The Tribulations of Reusing and Repackaging Data: A Review of "How has School Productivity Changed in Australia?"

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Abstract

In their paper, How has school productivity changed in Australia? *social economists Andrew Leigh and Chris Ryan (2008)[1] attempt to show that Australian (government) schools and their teachers' productivity has declined by some 73 per cent between 1964 and 2003 compared to an overall increase of 64 per cent across the Australian economy. In response I contend that Leigh and Ryan use an inappropriate statistical device to "decompose" student demographics to arrive at conclusions that contradict the original positive assessment of student standards by independent authorities (Rothman, 2007). Their work, which for many years seemed to be the foundation stone for Howard government education policy has by their own admission (A. Leigh & C. Ryan, personal communication, February 14, 2008), never been put to the test of peer review prior to publication. This paper critically analyses and contests their research by placing their claims within a social policy context that has subtly changed from one where teachers can make a difference to teachers are the difference.*

Introduction

Despite significant publicity[2], Leigh and Ryan (2008) reach radically different conclusions to the original research from which they drew their data. The 37 page report makes the following claims:

- A small but statistically significant fall in numeracy has taken place over the period 1964-2003.
- A small but statistically significant fall in both literacy and numeracy has taken place over the period 1975-1998.
- The decline in both is in the order of one-tenth to one-fifth of a standard deviation.

- Factors such as demographic or societal changes are not sufficient to explain theses changes;
- During the relevant periods per child expenditure on education increased by 10 percent over the period 1975-1998, and by 258 percent over the period 1964-2003.
- The "productivity" as measured by output per dollar has therefore fallen over the past 3-4 decades, specifically by 13 per cent with regard to numeracy and 73 per cent with regards to literacy.
- Most of the increased expenditure can be explained by a decrease in class sizes and student teacher ratios. Therefore decreased class sizes have not increased educational "productivity".
- Another possible cause of the decrease may be "falling teacher quality". This may be related to low teaching salaries, the implication (not specifically stated) being that increased salaries could lead to increased "teacher quality".
- The shift to a "whole-language" approach to teaching reading in the 1970s may have also contributed to the decline.

The claims are based on four Longitudinal Surveys of Australian Youth (LSAY) cohorts, the Youth in Transition 1961 and 1975 birth cohorts (YIT 61 and YIT 75), the Longitudinal Surveys of Australian Youth 1995 and 1998 Grade 9 cohorts (LSAY 95 and LSAY 98). The authors also examine numeracy data from the International Association for the Evaluation of Educational Achievement (IEA)[3].

Leigh and Ryan's (2008) argument that teacher and school productivity has declined since 1964 relies on accepting their tendentious data in relation to: (i) changes in "real" per child spending, (ii) changes in schooling and the economy, (iii) constancy in student demographics, (iv) more teachers and lower class sizes, and, (v) data (mis)use.

Changes in "Real" Per Child Spending

Crucial to Leigh and Ryan's (2008) productivity argument are the increases attributed to government funding per pupil since 1964, which they claim is largely driven by increased teacher numbers. Nevertheless, they overstate the increase in funding. They claim that government funding per pupil has increased from $165 (in today's dollar terms) in 1964 to $7169 in 2003. However, the Australian Bureau of Statistics (ABS) *Year Book* for 1964 indicates that per pupil expenditure was in fact $193 that in equivalent dollar terms in 2003 equates to $1791[4], not the $165 claimed by the authors. Significantly,

in 1964 the vast majority of government spending on education, both Federal and State was on public education. During the Howard years, there was a net increase in real terms of around $367 per student for the public school sector from the Commonwealth, based on the ABS Labour Price (education) index, and a corresponding real increase of around $2089 per student on average for the private school sector. Since 1996, much of the increased Federal government spending has been in the support of high fee private schools (Connors, 2007; Teese & Lamb, 2007). Governments spent around $31 billion on the recurrent operation of schools in 2004-2005. Of this, state governments spent $24 billion, more than three times the Commonwealth contribution of almost $7 billion (Australian Bureau of Statistics, 2007a). While increased spending on government schools rose by only 21 per cent, non-government school spending by Federal governments rose by 40 per cent in the period under review. Seventy per cent of Commonwealth recurrent funding for schools in 2004-2005 went to the roughly one third of all students who attend Catholic and independent non-government schools. This compared with the states' 7 per cent. That is, government schools receive 9 per cent of their (recurrent) funds from the Commonwealth; while non-government schools, on average, depend on the Commonwealth for 73 per cent of (recurrent) expenditure. This has resulted in the aggravation of an increasing "maldistribution of the total workload of schooling among schools in Australia, within and between the public and private sectors" (Connors, 2007). Moreover, a report commissioned by the former Howard government in 2007 "identified entrenched inequity in the Commonwealth system" (Patty, 2008, p. 1) that delivers more than $6 billion in subsidies to private schools each year where 60 per cent of independent and Catholic schools have had their funding maintained at artificially inflated levels.

Changes in Schooling and the Economy

Leigh and Ryan (2008) have assumed that the regulations governing early school leaving were strictly adhered to by both students and schools. While this appears to be the case in official school census data used by Leigh and Ryan, these are not necessarily reliable as such census occurs early in August, while testing occurs much earlier in a school year. During the 1960's it was common for schools to 'encourage' students to leave school early to take up readily obtained manual and unskilled employment. This would skew the school population towards the "higher performing" or more academic students thus affecting test score averages. On the other hand, the late 1980's and early 1990's was a period characterized by high levels of unemployment, especially in the youth labour market during Keating's "recession we had to have". After peaking at 34.5 per cent in mid-1992 it declined steadily to a post-recession low of 19.7 per cent in September, 2000 before rising again to 23.3 per cent in April, 2001 (Australian Bureau of Statistics, 2006). In 1994, the labour force participation rate of people aged 15-19 was 57 per cent compared to 63 per cent for the total population. Participation rates for

people aged 15-19 had been similar to those of the total population until 1986, when they started to decrease. This was the result of an increase in the number of people aged 15-19 staying at school or continuing to further education rather than entering the labour force. In 1994, 38 per cent of people aged 15-19 were not in the labour force and were attending an educational institution. In contrast, labour force participation rates for people aged 20-24 have been much higher than those for the total population over the past 15 years. In 1994, their participation rate was 82 per cent (Australian Bureau of Statistics, 1995). In the depths of the recession in mid-1992, just over 63 per cent of teenage youth were in full-time education (Gilfillan, 2001). When explaining the severity of the youth unemployment problem in June 1992, the then Prime Minister Keating, drew attention to the restriction on entry to the full-time labour market of full-time students. He suggested that full-time students were effectively excluded from the full-time labour market (Gilfillan, 2001). This together with the redesign of unemployment benefit schemes (an employed person was redefined as having worked for one hour a week or more), with programs such as "mutual obligation" and "work for the dole" introduced compulsory training programs ending automatic entitlement and effectively raised the school leaving age for some youth even further. The economic "packages" of both major political parties did not at that time anticipate a return to the almost full employment of 20 or 30 years ago (Hartley, 1992). The labour market for youth had shrunk by 6.9 per cent since 1995 (Australian Bureau of Statistics, 2006). At the same time, specialized vocational schools around Australia were closed or amalgamated with mainstream high schools. The high rates of youth unemployment were the result of a society in transition – basic changes in pathways for young people, the nature of jobs available to them, and perhaps ultimately in the organization and meaning of work itself (Hartley, 1992). This occurred at the same time as government equity policies changed to include in the mainstream previously segregated students with disabilities. The resultant increase in school retention rates led to substantial pressures in schools to accommodate an increased cohort of non-academic students.

Constancy in Student Demographics

In their comparison of the 1964 cohort of student test results with 2003 Leigh and Ryan (2008) used a statistical device to decompose, that is, take into account and breakdown the demographically very different groups of 14 year olds in schools at that time. In 1964 these children were mostly born in Australia (in 1951), their parents were white and Anglo. In contrast 14 year olds in 2003 were born in 1989 in a demographically different Australia. In 1964 according to the Australian Bureau of Statistics, the proportion of the overseas-born population had declined to 10 per cent. The creation of a national government immigration portfolio in 1945 accompanied a gradual increase in the proportion of overseas-born Australians, and by 1995, this proportion

had increased to 23 per cent. In 2005, the number of overseas-born Australians passed 4.8 million, representing almost one-quarter (24 per cent) of the total population.

Over the past 40 years, immigration has changed and the diversity of countries of birth has increased. Of the overseas-born population, the United Kingdom remains the largest source country, despite having fallen from 36 per cent of the overseas-born population in 1981 to 24 per cent in 2005. Some of the older migrant streams, such as people born in Italy, Greece and the Netherlands, have declined in absolute numbers as their populations aged and the number of deaths exceeded net gains in population due to more recent migration.

In contrast, over the last 25 years, the New Zealand-born (often from Pacifika background) population living in Australia nearly trebled, and in 2005 was the second largest overseas-born group (9 per cent of the overseas-born population). There also have been large increases in people born in Asian countries. For example, the China-born population increased nearly eightfold, from 25,200 people in 1981 to 191,200 people in 2005 (making up 4 per cent of the overseas-born population), while the Vietnam-born population increased fourfold, from 40,700 people in 1981 to 177,700 people in 2005 (also making up 4 per cent of the overseas-born population) (Australian Bureau of Statistics, 2007b). These significant trends are not acknowledged in the claims made by Leigh and Ryan (2008).

The most outstanding change that has occurred in the 1980s in the immigration intake has been in the source regions of immigrants. While the UK remained the top source country for Australian immigration, the percentage of total settler arrivals fell from 31 per cent in 1981-82 to 14 per cent in 1991-92. By comparison, the percentage of immigrants from Northeast Asia rose from 5 to 20 per cent of the overall intake, and southern Asia's contributions increased from 7 to 10 per cent. In 1991-92, Hong Kong topped the list in terms of permanent net gain with 12 per cent of arrivals. Vietnam occupied third place among the source countries with 9 per cent of arrivals. Overall, net permanent gain from countries of Southeast, Northeast and Southern Asia was 67 per cent of the total in 1991-92 (Fox & Iredale, 1994). Significantly these researchers point out that the school retention rates for Language Background Other Than English (LBOTE)[5] students in the period 1980 to 1996 is more than 20 per cent greater than the English Speaking Background (ESB) students. Many of the Non English Speaking Background (NESB) were at that time new arrivals with little experience in formal schooling in general and of course in (English) literacy and Australian teaching about numeracy in particular.

Another aspect of immigration of economic significance is the growth in temporary migration to and from Australia. While in 1990-91 more than 100 000 people entered

as permanent arrivals, fifteen times that number of visas, that is, more than 1.5 million, were issued to overseas residents entering Australia on a temporary basis (Sloan & Kennedy, 1992, p.4).

In schools, children from LBOTE families, not necessarily just the newly arrived, often require special or additional language instruction while immigrants from English speaking backgrounds are counted when they first arrive. Additional funding for schools is calculated on the numbers identified by languages other than English spoken at home, not by birthplace. The proportion of school students who are from LBOTE is increasing, though it has declined in non-metropolitan regions. Between 1986 and 1991 the overall figure is around 17 per cent, but this varies considerably, reaching over 50 per cent in some Metropolitan areas and over 90 per cent in some schools (Australian Bureau of Statistics, 2008). Research indicates that significant increases in the proportion of LBOTE student enrolments affects teaching staff personally and professionally with the major concerns focused on students' literacy development (Gilmour, 2005). LBOTE students, as a group, do well in Australian schools, with students born in non-English speaking countries aged 15 to 19 years participating at levels higher than students born in Australia or in English speaking countries.

But the overall statistics on performance and participation of school children from linguistically and culturally different backgrounds disguises important variations between ethnic groups. Research in New South Wales (Vialle, 1994) reported that the conduct of English as a Second Language (ESL) classrooms can provide children with an impoverished linguistic environment rather than an enriched one. High proportions of LBOTE children are not having their intellectual gifts recognised and nurtured, largely as a result of covert racism – that is, assumptions and interactions in which children are characterised as deficit language learners rather than those with intellectual strengths in a variety of forms. Vialle concludes that racist behaviours extend beyond the commonly acknowledged cultural bias in standardised testing procedures to the more insidious and subtle classroom interactions between teachers and students (Vialle, 1994). It has been suggested that due to the extent of diversity within LBOTE students that a major re-definition of LBOTE as an equity group is needed, or that LBOTE should be replaced by more relevant categories of disadvantage (Watson & Pope, 2000).

Leigh and Ryan (2008) seemingly discount the considerable barriers children born in non-English speaking countries who come to Australia with their parents face – they remain vitally dependent on the provision of intensive English classes on their arrival if they are to make a successful transition to the Australian school system. Gender and socioeconomic status, as well as culturally variable parental expectations, are also important determinants of educational outcomes (Department of Immigration and Citizenship, 1989). Leigh and Ryan ignore the diversity of LBOTE students, reinforcing

stereotypical views that 76 per cent for first generation NESB compared to 55 per cent for Australian-born students complete 12 years of school. A recent analysis of the LSAY data revealed that performance in literacy and numeracy varies widely among students from language backgrounds other than English. Some children, particularly those from refugee groups, may have little or no experience of formal schooling and may also have experienced great hardship and trauma. Some migrant groups experience financial difficulties and downward mobility in terms of socioeconomic status. Students may also have to confront racism in the school environment (Ainley et al., 2000).

Leigh and Ryan (2008) have used a technique known as the Oaxaca decomposition to attempt a separation of the effects of these changing demographics. They rely on certain statistical assumptions that were not developed for this particular purpose and that largely ignore or are unable to take into consideration the changes in complexity of schooling in the past 4 decades. They cite Cook and Evans (2000) who have used this formula to look at changing test scores. Cook and Evans' study was related to changes of achievement of students in the USA and attempted to ascertain whether such changes were due to family or school changes. These authors warn that:

> Omitting family background variables and whether a student lives in a two-parent family also biases the estimates for the other independent variables. The potential bias is most troubling...since it figures prominently in the decomposition of the convergence in test scores. (p. 746)

Cook and Evans go on to suggest that:

> Some care should be taken when interpreting these results because we can only measure one family characteristic (parents' education). We do however believe that the results are probably an overestimate of the role of changing family characteristics in the convergence in test scores. (p. 749)

Others have critiqued use of the Oaxaca decomposition because:

> It is inappropriate to model the dependent variable as a linear function of the explanatory variables . . . The linear technique fails to limit the influence on the probability that the outcome occurs at increasingly high asset levels (even in this case when a quadratic term is included), and thus is likely to be overstating the impact of student differences in achievement levels on demographic differences. (Fairlie, 2006, pp. 9, 11)

While Leigh and Ryan (2008) acknowledge that their "datasets do not contain a comprehensive set of demographic characteristics" they have no such riders to their analysis. They also claim that the shifts in demographic characteristics between 1964 and 2003 "should have acted to increase test scores over time". If they make this claim because of their point that the children of university educated parents do better on

literacy and numeracy tests (p. 19), then the figures of the growth in percentage of parents who have university qualifications, since 1964 as distinct from those with general tertiary qualifications makes it clear that their claims are not factual. Since the 1960's there has been a boom in TAFE and related qualifications attainment as an alternative pathway of entry into "the professions", but the growth in University qualifications is much smaller and is also skewed by the fact that such growth is by and large confined to the already privileged and well educated in society (Rothman, 2007; Teese & Lamb, 2007). This is further compounded by the shift of teacher and nurse education from the College of Advanced Education (CAE) type institution to universities. It can be argued that changes to Federal funding arrangements for University education and the introduction of fees in the 1980s and 1990s have resulted in a relative decline in university enrolments (Connors, 2007; Marks, McMillan, & Hillman, 2001; Rothman, 2007).

Fox and Iredale (1994) put the issue of demographic change into perspective simply "undoubtedly, the changes in immigration policy since 1947 have effected vast changes in Australian society and these are reflected in schools and post-school enrolments. The issues of inequity, racial discrimination and access to further training and employment still remain" (p. 11).

Furthermore US education researchers, MacLaren and Kinchloe, with over fifty books and hundreds of peer reviewed articles to their names warn in their latest book (McLaren & Kincheloe, 2007) that such "positivist rigour" as employed by Leigh and Ryan's (2008) work, actually "preclude the complex, multidimensional, multi-methodological work necessary to produce meaningful and useable research data . . . such complexity in everyday life undermines the total reliance on computational methods" (p. 15).

School retention rates for NESB students in the period 1980 to 1996 is more than 20 per cent greater than the ESB students – many of these NESB were at that time new arrivals with little experience in formal schooling in general and of course in (English) literacy and numeracy in particular. The Organisation for Economic Co-operation and Development (OECD) (2005) review of teacher policy and student learning drew three broad conclusions; the largest source of variation in student learning can be attributed to differences in student abilities, family and community background which in the short term are very difficult to influence; the single most important factor that can be affected by policy is "teacher quality"; finally while there is a positive relationship between student learning outcomes and teacher characteristics that are measurable – qualifications, knowledge and experience – these do not "capture differences in teacher quality" (Burke, McKenzie, & Centre for Economics of Education and Training, 2007, p. 6) as Leigh and Ryan (2008) claim is the case.

More Teachers and Lower Class Sizes

Leigh and Ryan (2008) consistently in their research conflate and confuse student-teacher ratio and class size – indeed class sizes in government and Catholic schools have risen slightly since 2000. In the 1960's it is possible to suggest that the pupil-teacher ratio was indicative of class sizes, but over the period under review, the added complexity of education has meant the additional employment of many non class-room based teachers, for example librarians, assistant principals, pupil welfare coordinators, careers teachers, remediation and special language teachers has resulted in a mismatch between student/teacher ratio and class size. While the 2004 student-teacher ratio was 14.3 this does not equate to class sizes of 14 – far from it – recent schools census figures in Tasmania indicate that 143 state schools had classes with more than 29 students. This is also the case in many Victorian primary schools. The Australian Bureau of Statistics (2001) warns that "definitional changes affect comparisons over time. Special school enrolments are included largely in Primary up to 1981. Student: teacher ratio is the ratio of the total number of school students to the total number of school teachers, including school principals, deputy principals, careers teachers etc. It is not a measure of class size" (p. 442).

The longitudinal research conducted in the USA (Project STAR) on class size and student learning outcomes (Word et al., 1999) indicated clear advantages in smaller class sizes especially for children from Cultural, Linguistic and Economically Diverse backgrounds. The most recent statistics available from the ABS annual *Schools Australia* (Australian Bureau of Statistics, 2008) indicate that growth in teacher numbers in the last decade in private schools has been more than double that of government schools. This is very significant as it may help in explaining the growth in Federal government spending on private schools in the last 12 years. In 1964 the proportion of students in private secondary schools was less than 20 per cent; in 2003 it was almost 40 per cent. Leigh and Ryan would not want to argue that this growth in private school teachers is actually related to what they have claimed is both a decline in teacher standards (Leigh & Ryan, 2006) and the decline in student outcomes as stated in the paper under review.

Lies, Damn Lies and Statistics: Tribulations of Reusing and Repackaging Data[6]

Their report reaches significantly different conclusions to one of the principle studies from which it drew its data. The Longitudinal Surveys of Australian Youth (LSAY) study on Achievement in Literacy and Numeracy by Australian 14-year-olds, 1975-1998 published in 2003 in fact states,

> The results reported here indicate that the achievements of Australian 14-year-olds in reading comprehension and mathematics have remained constant during the period. For some groups, there has been improvement, most notably for students from language backgrounds other than English. (Rothman, 2003, Executive Summary, p. ix)

Two main factors have led to this difference in findings.

Leigh and Ryan (2008) restricted their study to the group of students who were both fourteen years old AND in Year 9 at the time of the studies, claiming it is most valid to focus on a common group "…since both students' ages and grades may affect their performance over time" (p. 6).

The LSAY report on the other hand rejects this as a group from which to draw valid conclusions. While acknowledging that among the 14-year-olds in Year 9 there were slight statistically significant decreases in both reading comprehension and mathematics, (as opposed to the 14-year-old group as a whole for which there were not) they attribute this to the fact that the group of 14-year-olds in Year 9 in the earlier cohorts may have been of higher ability. As a result of school-entry and grade retention policies and practices, the decline in scores noted are more likely a reflection of changing enrolment and promotion practices than of changing achievement levels in reading comprehension and mathematics. They therefore determine that:

> …the subgroup of 14-year-old students was the most appropriate group to use for the multivariate analyses, because changes in school-entry ages and grade retention practices affected the composition of the subgroup comprising 14-year-olds in Year 9. (Rothman, 2003, Executive Summary, p. v)

Leigh and Ryan (2008) reject these arguments, claiming that while grade repetition rates certainly fell, this was offset by trends towards later school commencement, a fact they claim would have disproportionably affected students of below average ability. They therefore claim that

> …the proportion of students "old" for their grade, given the school commencement rules operating in their jurisdiction, actually increased in the later LSAY cohorts, presumably increasing the average ability of the students observed aged 14 and in Year 9 in the data, while in others it did not change. (p. 7)

Leigh and Ryan (2008) provide no evidence for the claim that later commencement would have disproportionably affected students of below average ability, and the argument

about "old for their age" students increasing average cohort ability is drawing a very long bow. The LSAY decision to use the whole 14-year old group is more convincing.

The other factor that led to a difference of findings concerns that of demographics, specifically the effect of the changing percentage of 14-year-olds from other-language backgrounds attending government schools. The LSAY report documents these students to have more than doubled, from 4.4 per cent to 10.7 per cent (Rothman, 2003).

The Leigh/Ryan report dismisses any affect from this by pointing to the increase of students with parents with a university degree as an offsetting factor, and by employment of the Oaxaca decomposition as previously discussed.

The LSAY report (Rothman, 2003) on the other hand draws significantly different conclusions. It states that while students from such backgrounds perform on average measurably below that of students from English language backgrounds, between 1975 and 1998, the magnitude of the difference decreased from –5.005 to –2.599. This is about half, indicating a significant improvement between students from homes where English is the main language spoken and students from homes where a language other than English is the main language spoken. The LSAY report sees this in entirely positive terms concluding, "this stability shows that schools have been able to maintain standards in reading comprehension while enrolling students from other language backgrounds" (Rothman, 2003, p. 32), and,

> With such dramatic changes in their clientele, schools found it necessary to ensure positive educational outcomes for a wider range of students from language backgrounds other than English. The data presented in this report show that Australian schools have been successful in providing educational opportunities and achieving positive outcomes for many of these students, reducing differences in scores between students from English-language backgrounds and students from other-language backgrounds, as measured at the student level and at the school level. (p. 39)

Once again, the LSAY report is more convincing. In fact given the differences in interpretation of the same data by Leigh and Ryan and by the LSAY researchers themselves, it is difficult not to conclude that the former have used the data selectively to achieve a result to their liking.

Since When are Teachers the Difference?

Increasingly it has been claimed that while teachers "ought to be the leading agents of change, they are instead often the main obstacles to it" (Lowe & Holt, 1998, p. 23). Teaching and learning are the "areas demanding reform and renewal [that] requires a more varied pedagogy" (Lowe & Holt, 1998, p.29). Lingard et al. (2001) indicate that teachers indeed can tip the balance especially for marginalised students, to which Hattie adds that "excellence in teaching is the single most powerful influence on achievement" (Hattie, 2003, p. 4). In Victoria, The Department of Education and Training agrees and also acknowledges that:

> The most powerful lever for reform is the transforming of teachers' practice. Teachers have a professional responsibility to continually improve their knowledge and understanding about the craft of teaching and translate that knowledge into practice. (SOFweb, 2003)

On the basis of the research evidence, "good" teachers can indeed have positive impacts on students' experiences and outcomes of schooling and "poor" teachers can have deleterious effects. As Gale (2006, p. 1) points out "accounts of what is wrong with teaching rarely begin by exploring the politics of schooling and almost never by placing it within broader socio-economic contexts". Gale also points to a change from "teachers *can* make a difference to students learning and their lives" (Connell, Ashenden, Kessler, & Dowsett, 1982; Hayes, Mills, Christie, & Lingard, 2006) to "teachers are *the* difference". This "small sleight of hand" (Gale, 2006, p. 6) has had dramatic implications as evidenced by Leigh and Ryan's (2008) claims. If such claims that student achievement is indeed so low and teacher standards and quality have dropped so far are left unchallenged then if the teachers are not at fault then the University faculties of education definitely are the real culprits for a perceived decline in literacy and numeracy standards in Australian students due to their "puddling around in postmodernist claptrap" (Milburn, 2008).

A review (Lowe & Holt, 1998, p. 13) of the research literature into the factors influencing change in schools suggests that "school factors account for some 25 percent of the variance in student performance". Hattie (2003) claims that teachers alone contribute 30 percent towards student achievement stressing that "it is what teachers know, do, and care about which is very powerful in this learning equation" (Hattie, 2003, p.2). Hattie claims that teachers together with schools make up more than 40 percent of the difference in student achievement, while home background contributes less than 10 percent. Hattie states that "schools barely make a difference to achievement. The discussion on the attributes of schools – the finances, the school size, the class size, the buildings are important as they must be there in some form for a school to exist, but that is about it" (Hattie, 2003, p. 2).

From recent research related to educational effectiveness (Darling-Hammond, 1996, 2000; Kleinhenz & Ingvarson, 2004; Rowe, 2003, 2004a, 2004b), much has been and continues to be learnt about key factors affecting students' general academic achievements, attitudes, behaviours and experiences of schooling. While much research suggests that outcomes are most influenced by students' home background and individual characteristics, Rowe (2004a) concludes that these have less than 10 percent of the variance:

> *The magnitude of these effects pale into insignificance* compared *with class/teacher effects.* That is, the *quality of teaching and learning provision* are by far the most salient influences on students' cognitive, affective, and behavioural outcomes of schooling, *regardless of…student background.* (Rowe, 2004b, p.4 [original emphasis])

While Rowe may have overstated the case (that the teacher contributes between 30 to 60 percent of difference in educational outcomes), for marginalised young people, for students at-risk of school failure, his conclusions are supported by other Australian research (Lingard, et al., 2001).

However, in analysing similar claims in the New Zealand context Nash and Prochnow (2004) conclude, "in the face of all the evidence, it is unrealistic to expect that the attainment of middle-class and working-class families can be equalized…as a result of pedagogical action by the school" (p. 189).

Connell put it more irreverently in 1993 stating, "the best advice we can give to a poor child keen to get ahead through education is to choose richer parents" (Connell, 1993, p. 22)

However, a growing number of researchers have since provided contrary evidence to the earlier claims that relative to home background influences, the effects of schooling are negligible (Rowe, 2003, 2004a, 2004b). Rowe concludes that:

> Much of the traditional and prevailing dogmas surrounding "factors" affecting students' experiences and outcomes of schooling throughout their primary and secondary years, especially socio-cultural and socio-economic factors, are now understood to be products of methodological and statistical artefact, and amount to little more than "religious" adherence to the moribund ideologies of *biological* and *social determinism.* Above all, a good deal of this "discourse" is not supported by findings from evidence-based research. (Rowe, 2004a, p. 1)

Conclusions

Where research is predicated on a business "productivity" model to study educational outcomes, with supposedly numerically measurable performance outcomes calculated against financial inputs, then testing is accorded an important place in such an approach as it produces the most easily measurable data. However, as a number of educational researchers have pointed out, such an approach simply does not account for the range of outcomes and diverse factors that contribute to a modern education. Detailed economic analysis by Hanushek and Welch (2006) indicate that "it is very difficult to establish a relationship between levels of educational expenditure And student performance" (Burke et al., 2007, p. 6) It does not measure qualitative factors that are important to an individual's participation in modern society, her or his ability to acquire the skills necessary to survive in the modern workplace, and it does not sufficiently take into account the complexity of "inputs" involved in diverse student cohorts over time (Marks et al., 2001).

Research restricted to literacy and numeracy testing in a narrow context involves only a few narrow measures of educational quality and performance. Many other aspects of a broad ranging education such as other subject areas, verbal communication, social skills, knowledge of wider society, as well as abilities to actually use both literacy and numeracy skills in a variety of contexts would need to be examined in order to provide a proper examination of overall education effectiveness.

Even accepting the tendentious Leigh and Ryan methodology, the claimed decline in numeracy and literacy during each period was quite small, for example as little as a quarter of a grade difference for numeracy between 1964 and 2003. Given the complexity of the factors involved, the claims to be statistically significant are open to question, as are the conclusions drawn from them.

The differences and similarities of the testing over time are not provided. However, a footnote on page 12 states that "not all the common items in the 1964-94 tests appear in the 1999 and 2003 tests". While it may appear fair and objective to compare common questions to different groups, where the questions are the same or similar it is likely that the common questions were written by the earlier tests to the curriculums of their times, and used by subsequent tests as a template for purpose of providing common comparable questions. Research shows (and teachers know) that a test or series of questions written to a particular curriculum will bias the results in favor of those who were actually taught that particular curriculum, and it is arguable that the tests were accordingly biased towards the earlier groups of students.
The report is in apparent contradiction to the relatively good results Australian students score as a whole on the international PISA and TIMMS test scores. The authors answer this by claiming that "…test scores in OECD countries were essentially

flat over the period 1970-94…", allowing Australia to maintain a relatively high position despite its lack of "productivity" (p. 18). However, for this claim to be true it would apparently have to indicate that all or most other OECD countries were performing as badly or worse in their educational productivity. Given that Australia ranks towards the lower end of OECD spending per capita on education, but still manages to perform well in international performance indicators, Australia's educational productivity cannot be as low as the authors claim.

The claims that a decrease in class sizes has not led to an increase in educational productivity is simply not demonstrated given the complexity of factors involved in making a valid comparison between the present and past decades. The claim of a decline in educational achievement has not been established. The complexity of the changes over the periods examined mean that class sizes are simply one of many factors that should be considered.

The possibility raised in the report that falling teacher quality led to a disproportionate drop in student performance is similarly not demonstrated or even reasonably indicated and neither are their claim that "…a 10 percent reduction in real teacher salaries reduces student performance by more than 10 percent…" (p. 33). Their research has not produced any evidence that teaching quality has either fallen over time or measures badly by any objective yardstick.

An extensive body of literature exists that examines the effect of characteristics of schools and their students on individual educational outcomes. One meta-review of literature on educational inputs on outcomes (outputs) has concluded that "student achievement seems unrelated to standard measures of the resources going into schools" (Hanushek, 1996, 1997). In fact, recent research argues that family characteristics do matter in student test score regression (Hoxby, 2000). Other similar studies have concluded that contrary to Leigh and Ryan (2008), changes in test scores from year to year might reflect variation in socio-economic makeup of the school rather than the quality of the school or its teachers (Krieg & Storer, 2006). Wider evidence suggests that public school teachers especially do extremely well despite their low salaries and supporting claims for salary increases should be about supporting teachers in their work and encouraging them to stay in the profession. Heckman's economic analysis (Heckman, 2006) of the effects of education (non) funding for Culturally, Linguistically and Economically Diverse (CLED) children are clear indicators that a focus on cognitive test scores – while important – miss important non-cognitive aspects of ability development (Burke et al., 2007) which is neglected in Leigh and Ryan's discussions.

Despite social idealism that believes education would "lead to the threshold of a just society in which inequalities due to personal background and circumstances have

been eliminated" (Anderson & Vervoorn, 1983), Leigh and Ryan (2008) attempt to lay the blame for this failure at the feet of schools, teachers and the university Faculties of Education. Their research data is at best unreliable and their methodological assumptions and tools are inappropriate. The claims of Leigh and Ryan do not stand up to close scrutiny. The data are fine, their use of the data is suspect.

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Endnotes

[1] Andrew Leigh and Chris Ryan are from the Research School of Social Sciences Australian National University

[2] When their paper was released The Australian newspaper in particular published at least 5 stories based on the paper, while the paper received less attention in the Sydney Morning Herald and The Age

[3] Australian Education Union briefing note

[4] Based on ABS recommended formula

[5] Although widely used, the term NESB has come into disfavour in recent years. It has been criticized for having conflicting definitions and grouping people who are relatively disadvantaged with those who are not. Consequently, the Australian Bureau of Statistics (ABS) does not recommend the use of the term NESB. Similarly, the Council of Ministers of Immigration and Multicultural Affairs (COMIMA) have agreed to move away from using the term.

[6] Many thanks to Peter Job for his contributions to this section

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