

The university performance of pupils from state and independent schools in New Zealand

David Hughes, Hugh Lauder and Robert Strathdee

ABSTRACT

A recently released survey by the Education Forum found that more than half of New Zealanders believe that private schools are doing a better job of educating children than state schools. It is difficult to make general claims about school effectiveness because it is difficult to get agreement on the criteria by which schools might be judged. In most studies of school effectiveness academic achievement will be measured by performance on the secondary school examinations such as School Certificate or Bursary or by performance on standardized achievement tests. However, it may be that such examinations and tests are only short term measures of effectiveness and that schools have long term effects which differ from their short term effects. Evidence from overseas research suggests that students from state schools perform better in their first year at university than students from independent schools. In an attempt to establish whether these findings are applicable to New Zealand, we have investigated the performance of first-year university students at the University of Canterbury in relation to the types of secondary schools they attended.

Introduction

A recently released survey by the Education Forum found that more than half of New Zealanders believe that private schools are doing a better job of educating children than state schools.¹ The New Zealand government was operating on the same belief when it decided to increase subsidies to private schools (Education Policy, 1991). This decision is based on the assumptions that (a) supplying additional funds to private schools will increase educational choices for parents thus allowing an increase in the number of parents opting for private education, and (b) increasing the number of children attending private schools will lead to an improvement in school outcomes because private schools are more effective than state schools.

It is difficult to make general claims about school effectiveness because it is difficult to get agreement on the criteria by which schools might be judged. Despite this, whatever one's set of criteria it is certain that academic achievement will be high on the list. In most studies of school effectiveness academic achievement will be measured by performance on the secondary school examinations such as School Certificate or Bursary or by performance on standardized achievement tests. However, it may be that such examinations and tests are only short term measures of effectiveness and that schools have long term effects which differ from their short term effects. That is, pupils from different types of secondary schools may perform differently once they leave school

and move on to tertiary education or into the workforce than they did on examinations and tests while at school.

Evidence from overseas research suggests that this is the case. For example, Dunn (1982) studied students entering the Faculties of Arts and Science at the University of Melbourne in 1975, 1976 and 1978. He found that the Victoria Higher School Certificate (HSC) scores were biased against state school students who performed better in their first year than Catholic and non-Catholic independent school students with the same HSC scores. This finding held up across faculties and years. West (1985) confirmed Dunn's findings when he investigated HSC as a predictor in five faculties at Monash University. Using the 1975, 1980 and 1982 intakes, West found that when entry qualifications were controlled for, students from state schools performed better in their first year at Monash than students from independent schools. As in Dunn's study the finding held up across faculties and years. West concluded that, in Victoria at least, the effect is real and recommended further investigation of its causes.

In an attempt to establish whether these findings are applicable to New Zealand, we have investigated the performance of first-year university students at the University of Canterbury in relation to the types of secondary schools they attended. In our analyses we have compared the performance of students from independent schools with state single-sex and state co-educational schools, and then combined the independent and state schools to compare all single-sex and co-educational schools.

The category 'independent schools' includes the private and integrated schools, most of which are single-sex. The Private Schools Conditional Integration Act of 1975 allows for the conditional and voluntary integration of private schools into the state education system. Integrated schools provide their own buildings and equipment while the state pays the day-to-day expenses including salaries. Integrated schools must meet state curriculum requirements but their programmes reflect their "special character". A school's special character is based on its religious or philosophical beliefs and the traditions and practices associated with those beliefs. Many Catholic private schools have become integrated schools since the passing of the Act so this category is essentially the equivalent of the Catholic and non-Catholic independent schools category used by Dunn and West in their studies.

Private and integrated schools were not analysed separately because the number of students from each type of school is relatively small. The state school category used by Dunn and West has been broken down to include 'state coeducational' and 'state single-sex' schools. This reflects the fact that in New Zealand, unlike Australia where almost all state schools are co-educational, there are significant numbers of both types of school and strongly held views about the effectiveness of each.

New Zealand Background to the Current Study

Lauder and Hughes (1990) investigated the differences in achievement of the pupils leaving 20 Christchurch secondary schools in 1982. Three levels of analysis were undertaken: raw differences in achievement; differences after controlling for the individual level variables pupil ability, socioeconomic status and gender;² and differences after controlling for the school level variables 'ability mix' and 'SES mix'.³ In a replication of this study, the differences in achievement of the pupils leaving 14 of the original 20 Christchurch schools in 1988 were again studied (Hughes and Lauder, forthcoming).

When achievement in the secondary school examinations was put on a scale from '1 = did not attempt any qualifications' to '10 = attained an A Bursary or Scholarship' it was found that the mean level of achievement of the pupils leaving from five of the 1982 schools was over '7 = attaining University Entrance', while at four schools it was less than '4 = three or four School Certificate or Sixth Form Certificate passes'. When the examination performances were investigated for the 1988 school

leavers it was again found that the schools varied widely in their mean level of achievement. In addition, the correlation between the 1982 and 1988 school means was found to be .92 which shows considerable stability across a six-year period.

These outcomes were clearly related to school type. The pupils from the independent schools had a significantly higher mean achievement than those from the state single-sex schools, who in turn outperformed those from the state co-educational schools ($p < .001$). When the independent and state schools were combined the pupils from the single-sex schools outperformed those from the coeducational schools ($p < .001$).

When individual level variables were controlled for there was a substantial reduction in the range of outcomes from the individual schools in both years (47% in 1982 and 62% in 1988). Despite these reductions in the range of outcomes between schools there were still very high correlations between the raw school outcomes and the school outcomes controlling for ability and SES (.92 in 1982 and .86 in 1988). The correlation between the 1982 and 1988 school means adjusted for individual level variables was 0.50 ($p < .05$, $df = 12$, one tailed) showing significant stability over a six year period.

The order of school types did not change when we controlled for ability and SES in either year of the study. That is, after ability and SES had been taken into account the pupils from the independent schools still had a higher mean achievement than those from the state single-sex schools, who in turn out-performed those from the state co-educational schools ($p < .001$) while the pupils from the singlesex schools still outperformed those from the co-educational schools ($p < .001$).

When the school level variables were introduced into the analyses there were further substantial reductions in the range of outcomes between schools (about 42% in 1982 and 37% in 1988). In addition, the correlations between the raw school outcomes and the outcomes controlling for both individual level and school level variables were not significant in either 1982 or 1988. The correlation between the 1982 and 1988 school mean outcomes controlling for both individual level and school lever variables was -0.67, showing that the outcomes were inversely related in the two years!

When we look at the outcomes for school types after controlling for school level variables we find unstable picture across the two years. In 1982 the order was independent, state co-educational and state single-sex, but in 1982 it was state single-sex, independent and state co-educational. In neither year, however, were the differences significant. The co-educational schools were non-significantly ahead of the single-sex schools in .1982 but in 1988 there was a significant difference ($p < .05$) in favour of single-sex schools.

These results show that school mix is related to the differences in outcomes between schools, but whether it is causally related cannot be directly determined from the data. Lauder and Hughes (1990) argued a case for school mix as a causal variable but acknowledged that there are other possible explanations.

For example, one could argue that the variation in attainment associated with school mix results from the fact that school mix is a proxy for unmeasured school processes. The schools with the highest school mixes may have the best teachers, resources, methods or school organization (or some combination of these) which gives them an advantage over other schools. School mix is - related to differences in outcomes between schools only because both variables are correlated with school process variables which cause achievement. Such an explanation can be used by advocates of market theory in education to argue that allowing parents and pupils greater freedom of choice in the schools they attend will lead to rising levels of achievement as pupils gravitate to the most successful schools and are exposed to these teachers, resources, methods and/or forms of organization. Other schools will be forced to upgrade their efforts if they are to avoid closure as their rolls drop.

If, however, school mix does offer a causal explanation for differences in school outcomes, schools which have a favourable mix will do better than those which do not - quite independent of other school processes. Under these circumstances allowing freedom of choice in which school to attend will not have the beneficial effect advocates of market theory claim. Schools which do better than others because of their favourable mix of pupils will attract additional students when there is freedom of choice thus altering their mix as more low SES pupils gravitate to them. Because school mix is causally related to achievement, the outcomes for these schools will in turn be lowered.

Some explanations of the achievement differences between schools will posit lasting changes in learning ability for the pupils attending different kinds of schools. For example, if one believes that high achieving schools do well because their superior teachers teach enduring study skills and habits one would expect their graduates to continue to do well in learning situations beyond the school as they apply these superior skills and habits. It; on the other hand, one believes in school mix as the causal variable one would expect the advantages experienced by pupils while at the successful schools to disappear when they move on to new learning situations and share the environment with the students from other schools who were previously at a disadvantage.

This study attempts to inform the debate on differences in school outcomes by investigating the performance of students from the different kinds of secondary schools when they get to university. That is, we investigate whether the pupils from the independent schools continue to outperform their state school counterparts at the university level or whether their previous advantages disappear.

Method

Sample

University records for those first-year full-time students attending the University of Canterbury in 1983 were consulted to obtain information on the courses studied, the point value of each course studied, the grade achieved in each course, the New Zealand high school attended, and the score achieved in each Bursary subject sat by those who had attempted at least four Bursary subjects.

The sample comprises the 864 students with data available on all variables. Together they constitute 68.6 per cent of the total full-time, first-year enrolment of 1260. Students with missing data were those without a bursary total and/or a New Zealand high school designation since the records were complete with regard to the other variables.

Some of the students with missing data were New Zealanders whose high school was not known or who had gained provisional admission from Form VI and so did not have a Bursary total. However, in other cases students were clearly from overseas and had not attended a high school in New Zealand. For example, in a small number of cases students were listed as having attended a high school in another country. In other cases it could be inferred that the student was from overseas. For example, some students had Asian names and no marks . or grades for any of the New Zealand qualifications. Presumably such students were from other countries and had been admitted *ad eundem statum* because New Zealand school students would have been expected to have Sixth Form Certificate grades in their records even if they had not sat Bursary. While it is not possible to be precise about the number of overseas students, it is clear that the sample is more than 68.6 per cent of New Zealand students which is the population of interest.

Variables

Using the data gathered and the Directory of Secondary Schools and Tertiary Institutions (Department of Education, 1983) we recorded the following for each student:

1. The type of secondary school attended ("school type"). These were coded as independent (n=247), state single-sex (n=242) or state co-educational (n=375).
2. Whether the student had attended a single-sex (n=464) or co-educational (n=400) high school ("school gender").
3. The sum of the points for which the student had entered ("points attempted").
4. The sum of the points which the student had passed, with C- or better counting as a pass ("points passed").
5. A score to reflect the overall performance of the student having regard to the number of points passed and the grades obtained ("total score"). This value was calculated by multiplying the points for each course by the grade obtained for that course with an A+ being worth ten points, an A nine points, an A- eight points and so on through B+, B, 8-, C+, C-, D, to E which was worth zero. So, for example, a six point course in which a student got an A would contribute 54 points to that student's total score while a 12 point course in which a D was obtained would contribute 12 points.

Some programmes proved slightly problematic here. Engineering students, fine arts students and students doing B.Sc. honours did not get points for at least some of their courses: We treated each of the three papers in a fine arts course as worth 12 points when calculating total scores for fine arts students. We could not do the same thing for engineering students and B. Sc. honours students because they did not all take the same number of papers. For example, the courses required in some branches of engineering required fewer papers than other branches. To overcome this problem we treated each engineering and B.Sc. honours student as enrolled for 48 points, found the mean grade obtained, and multiplied this by 48. We justify using 48 points rather than 42 or some other number on the grounds that engineering and B. Sc. honours courses are acknowledged as difficult and demanding.

6. Each student's best five subject total in the Bursary examinations ("Bursary total"). In the small number of cases where students had been absent from one bursary paper their four subject total was prorated to give a five subject estimate on the assumption that the missing paper would have been at the level of the average of the four papers sat.

Results

1. Are there differences between the performances at university of those from the independent, state single-sex and state co-educational schools?

Table 1 shows that there are no significant differences between the groups when we compare "point attempted", "points passed" and the proportion of attempted points which are passed. However: there is a significant difference ($p < .05$) between the three groups when we compare their "scores", with the order being state single-sex schools, state co-educational schools and independent schools.

Table 1

Mean Scores for Students from Independent,
State Single-sex and State Co-educational Schools

	A	B	C	D	E	F
	Points Attempted	Points Passed	BIA	Total Score	Bursary Total	Residuals
Independent	43.04	33.54	.80	184.12	291.04	-19.46
State Single Sex	44.06	36.16	.85	210.36	291.72	5.52
State Co-educational	43.63	34.86	.85	202.54	285.45	9.25
	n.s.	n.s.	n.s.	p<.05	n.s.	p<.0001

Of course, there is no guarantee that the students coming to university from the different types of high schools have the same level of ability. Perhaps the independent schools encourage their students of somewhat lower ability to attempt university while similar pupils from the state schools leave for positions in the workforce or attend other tertiary institutions. If this were the case, the performance of the independent school students might well be more meritorious than the performance of their better qualified state school peers. In order to check this possibility we first investigated the mean best five Bursary totals for the three school types and found that the differences were not significant as shown in Table 1.

Next, we ran the regression of "total score" on "Bursary total" ($R = .74$) and used the resulting regression statistics to calculate a "total score residual" for each student. A "total score residual" indicates the difference between the "total score" the student obtained and the "total score" we predicted for that student using his/her "Bursary total" and the regression statistics. A negative residual indicates that the student has done less well than we would have expected given the student's Bursary marks while a positive residual indicates that the student has done better than we would have predicted. These residuals were used to compare the mean performances at university of the pupils from the different high school types. Table 1 shows highly significant differences between the mean residuals for the three school types ($p < .0001$) with the order being state co-educational schools, state single-sex schools and independent schools.

2. Are there differences between the performances at university of those from the single-sex and coeducational schools?

Given that most independent schools are single-sex schools, we would expect the results here to closely parallel the previous findings. Table 2 shows that this is exactly what we do find. There are no differences between pupils from single-sex and co-educational schools when we compare "11 points attempted", "points passed", "proportion of attempted points which are passed" and "total score". Of these "total score" is the only variable which approaches significance ($p = .06$).

Again the best five Bursary totals were not significantly different for the two types of school but there is a significant difference on the "total score residuals" ($p < .0001$) favouring co-educational schools over single-sex schools.

Table 2
Mean Scores for Students from Single Sex and Co-educational Schools

	A Points Attempted	B Points Passed	C BIA	D Total Score	E Bursary Total	F Residuals
Single Sex	43.47	34.41	.81	192.15	290.66	-10.72
State Co- educational	43.71	35.35	.85	207.95	286.66	12.44
	n.s.	n.s.	n.s.	n.s.	n.s.	p<.0001

Discussion

These results suggest that the advantages the research previously discussed has shown to accrue to pupils from the independent schools do not carry over to the university level. Indeed, our findings are that the pupils from the state co-educational schools and to a lesser extent the state single-sex schools make better progress at university than those from the independent schools.

Our results do not allow us to identify the reasons for our findings, but there are obvious candidates. Chubb and Moe claim that research has shown that effective schools were those

... emphasizing, among other things: clear school goals, rigorous academic standards, order and discipline, homework, strong leadership by the principal, teacher participation in decision making, parental support and cooperation, and high expectations for student performance (1990: 16).

From this list the only factor on which students from the different types of school might possibly still differ when they get to university is parental support and cooperation.⁴ All the other factors are presumably constant for students irrespective of their school background; the University's goals, academic standards, order and discipline, homework requirements, leadership by the Vice Chancellor and expectations for student performance are the same for everybody.

Perhaps students from schools which emphasise, for example, order and discipline and homework are not as well suited to an institution such as the university (where order and discipline is hardly a hallmark and where students are relatively free to do or not do their homework) as those from schools which have encouraged higher levels of individual responsibility. Perhaps students from state schools have learned to self-manage their time better so that they are able to take advantage of the university system.

Of course, there are other possible factors at play here. For example, it may be that it is an advantage to attend a co-educational school and learn to develop relationships with the opposite sex before coming to university and so on.

We do not want to make too much of our findings because the analysis is hardly complete. Our study is limited to full-time university students in their first year of study at a single institution in one year only. However, that said, these results should give advocates of the marketisation of secondary education reason to think carefully. In the same way that judging schools by their raw achievement differences is naive given the strong relationship between individual level and school level variables and outcomes so, perhaps, is judging schools without having regard to how pupils perform in further education and work once they leave school.

Notes

1. Private schools seen as better, The Christchurch Press, 16.9.1991.
2. While measured ability and SES were significantly related to academic achievement, gender never was.
3. SES mix was entered into the regressions but ability mix was not.
4. We know of no research evidence that the students from the different types of schools do differ in this respect and we are not suggesting it as a possible explanation of the findings.

References

- Chubb, J. E. & Moe T. M. (1990) *Politics, Markets and America's Schools*. Washington: The Brookings Institution.
- Department of Education (1983) *Directory of Secondary Schools and Tertiary Institutions*, Wellington: Department of Education.
- Dunn, T. R. (1982) 'An empirical demonstration of bias in HSC examination results' *Australian Journal of Education*, Vol.26, No.2, pp. 190-203. '
- Hughes, D. C. & Lauder, H. C. (forthcoming) 'The stability of differences in school outcomes'.
- Lauder, H. C. & Hughes, D. C. (1990) 'Social inequalities and differences in school outcomes' *New Zealand Journal of Educational Studies*, Vol.25, No.1, pp. 37-60.
- Minister of Education (1991) *Education Policy* Wellington: GP Print Ltd.
- West, L (1985) 'Differential prediction of first year university performance for students from different social backgrounds, *Australian Journal of Education*, Vol.29, No.2, pp. 175-87.