Hill 1998; Rowe 1997; Rowe & Hill 1998; Rowe & Rowe 1999, 2000b,c,d; Rowe, Rowe & Pollard 2001).

### *Lack of information*

Another important message relates to the power of information as a catalyst for improvement and reform. All too frequently, systems, schools and teachers have lacked credible information regarding their relative contributions to performance and effectiveness. Fortunately, this is changing (see Hill 1995, 1998). The trend now is towards the development of indicator systems that facilitate benchmarking of performance against external standards or reference points (for example, ACT 2000b; Hill & Crévola 1999; Forster, Masters, & Rowe 2001; Rowe 2001; Victoria 1999). At this early stage, however, most of this effort is focussed on the measurement of students’ achievements rather than on identifying sources of variation and estimating the magnitudes of key factors that explain variation. Indeed, the evidence from systems that have put in place indicator systems, and more especially those that have begun to collect and use measures to explain variation in students’ measured outcomes, is that such information is a powerful stimulant to strategic policy and practice interventions that lead to improvement (Coe & Visscher 2002; Rowe, Turner & Lane 2002). Sadly, little if any use of ‘value-added’ measures of effectiveness occurs outside research projects, and there is notable reluctance by some within the profession to countenance any systematic collection of comprehensive data on student achievement and factors affecting achievement. Yet with increasing recognition of the power of information to motivate and shape improvement efforts, this situation is changing.

### *Emphasis on structure rather than function*

A further barrier to reform relates to a key reason why so many improvement initiatives in education fail to live up to initial expectations. Hill (1995, 1998) observes that most reforms in education are directed at the *preconditions* for learning rather than at influencing teaching and learning behaviours within the classroom. For example, many schools see the ‘middle years problem’ of schooling, or the ‘education of boys’ as a *structural* one, leading to the establishment of middle schools, P-12 colleges, special transition programmes, and single-sex classes/schools (Daly 1996; Rowe 2000c,f).

Effective improvement initiatives such as strategic teacher PD (see Crévola & Hill 1998; Hill et al. 1996a; Rowe 1997; Slavin 1996) are concerned not just with establishing preconditions, but with making teaching and learning more effective. They typify attempts to make strong connections between knowledge about school and teacher effectiveness and the design of effective improvement programmes and initiatives aimed at the enhancement of student achievement progress—especially in literacy and the related skills of verbal reasoning and written communication.

**There is strong empirical evidence for believing that schools and teachers can and do make a difference.**

**Many reforms stop short of changing what happens beyond the classroom door and thus fail to deliver improved teaching and learning outcomes.**

Similarly, while it may be desirable that schools have flexibility in the ways they utilise resources at the school level, improvements in student learning will only occur if the preconditions for learning (for example, on-going teacher PD) are then used to change the ways in which students are taught and learn in and outside the classroom. Many reforms stop short of changing what happens beyond the classroom door and thus fail to deliver improved teaching and learning outcomes for teachers and students, respectively. Real reform in improving outcomes for both boys and girls calls for substantial change in teaching and learning strategies, but unless there is total commitment of all staff to new ways of working, reform efforts soon falter.

### **Conclusion: Suggested strategies for supporting the learning needs of boys**

The fact that teachers have strong positive effects on students' experiences of schooling, including their attitudes, behaviours and achievement outcomes, is of vital importance with profound implications—for the education of both boys and girls. At the very basis of the notion of educational effectiveness, operational literacy, verbal reasoning and written communication skills are crucial, and need to be emphasised as keys to improving the achievements and experiences of boys throughout their primary and secondary schooling. To this end, I concur with MacDonald et al. (1999: 18-19) in outlining the following as being effective strategies that support the learning needs of boys:

- Focus on support for literacy across the curriculum, and especially PD for teachers;
- Early diagnosis and intervention for those 'at-risk' of literacy underachievement;
- Highly structured instruction and lessons, with an emphasis on challenge and frequent changes of activity;
- Greater emphasis on teacher-directed work in the classroom in preference to 'group' work;
- Clear objectives and detailed but simple instructions; provide explicit criteria for presentation of work;
- Short-term, challenging tasks and targets with frequent changes of activity;
- Establishment of assessment and monitoring systems designed to identify underachievement in key skills across the curriculum, as well as in individual subjects;
- Regular personal interviews for the purposes of target-setting;
- Positive reinforcement: immediate and credible awards for quality work, increased effort and/or improved behaviour;
- Providing opportunities for extra tuition/revision;
- Planned programme of differentiated personal and social development; and
- Meaningful work experience placement aimed at informing students about changing roles in adult and working life.