EDUCATION POLICY ANALYSIS ARCHIVES

A peer-reviewed scholarly journal
Editor: Gene V Glass
College of Education
Arizona State University

Volume 12 Number 17 **April 20, 2004** **ISSN 1068-2341**

Policy Issues for Australia's Education Systems: Evidence from International and Australian Research

Gary N. Marks
Julie McMillan
John Ainley

Australian Council for Educational Research
and
Melbourne Institute for Economic and Social Research

Citation: Marks, G., McMillan, J., Ainley, J., (2004, April 20). Policy issues for Australia's education systems: Evidence from international and Australian research. *Education Policy Analysis Archives, 12*(17). Retrieved [Date] from http://epaa.asu.edu/epaa/v12n17/.

Abstract

Our purpose here is to discuss education policy issues in the context of empirical evidence. We note that many commonly held beliefs about Australian education such as, the relative performance and participation levels of Australian students; the importance of socioeconomic background on educational outcomes both relative to other countries and changes over-time; gender differences in mathematics and science; and the labour market situation of early school leavers; are not supported by empirical research. Such findings have implications for

government policies. We also question current policy directions toward increasing Year 12 participation, expanding both secondary and post-secondary vocational education and reducing class sizes. It is hoped that the discussion will provide stimulus to evidence-based debates about Australian education.

School Education

Student Performance

A fundamental point about Australian education is that the performance of Australian secondary school students is high by international standards. The 1994 *Third International Mathematics and Science Study* (TIMSS) found that Australian performance in mathematics in the junior secondary years was lower than only eight (out of 45) countries. The performance of Australian students was significantly better than comparable countries such as New Zealand, England and the United States. The performance of Australian students was similar to the performance of students in Canada, Ireland, Sweden and France. In science, only four countries outperformed Australia: Singapore, Korea, Japan and the Czech Republic. Australia recorded science achievement levels similar to that for England and the United States, as well as most of the countries that were similar to it in mathematics (Lokan et al., 1996:15-16).

In the 1999 TIMSS study, Australian students performance in mathematics was again well above the international average by substantial 0.4 of a standard deviation. Australian performance was significantly lower than six countries: Singapore, Korea, Chinese Taipei, Japan and Flemish Belgium. It was not different from a second group of countries that included the Netherlands, Canada, Finland, and the Czech Republic. It performed significantly better than the United States, England and New Zealand (Mullis et al., 2000:32). In science, Australia also performed above the international average by about 0.5 of a standard deviation. Only Chinese Taipei scored significantly higher than Australia. Australia was not different from Singapore, Japan, Korea, the Czech Republic, England, Canada and Hong Kong. Its students outperformed those in the United States, New Zealand and Italy (Martin et al., 2000:32).

In the recent 2000 PISA study of 15 year olds in over 30 industrialised countries, Australian students performed well above the OECD average in the three domains of reading, mathematics and science. Students in Finland were the only national group that performed significantly better in reading literacy than Australian students. Students in Japan were the only ones who performed significantly better than Australian students in mathematics. Japanese and Korean students were the only national groups that performed significantly better than Australian students in science (Lokan et al., 2001:20-33).

Therefore, there is consistent evidence that Australian students are performing at levels that can be regarded as very good. Their high performance is not limited to a single subject area. This conclusion is no doubt surprising to many who are mindful of the inadequacies of the Australian education system. The media generally overlooks this ‘good news’ finding and many involved in Australia education are not aware of how well Australian students perform

relative to students in comparable countries. So it is important to find out what Australia is 'doing right'; is it the high quality of teaching or teacher education, the competition between government and non-government schools, the academic environment of schools, the curriculum, or the community's interest in students' education. Although many of these explanations may be dismissed out-of-hand, the question remains as to why Australian students are performing much better than students in comparable countries. Since Australia spends slightly less of its GNP on education than other comparable countries (Note 1), it could be argued that Australia spends its resources more effectively than other countries. So understanding why Australian student performance is high by international standards is also important to policy makers who need to know where the education dollar is best spent.

Although the performance of Australian students is higher than most comparable countries, there is no evidence that the absolute performance of Australian students has improved over time. Rosier (1980) focussed on changes in mathematics achievement between 1964 and 1978 and concluded that there had been a slight decline in the performance of 13-year-olds over that period time. Focusing on a longer time span (1964-1994) Afrassa and Keeves (1999) concluded that there was a decline in the mathematics performance of 13-year-olds. The magnitude of that decline was approximately 30 scale points (or 0.3 standard deviations), a non-trivial decline. Over the period from 1975 to 1998 there was no change in performance in reading or mathematics (Rothman, 2002). Comparison of science performance between 1994 and 1998 suggests that the relative position of Australia in the country league table of student performance improved (Martin et al., 2000:35). However, in absolute terms there was little change in mathematics and only a slight improvement in science.

Therefore, the performance of Australian students is high by international standards, but there is no evidence that this high standing is due to improvements in student learning and thus policy initiatives over the last 30 years. There are a number of strong arguments to further increase the achievement levels of Australian students. For individual students, proficiency in literacy and numeracy is by far the most powerful influence on a range of educational outcomes including early school leaving, tertiary entrance scores, and participation in higher education (Marks et al., 2000; Marks et al., 2001; McMillan & Marks, 2003). In addition, literacy and numeracy are important influences on labour market outcomes such as not becoming unemployed, the duration of unemployment, and income (Marks & Fleming, 1998b, 1998c; Marks, forthcoming; McMillan & Marks, 2003). The *International Adult Literacy Study* shows large labour market differences between high and low literacy groups (Kirsh et al., 1993). At the macro-economic level, there is strong case to improve student performance in literacy and numeracy since the economy is likely to be increasingly reliant on industries based on the manipulation of symbols (words and numbers).

An important policy question is to how to improve the performance of students at the bottom end of the distribution. Poor skills in literacy and numeracy are the strongest risk factor for unsuccessful school to work transitions—a stronger risk factor than low socioeconomic background. It is possible for a country to

achieve both high average levels of student performance and small variation. This involves policies that lift the performance of weaker students without undermining the performance of other students.

Educational Participation In Senior Secondary School

One of the most dramatic changes that has occurred in Australian education over past two decades is the rapid increase in Year 12 participation from 35 per cent in 1980 to a peak of 77 per cent in 1992.. This rate has since declined before rising again to around 76 per (ABS, 1984-2002). However, participation in the final year of school in Australia is lower than that in many other countries. According to the OECD, 78 per cent of sixteen year olds in Australia are enrolled in upper secondary school. This figure is lower than the OECD average of 84 per cent and is considerably lower than enrolment rates at the same age in Austria (90 per cent), Belgium (97 per cent), Canada (85 per cent) and Sweden (96 per cent) (OECD, 1998:170). However, school completion in university-oriented programs in Australia is higher (66 per cent) than the OECD average (OECD, 2001a:146).

The lower level of participation in Australia poses the policy question of whether participation rates should be increased. This involves an assessment of how those who do not complete secondary school are faring in the labour market. The early labour market experiences of non-completers are highly dependent upon the economic climate. Research on non-completers who entered the labour market during the early 1990s showed that this group were experiencing substantially poorer labour market outcomes than an equivalent group who had left school a decade earlier (Lamb et al., 2000). On the other hand, research on a more recent group of non-completers who entered the labour market later in the 1990s when the economy was healthier, presents a far more positive picture (Marks & Fleming, 1998a). Subsequent work following the progress of this group until age 19 shows increasing levels of full-time work, incomes and occupational status (McMillan & Marks, 2003). Among those who did not go to university, there was little difference between early school leavers and school completers in full-time work in the initial years after the leaving school. It was non-completers who left school in Years 11 and Year 12 that were having problems securing full-time work (Marks et al., Forthcoming). Furthermore, school completion in itself has little influence on labour market outcomes among 21 to 25 year olds (Marks et al., 2003).

Those who do not complete secondary school have poorer labour market outcomes than those with university qualifications. It is well established, both in Australia and overseas, that university qualifications are associated with higher incomes, less unemployment, and more steeply rising occupational and income trajectories. When making comparisons between non-completers and those school completers who do not pursue university studies, the evidence that completing school is beneficial is equivocal. In some regards non-completers fare better than school completers who do not enter higher education: they are more likely to be in full-time employment and receive higher hourly earnings, at least initially. However, in other regards non-completers experience less successful transitions from school: compared with completers who did not enter higher education, male non-completers are more likely to be unemployed, and

female non-completers are more likely to be outside the labour force and not studying (McMillan & Marks, 2003).

During the last decade, one policy response to the labour market outcomes of school non-completers was to increase participation in school. This involved broadening the curriculum by including courses that potential school leavers would find attractive so would remain at school. This policy direction was in part a product of research conducted during the 1980s and early 1990s that argued that non-completers left school because they were alienated from the academically orientated curriculum. This is undoubtedly true for some students although the degree of student antipathy with school has been over-stated. Longitudinal research on a cohort of young people who were in Year 9 in the mid 1990s shows that the majority of non-completers leave school for positive work related reasons. About 50 per cent say the main reason they left school was to get a job or an apprenticeship (whether or not they actually had a job to go to), and a further 5 per cent say they wanted to earn their own money. Only 13 per cent said their main reason for leaving was that they did not like school, only 6 per cent left because of the subject choice at their school, and only 2 per cent said they left on the advice of teachers. Interestingly, only 1 per cent cited financial reasons (McMillan & Marks, 2003). Although, subjective evaluations may include *post-hoc* rationalizations –non-completers are most often students with lower achievement levels, so are struggling in senior secondary school–these data do indicate that schools and the school curriculum are a much smaller influence on school leaving than generally believed. The policy implication of these results is that further efforts to make Year 12 more 'attractive' to potential school leavers may not be the most appropriate strategy.

Given that many non-completers have positive reasons for leaving school and the majority do obtain full-time work, is there any reason why a student, keen to leave school and has a clear intention of working in a particular type of job should not do so? Analysis of the labour market outcomes on youth cohorts aged between 17 and 25 shows that prior experience of full-time work has considerably larger effects than qualifications on subsequent full-time employment (Marks et al., Forthcoming; McMillan & Marks, 2003). Experience in full-time work provides a strong basis for continued full-time work. The strong influence of prior experience in full-time work on subsequent full-time employment appears to becoming stronger (Marks & Fleming, 1999). So delaying entry to the labour market for one or two years may not beneficial given the importance of labour force experience.

Increasing school completion is likely to have other undesirable outcomes. Government school students are more likely to leave school than non-government students, so if Year 12 participation is increased, students who would have otherwise left school will be enrolled in government schools. Therefore, the responsibility of catering for this academically weak group of students will fall on government school systems while non-government schools concentrate on maximising the university entrance performance of their senior students. Thus, the gap in performance between the government and non-government sectors will widen and government schools will be increasingly viewed as a residual category. Parents who can afford to send their children to non-government schools will do so. The result will be increasing socioeconomic

inequalities in education.

Policy options for students likely to leave school early should consider the prevailing and future economic conditions, the ease at which school leavers can later pursue full-time education and training, the cost to potential employers and the assistance available to students who make unsuccessful school-to-work transitions.

Assessments about the current and future state of the youth labour market provide crucial contextual background for the formulation of policy options. The substantially more favourable labour market experiences of school leavers during the late 1990s compared to the early and mid 1990s, is largely due to the improvement in the macro-economy. In an analysis of unemployment in three Australian youth cohorts, a large contextual effect of the annual unemployment rate was found (Marks & Fleming, 1998b). The OECD reported that, in general, countries with healthier economies and lower unemployment show more successful school to work transitions (OECD, 2000b:37-43). Therefore, low unemployment is a necessary precondition for allowing students to leave school before completion of Year 12.

A second issue concerns the ease with which school leavers can later return to full-time education. A problem with early school leaving is that it reduces options for further (especially higher) education. Universities typically judge prospective students on their performance in Year 12, so non-completers face barriers if they wish to pursue higher education at a later time. Therefore, encouraging universities to adopt flexible entrance requirements for young people who do not complete Year 12, and providing other forms of further education, would represent a policy alternative to increasing school completion. Many universities already have some but limited provisions for later age entry.

A third issue is the cost to employers in employing young people who have just left school. Employers need to be encouraged to employ those who have not completed secondary school and to provide associated training to develop their skills. This could include the further extension of formal training provisions to industries that do not traditionally take apprentices. This has been the thrust of the new apprenticeships and traineeship schemes. Another policy option is to reduce the marginal cost to employers of employing school leavers.

Finally, it is important to assist those young people who are experiencing unsuccessful transitions to the labour market. Estimates from studies of recent school leavers suggest that 10 per cent (or less) of those who do not enter higher education are facing severe difficulties in obtaining work (Marks et al., Forthcoming; McMillan & Marks, 2003). Policies should be targeted at this small group that are actually experience difficulties rather than assuming that all school non-completers are at risk. However, before specific policies can be implemented closer monitoring the school to work transition is required because many do not come to the attention of government departments if they have not applied for social security benefits.

Vet-in-Schools

In Australia, a number of vocational education and training (VET) programs are available to students who are still at school and this has been a substantial area of growth throughout the 1990s. Nationally, approximately one quarter of the student cohort from Year 9 in 1995 had participated in some form of VET as part of their studies in Year 11 and 12 (Fullarton, 2001). These data indicate that some 15 per cent of school students had undertaken some VET-in-School subjects at either Year 11 or Year 12, and 7 per cent had completed subjects in both Year 11 and Year 12. Only a few (slightly more than one per cent) had participated in a school-based new apprenticeship or traineeship. There are substantial differences among jurisdictions in participation in VET. The highest level of participation is found in Queensland (41 per cent) and the lowest in Victoria (12 per cent). Participation in VET in schools is also higher among students from government schools and with below average achievement levels (Fullarton, 2001). Lamb et al. (1998) noted that VET-in-schools tends to attract students with manual occupational backgrounds.

There is little research on whether VET-in-schools programs benefit their participants. Malley et al. (2001) argued that most of the participants in VET in schools would have stayed at school anyway and that the availability of VET programs did not encourage potential early school leavers to remain at school. Fullarton (2001) found that after leaving school the unemployment rate for the VET-in-schools group was similar to that for the comparison group. Furthermore, VET-in-schools does not facilitate entry to a recognised form of post-secondary vocational education or training. These results indicate that the labour market outcomes of VET-in-schools participants should be carefully monitored. It may be more beneficial for such students to directly enter the labour market, and have their training needs met by the TAFE system. Schools are arguably less equipped to provide vocational training since they usually have only weak links to employers and have limited financial and human resources to provide suitable training.

Participation In Higher Education

Another important change in Australia's education system is an increasing level of participation in higher education. In 1999, total higher education enrolments were 686,000, more than twice the 330,000 students enrolled in 1980 (DETYA, 2000:8,15). Estimates from the *Longitudinal Surveys of Australian Youth* show that approximately 40 per cent of recent youth cohorts participate in higher education. The comparable figure for the early 1980s was 20 per cent (Marks et al., 2000).

Over the last decade, the growth in higher education enrolments has been between 2 and 10 per cent per annum, a figure that is much higher than the population growth rate. The OECD reports that university enrolments in Australia increased by over 25 per cent between 1990 and 1996. However, the growth in university enrolments between 1995 and 1999 was considerably less, with Australia showing the seventh lowest growth of 21 OECD countries (OECD, 2001a:152).

Overall, the OECD estimates the proportion of the age cohort entering higher

education in Australia at 45 per cent (this figure includes TAFE diplomas). This participation rate is the same as the OECD average and comparable with the United Kingdom and the United States (OECD, 2001a:155).

Attrition from university courses is a concern. An Australian longitudinal study of the cohorts that commenced university in 1992 and 1993 estimated ultimate completion rates of 72 and 71 per cent respectively. For the 1992 commencing cohort, 60 per cent had completed an award in their original university by 1997 and 64 per cent had completed an award by 1999 (Martin et al., 2001; Urban et al., 1999). However, attrition in Australia is not particularly large compared to other countries. The ratio of graduates to enrolled students in any year is around 27 per cent for Australia, which compares favourably with the OECD average of 19 per cent but is less than that for the United Kingdom and the United States (OECD, 2001a:169).

The labour market outcomes of graduates are superior to those of non-graduates in terms of both reduced unemployment and higher incomes. Analysing pathways over a seven-year period (from the late 1980 to the mid 1990s), only 6 per of graduates (Note 2) experienced extended periods of unemployment, part-time work, and not being in the labour market. This compares with between 20 and 30 per cent of non-graduates (Lamb, 2001:8; Lamb & McKenzie, 2001:25). In 1998, unemployment among 20-24 year old university graduates was substantially lower (around 3 per cent) than that for other educational groups. Similar differences are found in most industrialized countries (OECD, 2000a:270).

The higher income returns from university qualifications are well documented. The OECD reports higher incomes for university graduates (compared to the mean income) in all 20 countries investigated (OECD, 1998:352). For Australia, Borland (2002) estimates the private rate of return for a university education among adults at 14 percent equivalent to a lifetime net monetary gain of nearly $400,000. In the early career, a university qualification is one of the strongest influences on income, increasing hourly earnings by around 20 per cent, net of other influences (Marks & Fleming, 1998c). The increase in income inequality observed in several countries (including Australia) is often attributed, at least in part, to increased returns to degrees.

The issue of increasing participation in higher education should be considered and debated. There are compelling arguments in favour of increasing participation. First, there is strong demand in the labour market for university graduates. The predictions, 20 years ago, of underemployment and decreasing wages for graduates has not eventuated. If anything, the strong demand for graduates is increasing. Second, much of Australia's economic and employment growth in the medium- to long-term is likely to be in industries that employ graduates. In addition, industries that have traditionally employed students with a vocational education are likely to become more technologically sophisticated and require a different set of skills. Finally, there is considerable unmet demand for higher education. Surveys of Year 9 students indicate that approximately 70 per cent intend to go to university. Although not all students in this group are suited to higher education, it does indicate a much higher level of demand than supply. The main argument against increasing participation in

higher education is cost. Although the Higher Education Contribution Scheme (HECS) and other measures have reduced the per capita cost of university education, most undergraduate teaching is supported from taxation revenue. Recent reforms to the HECS system include increasing participation but there is little debate on what the participation levels should be in 5, 10 or 20 years time and how should it be funded. (Note 3)

Post-Secondary Vocational Education and Training

Vocational education and training (VET) is an important part of the Australia's post-secondary education system. Most (over 95 per cent) vocational education and training is provided in institutes of technical and further education (TAFE). Courses include a range of vocational training from entry-level employment preparation, through to trades, advanced vocational, para-professional and professional courses. In addition, many recreation and leisure programs are offered. In 1997, approximately 121 000 TAFE students graduated with a qualification from a vocational course of at least 200 hours or one semester in duration (NCVER, 1998). Overall, there were 1.4 million enrolments in VET programs in 1997. Participation is characterised by part-time attendance and a wide age range (persons aged 15-24 years comprise 38 per cent of the clients). Entry to many courses is possible after Year 10, but in practice nearly half of the entrants to vocational courses have completed Year 12. In the early 1980s, the corresponding proportion was one fifth.

Apprenticeships are an important component of VET. Over three to four years an apprentice works for an employer (or group of employers) and attends a training institution (traditionally a TAFE institute, typically for a total of 800 hours). Recent changes have occurred in response to perceived limitations in the apprenticeship system, such as inflexibility, a limited range of occupations, old technology, lack of access for women and declining numbers. In 1985, traineeships were introduced to provide a shorter and more flexible approach to entry-level training. Traineeships typically involved a one-year program with an employer incorporating on-the-job and off-the-job training, mostly in office-based and retail industries. More recently, apprenticeships and traineeships have been integrated as part of a more unified entry-level training system. In the mid 1990s, 18 per cent of males had participated in an apprenticeship by age 19, 5 per cent had participated in a traineeship and 25 per cent participated in a non-apprenticeship TAFE course. The comparable figures for women were, 2 per cent for apprenticeships, 7 per cent for traineeships and 29 per cent in a TAFE course (Lamb et al., 1998:20).

Participation in vocational education is higher among males, students from lower socioeconomic backgrounds, rural students, and English-speaking (rather than non-English speaking backgrounds) backgrounds. Furthermore, VET participants are more likely to have attended government or Catholic schools (rather than independent schools), have low achievement levels in literacy and numeracy, and to be school non-completers (Lamb et al., 1998, pp. 19-29). This is the opposite pattern to participation for higher education.

Overall VET participation increased between the mid-1980s and mid-1990s. However, there were declines in the proportion undertaking apprenticeships by

age 19 (among males from 26 to 18 per cent) (Note 4) and increases in the proportion participating in TAFE courses by age 19 (among males from 10 to 25 per cent) (Lamb et al., 1998:20). The OECD estimates the proportion of 18-21 years olds currently enrolled in non-university tertiary education (VET) in Australia is around 8 per which is slightly higher than the OECD average of 5 per cent (OECD, 1998:184).

Apprenticeships are associated with lower rates of unemployment in youth cohorts and substantially higher levels of full-time work. Traineeship are also beneficial but to a lesser extent (Marks et al., Forthcoming; McMillan & Marks, 2003). However, TAFE certificates and diplomas do not have strong beneficial effects on the labour market outcomes (Long et al., 1996; Marks et al., Forthcoming). These findings for vocational education that apprenticeships improve employment prospects but that vocational education, in general, does not substantially improve labour market outcomes is consistent with other work in Australia (Dockery & Norris, 1996; Nevile & Saunders, 1998). Furthermore, such findings are similar to that found in other countries (Ryan, 2001). In part, this reflects the industries and occupations, which these programs provide access. Furthermore, vocational education may benefit enterprises and the overall economy. However, the lack of evidence that vocational education provides substantial benefits to its participants is a concern. One interpretation is the greater benefit of apprenticeships and traineeships compared to TAFE certificates and diplomas is because the former involve full-time employment.

Since VET is closely aligned with industry, shifts in employment patterns impact on its development. One source of change arises from shifts in employment away from industrial sectors traditionally served by VET (e.g., manufacturing) and the growth in other sectors such as hospitality and service (clerical and office) industries. This results in changes in the institutional organisation of VET (e.g., within TAFE institutions and between TAFE and other VET providers), the areas in which programs are provided (e.g., the emergence of formal training arrangements such as traineeships and new apprenticeships in industries not previously involved in apprenticeships) and the forms of provision that emphasise skill-specific modules of training rather than structured courses leading to a qualification. Another source of change arises from the shifting vocational demands within industries that emphasise higher-order transferable skills that can be adapted to new workplace demands.

Changing VET programs in response to these pressures may result in a closer relationship between VET and higher education, so that TAFE diploma programs overlap with university degree programs to a greater extent. As these changes emerge there will be a need for greater attention to issues concerned with accreditation, recognition of prior learning, and coordination of administration. At present responsibility for administration and delivery of VET resides with the state and territory governments (within a national strategic plan developed through a ministerial council on the advice of the Australian National Training Authority). In terms of student fees, there have been arguments that the principles of the Higher Education Contributions Scheme should be applied to VET so that funding becomes more comparable with that in universities. This may be premature given that the income returns to VET are considerably lower than that for university degrees and that much of the participation in VET is

directed to short duration certificates and training modules.

Equity

In Australia, gender differences in educational participation have reversed. In 1970, boys were more likely to complete school than girls and had higher levels of participation in higher education. During the early 1980s, Year 12 participation for girls was only 3 percentage points higher than that for boys. By the late 1980s, the gender gap favouring girls in Year 12 participation had increased to around 10 percentage points. Across the OECD world, young women show higher levels of educational attainment than young men, the reverse of the situation for older cohorts (OECD, 1997: 35, 320-321).

Similarly, the gender gap in higher education has increased over time from no gap in the early 1980s to about 10 percentage points during the late 1990s (Marks et al., 2000). These changes have also occurred in most OECD countries. In 17 of 21 OECD countries, school graduation rates for women exceed those by men. Differences in university-orientated school courses are even stronger (OECD, 2001a:140, 146). Over the last two decades there has been a clear and continuing trend of higher female participation in tertiary study, especially in university programs (Bradley & Raminez, 1996). University graduation rates are higher for women than for men (OECD, 2001a:166). However, gender differences in graduation rates for second degrees are much smaller, and in advanced degrees men still tend to outnumber women. This pattern is also found in Australia, where 58 per cent of first-degree graduates, 52 per cent of second degree graduates, and 40 per cent of advanced degree graduates are women (OECD, 2001a:173). An Australian longitudinal study of university commencing students in the early 1990s found that women were almost ten per cent more likely to complete an award course than men (Martin et al., 2001; Urban et al., 1999).

In international achievement studies of reading literacy, females outperform males. Across all OECD countries in the 2000 PISA study of 15-year-olds, females scored higher in reading literacy than males. The differences ranged from 14 points in Korea to around 50 points in Finland and New Zealand, with the average difference being 32 points (one third of a standard deviation). In Australia, the difference between males and females was 34 scale points, about the average for the OECD. Within Australia there are indications that gender differences in reading achievement have changed over time. Marks and Ainley (1997) reported a decline in the proportion of boys attaining mastery in reading.

In the Australian 1994 TIMSS study, differences between males and females in mathematics and science were not statistically significant. Australia was one of only a few countries in which there was not a difference in favour of males (Lokan et al., 1996). The lack of gender differences in mathematics and science achievement observed in 1994 was replicated in the 1999 repeat of the TIMSS study (Martin et al., 2000; Mullis et al., 2000). These results contrasted with those reported from earlier international studies of mathematics and science achievement (Comber & Keeves, 1973; Rosier, 1980; Rosier & Keeves, 1991). The results have been quite reasonably interpreted as evidence of the impact of programs that promoted participation in mathematics and science among girls

at school, and of the impact of more general social changes.

Gender differences are also evident for tertiary entrance scores. In New South Wales, females are more frequently found in the top percentiles for university admission (NSW UAC, 1998:10). In the great majority of Year 12 courses in New South Wales, females outperform males and the gap appears to have increased throughout the 1990s (Collins et al., 2000:50,57-60; MacCann, 1995). The Victorian Tertiary Admission Centre (VTAC, 1998-1999:98-99107) reports higher percentages of females in the top percentile bands, with males more common in the lower bands. Females outperform males in the majority of subjects in Victoria and Western Australia (Collins et al., 2000:55). In the Queensland Cores Skills Test (QCS), there were proportionally more males in the very top band, more females in the following high and middle achieving bands, but more males in the lower bands. The trend towards females outperforming males is not limited to the Australian context (Baker & Jones, 1993).

Socioeconomic Background

As a result of a number of large-scale studies conducted at a national and international level there is now consistent evidence of the magnitude of the relationship between socioeconomic background and educational outcomes. Typically, correlation coefficients of approximately 0.3 are reported between socioeconomic status and educational outcomes. In PISA, achievement was positively associated with student socioeconomic status in all countries but there were differences between countries in the strength of this association (Note 5). A measure of the strength of this association is provided by the gain in reading literacy associated with a one international standard deviation increase on the index of socioeconomic status. For Australia the size of this measure of the association was 32 scale points, very close to the OECD average of 34 scale points. (The standard deviation was 100 scale points). The countries showing the weakest effect of socioeconomic background was Korea (14 points) and the strongest was for Germany (45 points). The effects for the United Kingdom, the United States, New Zealand and Canada were 38, 34, 32 and 26 points respectively. In terms of the socioeconomic distribution of achievement, Australia is around the international average and not a leader in terms of equality of outcomes (OECD, 2001b). Similar results were reported in the TIMSS studies for mathematics and science among middle primary and junior secondary students (Lokan et al., 1996:40; 1997:44) (Note).

The influence of socioeconomic background on educational outcomes is declining in many OECD countries (Rijken, 1999:51-78; Sieben, 2001:33-55). In Australia, there is evidence that the influence of socioeconomic background on early school leaving, participation in Year 12 and higher education is declining over-time (Fullarton et al., 2003; Marks & McMillan, 2003; McMillan & Marks, 2003).

Socioeconomic background is often considered the most important influence on educational outcomes and an important element in the funding of schools. However, its influence on early school leaving, Year 12 completion and University entrance performance is considerably smaller than that of

achievement in literacy and achievement (Marks & Fleming, 1998a; Marks et al., 2000; Marks et al., 2001). Both the Australian and international PISA reports demonstrate large variation in achievement scores among students with the same socioeconomic backgrounds (Lokan et al., 2001:163-168; OECD, 2001b:185). This variation reflects the lack of a strong association between socioeconomic background and achievement.

From a policy perspective, it is important to further reduce the impact of socioeconomic background. There are countries where the impact of socioeconomic background is considerably weaker that it is in Australia. A general rather than streamed curriculum is helpful since school systems characterised by tracking or streaming often (but not always) show stronger effects of socioeconomic background (OECD, 2001b:195-196). However, a more effective policy focus would be to focus on educational performance rather socioeconomic background since poor performance is the primary concern and improving the performance of low performing students will necessary reduce socioeconomic inequality. Furthermore, such a focus avoids the predictable criticisms of any measure of socioeconomic background used to fund disadvantaged schools.

Ethnic and Indigenous Minorities

Although formulas for school funding often include the proportion of non-English speaking students, these students most often exhibit superior educational outcomes (Marks & Fleming, 1999; Marks et al., 2000; Marks et al., 2001). Differences in middle-secondary school achievement are often minimal so it appears that ‘cultural factors’ are responsible for their higher performance during the last two years of school. However, at the primary school level students with language backgrounds other than English tend to show lower mean achievement levels than students with an English language background (Lokan et al., 1997:173-178).

Indigenous students show much poorer educational outcomes than non-indigenous students. The difference between Indigenous and non-Indigenous students in the PISA assessments of reading, mathematics and science was very large at around 0.8 standard deviations (Note 7). Similar results were found for mathematical and scientific literacy (Lokan et al., 2001:20-33).

The educational participation of Indigenous students is much lower than that of non-indigenous students. In 1997 the Year 8 to Year 12 school retention rate for Indigenous students was 31 per cent compared to 73 per cent for non-Indigenous students (Long et al., 1999b:37). In 1996 approximately 11 per cent of non-Indigenous 20 to 24 year-olds held a university degree compared to only 2 per cent of 20 to 24 year-old Indigenous Australians (Long et al., 1999b:76). Similarly, the more select group of Indigenous students who compete for a tertiary entrance score show scores, on average, 11 points lower than non-Indigenous students (Marks et al., 2001). Indigenous students remain the most educationally disadvantaged group of young Australians.

School Sector

Over the past two decades there has been a shift of school enrolments from the government to the non-government sector. In 1984, 75 per cent of school students were enrolled in government schools. By 2000 the percentage of students in government schools was down to 69 per cent (ABS, 2001:34). The most current data shows that the percentage of students in government schools is smaller in the secondary sector (64 per cent) than the primary years (73 per cent) and smaller again for the final year of secondary school (61 per cent). Across all levels of schooling in 2000, 20 per cent of students were in Catholic schools and 11 per cent were in other non-government schools. For Catholic schools there was little difference in the enrolment share at primary (19 per cent) and secondary (21 per cent) levels. For other non-government schools the enrolment share for the secondary school years (15 per cent) was almost double that for the primary school years (8 per cent). For the final year of secondary school 22 per cent of students were in Catholic schools and 17 per cent were in other non-government schools.

The shift of enrolments from the government to non-government schools poses a significant challenge to the organisation of schooling in Australia. Schooling in Australia has been largely through comprehensive government schools that have a broadly representative intake, with non-government schools providing for a smaller number of students. If the current trend continues government secondary schools may come to be regarded as providing for a little more than half of the student population. The issue is compounded because the shift of enrolments is probably not uniformly spread across the social distribution in the community. Some organisational responses such as, the *Schools of the Future* program in Victoria and *Partnerships 21* in South Australia, have attempted to respond to this challenge by devolving more authority to individual schools and shortening the lines of authority for operational decisions. In these respects government schools would operate like non-government schools. Neither program has operated for a sufficient time for a considered evaluation of their long-term impact.

One of the most dramatic changes in Year 12 participation is the substantial decline in school sector differences. In the early 1980s only 30 per cent of those who had attended government schools participated in Year 12 compared to 44 per cent of Catholic school students and 88 per cent of independent school students. By the late 1990s, 71 per cent of government school students participated in Year 12 whereas the participation rate of independent school students had remained the same. Participation among students from Catholic schools had become almost as high as that of students from independent schools (Fullarton et al., 2003).

School sector has a substantial impact on tertiary entrance performance. On average, students attending independent schools have higher mean *ENTER (Equivalent National Tertiary Entrance Rank)* scores than students attending Catholic schools, who in turn have higher *ENTER* scores than students attending government schools. Differences in *ENTER* scores between students attending independent and government schools are reduced by nearly 50 per cent after controlling for differences in Year 9 achievement and the socioeconomic backgrounds of students. Differences in *ENTER* scores between

students attending Catholic and government schools are reduced by about 20 per cent after controlling for prior achievement and the socioeconomic backgrounds of students. Achievement growth in the final years of school is much greater among non-government than government school students (Marks et al., 2001). So, on average, students attending non-government schools perform better than government school students even when taking into account the socioeconomic and academic mix of students.

The interpretation of these differences is not clear. It is possible that many independent schools have a more defined focus on university entrance than many government schools and do not need to spread their efforts over such a diverse range of endeavours (including a wider range of vocational courses). In general, research on school effectiveness has pointed to the importance of the academic environment of a school for growth in student performance (see below). The difference between government and independent schools in tertiary entrance performance could be attributed partly to differences in resource levels but that seems less likely to provide an explanation for differences between Catholic and government schools. It is also possible that because of greater flexibility in recruitment strategies, coupled with the availability of financial resources, non-government schools are able to attract and retain very capable teachers. Rowe (1999) has argued on the basis of data from one state that there are important differences between subject areas within schools and between classes within schools. He interprets this as an indication of the importance of individual teachers.

School Differences in Performance

Most studies of educational outcomes identify differences among schools in student performance. Those differences are, at least, partly associated with differences in the social and academic mix of the student population in each school. The extent to which there are differences among schools indicates the effect of national patterns of school organisation and the effect of differences in the effectiveness of schools. Where school systems are selective, where residential areas are socially stratified, or where schools are differentially effective, between-school differences will be larger. Technically, the extent of these differences can be represented as the percentage of the variation in student achievement that can be explained by the variation in the average achievement for each school. If all the students in each school achieved the same score but there were differences between schools then 100 per cent of the variation in student achievement could be attributed to the school attended. If all students achieved different scores but all the schools had the same average score then none of the variation in student achievement could be attributed to the school attended.

One of the issues investigated in the data from PISA was the extent to which there were variations between schools in student performance (OECD, 2001b:60-67) (Note 8). This was indicated by the percentage of the variation in student scores that could be attributed to differences between schools and the percentage that could be attributed to differences among students within schools. On average, a little more than one third (36 per cent) of the variance in student achievement was attributable to between-school differences across

OECD countries. Belgium, Germany and Austria, each of which have selective school systems, have around 70 per cent of the variance in reading achievement attributable to between-school differences. In Italy, the Czech Republic and Greece the figure is around 50 per cent. At the other end of the scale are Finland, Sweden and Iceland where the percentage of variance attributable to between school differences is less than ten per cent. For Australia, approximately 20 per cent of the variance in reading literacy is associated with differences among schools. This figure is comparable with that for the United Kingdom and New Zealand, lower than the United States (35 per cent) and just a little higher than Canada (OECD, 2001b). Furthermore, school differences are considerably smaller once differences between schools in the academic mix of students are taken into account. In general terms it can be concluded that in Australia efforts to improve student performance need to be directed to less-successful students within schools rather than to improving particular schools.

School Influences on Outcomes

Differences between schools are largely the result of differences between schools in the social and academic mix of students. Once such differences are taken into account there is only a minority of schools, in which the school itself is a significant independent influence on student performance. In Australia, only 17 per cent of schools had an independent influence on Year 12 participation after taking into account state or territory, and prior student achievement. This figure declined to 12 per cent after adding school sector to the analysis (Marks et al., 2000). Similarly, only 17 per cent of schools had significant effects on tertiary entrance performance after controlling for student intake (prior achievement and socioeconomic background). After taking into account other student factors this figure declined to 11 per cent (Marks et al., 2001). This means that only in a minority of schools does the individual school increase or decrease student performance to a significant extent, net of other factors.

Although only a minority of schools significantly lift school performance, there has been much research on the characteristics of ‘effective’ schools. That is, schools that lift student performance above what is expected given the schools’ social and academic intake. After reviewing the international literature, Kreft (1993) concluded that more effective schools have: a higher level of parental involvement with the school; higher levels of expectations among students; frequent monitoring of student performance; greater involvement by parents and teachers; an orderly school atmosphere; and strict discipline. In a review of the US research on unusually effective schools, Levine (1992) identified a large number of correlates including mastery of central learning skills, students having a sense of efficacy, school resources and support for teachers. A more recent review of the literature concluded that research on effective schools identifies five factors: strong educational leadership; emphasis on acquiring basic skills; an orderly and secure environment; high expectations of student achievement; and frequent assessment of student progress (Scheerens & Bosker, 1997:146).

After performing meta-analyses on factors often understood as important to school effectiveness, (Scheerens & Bosker, 1997, pp. 237-238) conclude that the most powerful factors operate at the classroom level. Hill and Rowe (1996)

reached the same conclusion from the analysis of data on student progress through Victorian primary schools. Differences among classrooms within schools were greater than differences among schools. Some of these differences may be partly attributable to the clustering of students of similar abilities in the same classrooms but it does appear evident that differences between classrooms are important and that it is what individual teachers do that is crucial for student learning.

Despite the general factors that have been identified as characteristics of effective schools, there is little that is specific. It is difficult to conclude which particular factors (and therefore policy initiatives) make for effective schools. Many inter-correlated factors are canvassed as important influences, which may vary between school systems. It may well be that variable-focussed modelling is appropriate for establishing the extent to which schools vary and for identifying schools that appear to be effective, but case centred forms of analysis (both quantitative and qualitative) are needed to elucidate the ways in which factors cluster to influence outcomes.

Providing additional resources to schools, and reducing class size, are two related and much debated ways of improving educational outcomes. One approach to the investigation of these issues has been through the econometric analyses of education production functions that make use of the natural variation of class size across schools and models student achievement in relation to class size, controlling for student characteristics and prior achievement. It is crucial to control for prior achievement because in many school systems low-achieving students are often allocated to smaller classes. Greenwald, Hedges and Laine (1996) applied meta-analytic techniques to a series of studies and concluded that increased resources were associated with improved student outcomes. This analysis was important because it differed from the conclusions of Hanushek (1989), who found little or no effects of school resources. However, even though Greenwald et al. (1996) concluded that there was an effect of resources, the magnitude of the effect was not large.

A number of experimental studies of class size and achievement have been reported. Some 20 years ago, Glass and Smith (1979) conducted a meta-analysis of laboratory experiments using instructional groups of different size. They concluded that reduced class size could be expected to produce increased student achievement but that benefits are only evident when the class size is reduced below 20. In the United States policy had been strongly influenced by the results of the Tennessee class-size experiment (Finn & Achilles, 1999). In 79 schools, students and teachers in the kindergarten year were randomly assigned to different class sizes from kindergarten through to Grade 3. Small classes contained between 13 and 17 students and large classes contained between 22 and 26 students. There has been a consistent finding that students in the smaller classes showed larger gains in reading and mathematics achievement. The magnitude of the effect in one year has been variously estimated as 0.21 (Word et al., 1994) or 0.15 standard deviations (Goldstein & Blatchford, 1998). As part of a follow up it was concluded that the benefits of the smaller classes lasted through to the later years of primary school but with an attenuated magnitude (Nye et al., 2001).

Although the results of the Tennessee experiment have provided support for the proposition that reduced class size produces enhanced learning outcomes, the conclusions for practice are not unequivocal. Prais (1996) argues that for a given investment alternative actions such as time for teacher professional development, devoting resources to students with learning difficulties, developing better curriculum resources, and varying the time students spend in groups of different size should be seen as better use of resources. The extent to which the results of this study of the early primary years can be generalised to later stages of schooling is untested. In addition, analysis of the costs of class size reduction programs in the United States have identified issues associated with the cost of physical resources (such as rooms) and maintenance of teacher quality when there is a rapid expansion of teacher numbers (Brewer et al., 1999). These issues impact on both the cost and effectiveness of class size reduction initiatives in school systems. Therefore, the narrow emphasis of class size as a way to improve school performance needs to put in the context of its small effects and the possibility that there may be more effective ways to improve student performance.

Discussion

In Australia, as in many other countries debates about the education system have generally not engaged with the empirical evidence. Governments have pursued easy policy options, such as increasing the levels of school completion, expanding vocational education, and reducing class sizes, which are politically less contentious, supported by various interests groups and simple enough to be understood by the general public. The empirical evidence on the benefits of such policies is, at best, equivocal. Furthermore, they are unlikely to substantially benefit future cohorts of young people. More difficult issues such as reducing socioeconomic inequalities in education, improving indigenous education and reducing differences in student performance between government and non-government schools are put into the too ‘hard’ basket.

There are a variety of contentious issues that are relevant to many education systems. Should educational outcomes only reflect ability and effort, or are concepts such as ‘ability’, ‘merit’, or even ‘effort’ too contentious to be considered? Should all students complete school or is it more important for school leavers to gain secure full-time employment? What policies should be implemented to reduce socioeconomic inequalities in education? Should indigenous and minority students have similar educational outcomes to non-indigenous students or should higher priority be given to a culturally appropriate education. Should policies be implemented to improve the educational and labour market outcomes of boys? These are difficult questions and can only be resolved by constructive evidence-based debate. Such debate may lead to formulation of effective policies which improve student outcomes and reduce socially based inequalities in education.

Notes

The views expressed in this article are not necessarily those of the Australian Council for Educational Research or the Melbourne Institute for Economic and

Social Research.

1. As a proportion of Gross Domestic Product, public and private expenditure on education in Australia (at 5.46 per cent) is slightly below the OECD mean (5.75 per cent). Similarly, public expenditure on education (as a proportion of GDP) is lower in Australia (4.34 per cent) than the OECD mean (4.64) (OECD, 2001a:80). Public expenditure on tertiary education as a proportion of GDP in Australia (1.09) is slightly above the OECD mean (1.06 per cent) (OECD, 2001a:81). Expenditure per primary and secondary school student in Australia is the same as the OECD mean. Expenditure per tertiary student in Australia is higher than the OECD mean (OECD, 2001a:59).
2. In this study, graduates were comprised of predominantly university graduates, although a smaller group of TAFE diploma graduates was also included.
3. Reform of university funding is a difficult issue. One argument is that increases in participation should be funded through taxation. Since Australia collects a smaller proportion of GDP in taxation than many other OECD countries, then governments should simply increase taxes. However, there are few taxation options for Australian governments. The top marginal tax rate of 48 per cent starting at $60,000, is a high tax regime compared to many other industrialized countries. Australia has just emerged from a difficult debate about indirect taxes, so it is very unlikely that the GST will be extended or increased. Many of the European countries, which collect larger proportions of tax, do so because of indirect taxes. Many of the options for increasing tax revenues such as increasing fuel taxes, taxes on the sale of the family home, and death duties, have their own economic, social, and political costs. Furthermore, they may not attract sufficient revenue.
4. A similar decline in apprenticeships was found in the *Youth in Transition* cohorts. The participation rate by age 19 declined from 18 per cent in the early 1980s to 14 per cent in the mid 1990s (Long et al., 1999a:8). A decline is also evident in a more recent LSAY cohort (who had been in Year 9 in 1995). By 2000 when the modal age of the age was 19, 13 per cent had participated in an apprenticeship.
5. An international index based on parental occupations was used to measure socioeconomic status.
6. The relationship was a little stronger at junior secondary than middle primary level.
7. Based on a sample of nearly 500 indigenous students. A total of 192 students in the main sample identified themselves as of Indigenous origin. The study included an additional 300 indigenous students from the same schools as the main sample as an additional sample.
8. Within Australia, there were relatively few significant differences among jurisdictions (Lokan et al, 2001). In reading literacy, the performance of students from the ACT was significantly better than that of students from Queensland, Victoria, Tasmania and the Northern Territory. In mathematical literacy, there were few differences among jurisdictions, but in scientific literacy both the ACT and Western Australia had higher performance levels than several other states.

References

ABS. (1984-2001). *Schools Australia (Catalogue no 4221.0)*. Canberra: Australian Bureau of Statistics.

ABS. (2002). *Schools Australia (Catalogue no 4221.0)*. Canberra: Australian Bureau of Statistics.

Afrassa, T., & Keeves, J. P. (1999). Changes in Student Mathematics Achievement in Lower Secondary School Schools Over Time. *International Education Journal*. *1*(1), 1-21.

Baker, D. P., & Jones, D. P. (1993). Creating Gender Equality: Cross-National Gender Stratification and Mathematical Performance. *Sociology of Education*. *66*, 91-103.

Borland, J. (2002). *New Estimates of the Private Rate of Return to University Education in Australia* (Melbourne Institute Working Paper No. 14/2002): Melbourne Institute of Applied Economic and Social Research, The University of Melbourne, Victoria 3010 Australia.

Bradley, K., & Raminez, F. O. (1996). World Polity and Gender Parity: Women's Share of Higher Education, 1965-1985. *Research in Sociology of Education and Socialization*. *11*, 63-91.

Brewer, D., Krop, C., Gill, B., & Reichardt, R. (1999). Estimating the Cost of National Class Size Reductions under Different Policy Alternatives. *Educational Evaluation and Policy Analysis*. *21*(2), 179-192.

Collins, C., Kenway, J., & McLeod, J. (2000). *Factors Influencing the Educational Performance of Males and Females in School and their Initial Destinations after Leaving School.* Canberra: DETYA.

Comber, L. C., & Keeves, J. P. (1973). *Science Education in Nineteen Countries: International Studies in Evaluation I.* New York: John Wiley & Sons.

DETYA. (2000). *Students 1999: Selected Higher Education Statistics. DETYA No. 6444.* Canberra: Department of Education, Training & Youth Affairs.

Dockery, A. M., & Norris, K. (1996). The 'Rewards' for Apprenticeship Training in Australia. *Australian Bulletin of Labour*. *22*(2), 109-125.

Finn, J., & Achilles, C. (1999). Tennessee's Class Size Study: Findings, Implications and Misconceptions. *Educational Evaluation and Policy Analysis*. *21*(2), 97-110.

Fullarton, S. (2001). *Vet In Schools: Participation and Pathways.* (LSAY Research Report No. 21). Melbourne: Australian Council for Educational Research.

Fullarton, S., Walker, M., Ainley, J., & Hillman, K. J. (2003). *Patterns of Participation in Year 12* (LSAY Research Report No. 33). Melbourne: ACER.

Glass, G., & Smith, M. L. (1979). Meta Analysis of Research on Class Size and Achievement. *Educational Evaluation and Policy Analysis*. *1*, 2-6.

Goldstein, H., & Blatchford, P. (1998). Class Size and Educational Achievement: A Review of Methodology with Reference to the Study Design. *British Educational Research Journal.24*(3), 255-269.

Greenwald, R., Hedges, L., & Laine, R. (1996). The Effect of School Resources on Student Achievement. *Review of Educational Research*. *66*, 361-396.

Hanushek, E. (1989). The Impact of Differential School Expenditures. *Educational Researcher*. *18*(4), 45-65.

Hill, P., & Rowe, K. J. (1996). Multilevel Modelling in School Effectiveness Research. *School Effectiveness and School Improvement*. *7*(1), 1-34.

Kirsh, I. S., Jungeblut, A., Jenkins, L., & Kolstad, A. (1993). *Adult Literacy in America. A First Look at the Results of the National Adult Literacy Survey*. Washington: National Center for Education

Statistics.

Kreft, I. G. G. (1993). Using Multilevel Analysis to Assess School Effectiveness: A Study of Dutch Secondary Schools. *Sociology of Education*. *66*(104-129.).

Lamb, S. (2001). *The Pathways from School to Further Study and Work for Australian Graduates* (LSAY Research Report No. 19). Melbourne: Australian Council for Educational Research.

Lamb, S., Dwyer, P., & Wyn, J. (2000). *Non-Completion of School in Australia: The Changing Patterns of Participation and Outcomes* (LSAY Research Report No. 16). Melbourne: Australian Council for Educational Research.

Lamb, S., Long, M., & Malley, J. (1998). *Access and Equity in Vocational Education and Training.* (ACER Research Monograph No. 55). Melbourne: Australian Council for Educational Research.

Lamb, S., & McKenzie, P. (2001). *Patterns of Success and Failure in the Transition from School to Work in Australia* (LSAY Research Report No. 18). Melbourne: Australian Council for Educational Research.

Levine, D. U. (1992). An Interpretative Review of US Research and Practice Dealing with Unusually Effective Schools. In D. Reynolds & P. Cuttance (Eds.), *School Effectiveness: Research Policy and Practice.* London: Cassell.

Lokan, J., Ford, P., & Greenwood, L. (1996). *Maths and Science on the Line: Australian Junior Secondary Students Performance in the Third International Mathematics and Science Study.* (Vol. 1). Melbourne: Australian Council for Educational Research.

Lokan, J., Ford, P., & Greenwood, L. (1997). *Maths and Science on the Line: Australian Middle Primary Students Performance in the Third International Mathematics and Science Study*. Melbourne: Australian Council for Educational Research.

Lokan, J., Greenwood, L., & Cresswell, J. (2001). *15-up and Counting, Reading, Writing, Reasoning : How Literature are Australia's Students? The PISA 2000 Survey of Student's Reading, Mathematical and Scientific Literacy Skills.* Melbourne: Australian Council for Educational Research.

Long, M., Carpenter, P., & Hayden, M. (1999a). *Participation in Education and Training. 1980-1994.* (LSAY Research Report No. 13). Melbourne: Australian Council for Educational Research.

Long, M., Frigo, T., & Batten, M. (1999b). *The School to Work Transition of Indigenous Australians: A Review of the Literature and Statistical Analysis.* Canberra: Department of Education, Training and Youth Affairs.

Long, M., McKenzie, P., & Sturman, A. (1996). *Labour Market Participation and Income Consequences in TAFE* (ACER Research Monograph Series No. 49). Melbourne: Australian Council for Educational Research.

MacCann, R. (1995). Sex Differences at the NSW Higher School Certificate after Adjustment for the Effects of Differential Selection. *Australian Journal of Educational Research*.*39*(2), 163-188.

Malley, J., Frigo, T., Robinson, L., & Hawke, G. (2001). *The Quest for a Working Blueprint: Vocational Education and Training in Australian Secondary Schools.* Leabrook, SA: National Centre for Vocational Education and Training (NCVER).

Marks, G. N., & Ainley, J. (1997). *Reading Comprehension and Numeracy among Junior Secondary School Students in Australia* (LSAY Research Report No. 3). Melbourne: Australian Council for Educational Research.

Marks, G. N., & Fleming, N. (1998a). *Early School Leaving in Australia: Findings from the 1995 Year 9 LSAY Cohort.* (LSAY Research Report No. 11). Melbourne: Australian Council for Educational Research.

Marks, G. N., & Fleming, N. (1998b). *Factors Influencing Youth Unemployment in Australia: 1980-1994.* (LSAY Research Report No. 7). Melbourne: Australian Council for Educational Research.

Marks, G. N., & Fleming, N. (1998c). *Youth Earnings in Australia: 1980-1994.* (LSAY Research Report No. 8). Melbourne: Australian Council for Educational Research.

Marks, G. N., & Fleming, N. (1999). *Early School Leaving in Australia: Findings from the 1995 Year 9 LSAY Cohort* (LSAY Research Report No. 11). Melbourne: Australian Council for Educational Research.

Marks, G. N., Fleming, N., Long, M., & McMillan, J. (2000). *Patterns of Participation in Year 12 and Higher Education in Australia: Trends and Issues* (LSAY Research Report No. 17). Melbourne: Australian Council for Educational Research.

Marks, G. N., Hillman, K., & Beavis, A. (2003). *Dynamics of the Australian Youth Labour Market: The 1975 Cohort, 1996-2000* (LSAY Research Report No. 34). Melbourne: Australian Council for Educational Research.

Marks, G. N., & McMillan, J. (2003). Declining Inequality? The Changing Impact of Socioeconomic Background and Ability on Education in Australia. *British Journal of Sociology*. *54*(4), 453-471.

Marks, G. N., McMillan, J., & Hillman, K. J. (2001). *Tertiary Entrance Performance: The Role of Student Background and School Factors* (LSAY Research Report No. 22). Melbourne: Australian Council for Educational Research.

Marks, G. N. (Forthcoming). *The Transition of Youth to Full-Time Employment*. Melbourne: Australian Council for Educational Research.

Martin, M. O., Mullis, I. V. S., Gonzalez, E. J., Gregory, K. D., Smith, T., A., Chrostowski, S. J., et al. (2000). *TIMSS 1999 International Science Report. Findings from the IEA's Repeat of the Third International Mathematics Study at the Eight Grade*. Boston: International Study Center Lynch School of Education, Boston College.

Martin, Y. M., MacLachlan, M., & Karmel, T. (2001). *Undergraduate Completion Rates: An Update. Occasional Paper 01/F*. Canberra: Higher Education Division, Department of Education, Science and Training.

McMillan, J., & Marks, G. N. (2003). *School Leavers in Australia. Profiles and Pathways* (LSAY Research Report No. 31). Melbourne: Australian Council for Educational Research.

Mullis, I. V. S., Martin, M. O., Gonzalez, E. J., Gregory, K. D., Garden, R. A., O'Connor, K. A., et al. (2000). *TIMSS 1999 International Mathematics Report. Findings from the IEA's Repeat of the Third International Mathematics Study at the Eight Grade*. Boston: International Study Center Lynch School of Education, Boston College.

NCVER. (1998). *Australian VET: TAFE Graduate Destination Survey 1997 - National Report.*: Leabrook, SA: National Centre for Vocational Education and Training (NCVER).

Nevile, J. W., & Saunders, P. (1998). Globalisation and the Return to Education in Australia. *The Economic Record*. *74*(226), 279-285.

NSW UAC. (1998). *New South Wales Vice Chancellors Conference. Report on the Scaling of the 1998 NSW Higher School Certificate*. Sydney.

Nye, B., Hedges, L., & Konstantopoulos, S. (2001). The Long Term Effects of Small Classes in Early Grades: Lasting Benefits in Mathematics Achievement at Grade 9. *Journal of Experimental Education*. *69*(3), 245-258.

OECD. (1997). *Education at a Glance: OECD Indicators 1997.* Paris: Organisation for Economic Co-Operation and Development.

OECD. (1998). *Education at a Glance: OECD Indicators 1998.* Paris: Organisation for Economic Co-Operation and Development.

OECD. (2000a). *Education at a Glance: OECD Indicators 2000.* Paris: Organisation for Economic Co-Operation and Development.

OECD. (2000b). *From Initial Education to Working Life. Making Transitions Work*. Paris:

Organisation for Economic Co-Operation and Development.

OECD. (2001a). *Education at a Glance: OECD Indicators 2001.* Paris: Organisation for Economic Co-Operation and Development.

OECD. (2001b). *Knowledge and Skills for Life. First Results from the OECD Programme for International Student Assessment.* Paris: Organisation for Economic Co-Operation and Development.

Prais, S. (1996). Class Size and Learning: The Tennessee Experiment - What Follows? *Oxford Review of Education*. *22*(4), 399-415.

Rijken, S. (1999). *Educational Expansion and Status Attainment. A Cross-National and Over-time Comparison*. Netherlands: Inter-University Center for Social Science Theory and Methodology.

Rosier, M. J. (1980). *Changes in Secondary School Mathematics in Australia, 1964-1978*. Hawthorn, Victoria: Australian Council for Educational Research.

Rosier, M. J., & Keeves, J. P. (1991). *The IEA Study in Science I.:Science Education and Curricula in Twenty-three Countries*. Oxford: Pergamon.

Rothman, S. (2002). *Achievement in Literacy and Numeracy by Australian 14 Year-olds, 1975-1998* (LSAY Research Report No. 29). Melbourne: Australian Council for Educational Research.

Rowe, K. (1999). *VCE Data Project (1994-1999): Concepts, Issues, Directions, and Specifications. A Research and Evaluation Project Conducted for the Victorian Board of Studies.* Melbourne: Centre for Applied Educational Research, University of Melbourne.

Ryan, P. (2001). From School-to-Work: A Cross-National Perspective. *Journal of Economic Literature*. *39*(March), 34-92.

Scheerens, J., & Bosker, R. (1997). *The Foundations of Educational Effectiveness*. Oxford: Pergamon.

Sieben, I. (2001). *Sibling Similarities and Social Stratification: The Impact of Family Background across Countries and Cohorts.* The Netherlands: Interuniversity Center for Social Science Theory and Methodology.

Urban, M., Jones, E., Smith, G., Evans, C., MacLachlan, M., & Karmel, T. (1999). *Completions: Undergraduate Academic Outcomes for 1992 Commencing Students (Occasional Paper 99/G).* Canberra: Higher Education Division, Department of Education, Training and Youth Affairs.

VTAC. (1998-1999). *VTAC Annual Statistics*. Melbourne: Victorian Tertiary Admissions Centre.

Word, E., Johnston, J., Bain, H., Fulton, B., Zacharias, J., Achilles, C., et al. (1994). *The State of Tennessee's Student Teacher Achievement Project: Technical Report.* Nashville: Tennessee State Department of Education.

About the Authors

Gary N. Marks

Gary N. Marks is a Principal Research Fellow at the Australian Council for Educational Research. Since 1996 he has authored a substantial number of reports and articles based on the Longitudinal Studies of Australian Youth Project, a study focusing on the transition from school to work. He is also involved in a longitudinal study of adults and is currently working on wealth in Australia and its influence on educational outcomes. Both longitudinal studies have a substantial policy focus.

Julie McMillan

Julie McMillan is a Research Fellow at the Australian Council for Educational Research, where she works on the Longitudinal Surveys of Australian Youth

project. Her current research focuses on young people's educational and labour market pathways and outcomes. Other research interests include the development of measures of socioeconomic disadvantage among school students, higher education students, and the general population.

John Ainley
+61 3 9277 5507 (Voice)
+61 3 9277 5500 (Fax)
Email: ainley@acer.edu.au

John Ainley is Research Director of National and International Surveys at the Australian Council for Educational Research. Over the past two decades he has directed a range of policy-oriented research studies for state and federal education authorities. He directed a five-year longitudinal study of Progress through High School, conducted national surveys of subject choice and has written research reports from the Longitudinal Surveys of Australian Youth project. Most recently he completed a five-year longitudinal study of children's development of reading proficiency for the Catholic Education Commission in Victoria.

The World Wide Web address for the *Education Policy Analysis Archives* is
epaa.asu.edu

EPAA is published by the Education Policy Studies Laboratory, Arizona State University