Assessing New Zealand Educational Beliefs
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New Zealand is a small country operating a system whereby all schools are classified into decile groups according to socio-economic status. This classification has led to a number of beliefs about the performance of students both within decile groups and between upper and lower decile schools. Data from CEM Centre (NZ) indicator systems allowed us to test some of these beliefs and to show that they could be, in fact, misconceptions. This paper highlights some of the issues and discusses the results from recent analyses.

Introduction

In New Zealand the quality of teaching and curriculum delivery is believed to be similar throughout the country irrespective of the type of school. However, the enrolment of students from wealthier families can give some schools better access to additional funds through in-house charges and fundraising activities. Less wealthy schools, on the other hand, may need more funding from the New Zealand Government to counterbalance the lack of potential fundraising.

Prior to 1995 the New Zealand Government had various discretionary funds available to help those schools with a high proportion of disadvantaged students. ‘Disadvantage’ was defined as schools with more than 50% Maori students and/or more than 50% of parents falling within the lowest two occupational categories of the Elley and Irving Scale (Irving, 1991). In addition, schools could apply for money to assist staff with programmes aimed at helping students with learning and behavioural difficulties or to improve teacher-student ratios. However, since these discretionary funds were limited, allocation went to schools that submitted the most convincing arguments. This meant that it was possible for schools that served a ‘disadvantaged’ community to miss out on the financial help they needed.

From 1995, the Government pooled three discretionary funding resources into one major source that became known as the Target Funding for Educational Achievement (TFEA). The allocation of TFEA funding was based on the socio-economic status of families whose children were attending each school. Based on this set of data, every New Zealand school was given a decile rating. Throughout New Zealand there were 260 schools allocated to each decile group. Decile 1 schools were deemed to be at the lowest socio-economic level, thus attracting most of the TFEA funds. Decile 10 schools were deemed the wealthiest and least deserving of TFEA funds.

In 1995, the Government distributed the TFEA funds to Decile 1, 2 and 3 schools. In 1996, this funding was extended to include Decile 4 schools. With the injection of 8.5 million (NZ) dollars into the Education sector in 1997 the funding stretched to Decile 9 schools. Decile 1 to 4 schools are now further divided into three subgroups and the difference between the per student funding for Decile 1 and Decile 9 schools can be considerable. To illustrate this, a comparison was calculated for schools with a hypothetical roll of 400 students at the various decile levels (Table 1).

Decile 1A schools receive 30 times as much funding per pupil as a Decile 9 school. A Decile 4 school receives 5.7 times as much funding (per pupil) as a Decile 9 school.

Decile Status

Although the TFEA funding source is approximately 4% of the Government’s total school allocation, the introduction of decile groups has emerged as a major influence on the social, financial, intellectual intake, and cultural status of New Zealand schools. Not only can the funding difference be considerable but the higher the decile level the higher the value parents put on a school. In general, decile 10 schools are highly sought after by potential parents.

The result is that schools in all decile levels are asking to compare themselves against
other similar decile schools. Lower decile schools do not want to be included with higher decile schools where the parents are wealthier. Minimal or zero TFEA funding to the highest decile schools means that these schools want to see how they measure against other higher decile schools who also do not have the advantage of TFEA funding. The middle decile groups do not want to be measured against either the very high or very low decile groups for similar reasons.

**Indicator systems**

New Zealand has 334 secondary schools that begin with Year 9 and finish with Year 13. In 1999, Durham University, UK, established a New Zealand CEM Centre to provide useful indicators to help New Zealand schools monitor their relative progress. The CEM Centre offers "projects" which measure individual student progress during Year 11 (Yellis), from Years 9 to 11 (MidYIS) and from Years 11 to 13 (Blis). Within each project, feedback from the first assessment can give a picture of the school’s intake. Feedback from the second assessment can give a measure of how each student, group, class or school progressed over a specified period.

**Decile Beliefs**

School requests for decile comparisons are often accompanied by general comments about how the decile status can influence intake, performance and student progress.

The beliefs about schools in different decile groups fall into two categories:

- school intake
- student progress

In order to investigate a few of the beliefs, examples from both these categories will be addressed by comparing four groups of schools:

- Decile 1 to 3 schools
- Decile 4 to 6 schools
- Decile 7 to 8 schools
- Decile 9 to 10 schools

Data have been collected from 1999 to 2001 from the different projects that span Year 9 to Year 13 of the secondary school years. Data are therefore based on the 72 schools registered for CEM projects in 1999, 96 schools registered in 2000 and 98 schools registered in 2001. This paper uses some of this data, particularly from Years 9 to 11, to illustrate how some beliefs can be addressed.

**Belief 1: High decile schools attract top ability students while low decile schools are left with most of the lower ability students.**

The decile status of a school reflects the socio-economic status of families attending that school. Is it correct that the top decile schools (decile 9 and 10) attract not only the more wealthy families but also top academic students? Likewise, do the lowest decile schools end up with most of the low ability students?

**Year 9 Intake (The MidYIS project)**

To investigate this belief, we need to look at the Year 9 intake. The data for 1999, 2000 and 2001 showed similar patterns at this level. Figure 1 shows a graph of the 2001 student intake based on 78 secondary schools and 12,917 students.

The bands (A to D) in Figure 1 are the quartiles calculated from the overall results from the Year 9 programme that tests vocabulary, mathematics, spelling, grammatical skills, nonverbal pictures and shapes. Students in the ‘A’ band are situated in the top quartile and students in the ‘D’ band are in the bottom quartile.

From Figure 1 it is clear that the statement: high decile schools attract top ability students, is largely correct. In Figure 1, Decile 9 to 10 schools attract significantly more ‘A’ band students and significantly fewer ‘D’ band students than the other decile groups (where p<0.05). However, the other decile groups have 13% to 24% of their students in the ‘A’ band. Top students are therefore not exclusive to top decile schools.

As a general trend, the lower the decile group the higher the percent of students in the ‘D’ band. Although Decile 1 to 3 schools have 41% of their students in the D band, the Decile 4 to 6 group has 28% and the Decile 7 to 8 group has 21% of their students in the lowest quartile band. The highest decile group only has 10% in the ‘D’ band.

Schools in the 4 to 6 and 7 to 8 decile groups have more ‘B’ and ‘C’ band students than ‘A’ and ‘D’ band students. These two decile...
groups have intakes that are not significantly different from each other in each of the A to C bands. Yet, the TFEA funding allocation per student for a Decile 4 school is double that of a Decile 7 school (Table 1).

Year 11 Intake (The Yellis project)

Similar patterns to the Year 9 intake emerge with another smaller group assessed at the beginning of Year 11. Figure 2 shows Year 11 intake data from 22 secondary schools in the Yellis project. While the groups that span Decile 1 to 8 show similar percentages in the ‘A’ to ‘D’ bands both across the bands and between the groups, the Decile 9 to 10 schools show a significantly higher percentage of ‘A’ band students and a significantly lower percentage of ‘C’ and ‘D’ band students.

In Christchurch, the local newspaper publishes League Tables that identify secondary schools in Canterbury. The League Tables give the total number of students in each school and the percent of Year 11 students who received A, B, C, D, and E grades in the national Year 11 examination. Schools who score well are predominantly high decile schools and some have been known to use these results to attract students. Figure 2 shows that schools which do well in League Tables have a very high percentage of top ability students entering Year 11. This must be a major contributing factor to the League Table results.

Belief 2: Lower ability students in lower decile schools would show better progress if they were compared to students in other lower decile schools.

Relative progress is measured by taking a correlation of all students who obtained results for both the beginning and end assessments in a CEM project. Each student is measured against a line of ‘best fit’ for each subject. Students are allocated both a raw residual value as well as a standardised value.

Each school receives residual values for their individual students as well as the average residual for each subject. The external benchmark comprises all students registered for a project in any one year, irrespective of their decile group. In 2000, several lower decile schools expressed Belief 2. As a consequence, residual analyses were recalculated, this time using only Decile 1 to 4 schools (N=1343 students) as the cohort group. Four schools in the Decile 1 to 4 group were looked at and their new standardised residuals were compared with their original standardised residuals.

For example, Table 2 compares the standardised residuals (or ‘Value Added’ scores) calculated for the same low decile school. A student is keeping pace if their residual is 0.0. If the student lagged behind in a subject, the result would be a negative value. If the progress was further than expected, the result would be a positive value. By averaging the individual student residuals for a subject, the values can be obtained for each subject, as seen in Table 2.

For all subjects, the difference between standardised residuals from the whole cohort and standardised residuals calculated from the Decile 1 to 4 group was not significant (p>0.05). Belief 2 therefore appeared to be a misconception. Low ability students seem to show similar progress whether measured against lower decile schools or when measured against a group containing all decile levels.

Belief 3: Students in lower decile schools make better progress than students in higher decile schools.

Lower decile schools are often at the bottom end of a League Table. Some lower decile schools believe that they are not given a fair opportunity to show that their students progress just as much, if not more, than those from than higher decile schools. If the lower decile schools do not obtain many high grades in national examinations does this mean that their students are making poor progress?

CEM Centre projects measure value added progress by comparing low ability students against other similar low ability students. Likewise, high ability students are compared to similar high ability students. This means that, hypothetically, students of any ability, irrespective of the type of school they attend, can obtain positive, negative or zero residual scores.

The two most popular subjects, mathematics and English, are used to illustrate that decile school ranking is a poor indicator of student progress.
Figures 3 and 4 show scattergrams of students in Decile 1-3 and Decile 9-10 schools by taking the baseline test scores in mathematics and plotting them against the corresponding residual (or ‘Value Added’) scores obtained from measuring progress to the Year 11 nation-wide mathematics examination.

Whether students scored highly or not on the baseline test, similar ranges of value-added residual scores can be seen for both Decile 1-3 and 9-10 schools in mathematics.

Likewise Figures 5 and 6 show scattergrams of Decile 1-3 and Decile 9-10 students using the baseline test scores in vocabulary and plotting them against the residual scores obtained in the Year 11 nation-wide English examination. Again, as in mathematics, both extreme decile groups show a broad range of residual scores.

A similar broad range of residual scores could also be seen in the 1999 subjects and in all other subjects calculated for Value Added in 2000. This broad range of residuals for extreme decile groups reaffirms that decile school ranking has little to do with student progress.

Discussion

The purpose of this paper was to address a few of the beliefs that have arisen since the introduction of decile ranking for schools in New Zealand. These beliefs often relate to funding and socio-economic issues and appear to be of some concern for New Zealand schools. Some comments and beliefs are now possible to investigate with data from indicator systems that measure student intake and relative student progress.

Decile-related concerns are not restricted to the very high and very low decile schools. Since the CEM Centre began in 1999 there have been constant requests from the entire range of decile schools to measure their school against other similar decile schools. Schools need to know if they are maximising their use of the limited funding available and how they compare to other schools with similar TFEA funding.

In terms of Government base funding, all schools are treated the same. However, for targeted TFEA funding, which is 4% of total Government funding, there can be a large monetary difference based on decile rating. Table 1 illustrates that lower decile schools receive considerably more TFEA funds than higher decile schools, with Decile 10 schools receiving nil or little targeted funding. In addition, because the decile ratings are based on socio-economic factors, issues relating to the decile status of a school can be sensitive and crucial to enrolment figures. The disparity between top ability and low ability students can also be reflected in certain decile groups, as seen in Figure 1. The belief that the highest decile schools attract more higher ability students was reinforced.

Lower decile schools have more funding but their academic progress is a different issue. Figures 3 to 6 show that while there may be a difference on intake between the highest and lowest decile group of schools, there is little difference in the range of residual scores between the two extreme groups, as illustrated in Year 2000 mathematics and English. A wide range of Value Added scores is possible within high and as well as low decile schools.

Schools need to be aware that decile ranking is not a good indicator of student progress. Instead of being concerned with comparisons to other similar decile schools perhaps the focus should be placed on investigating ways to target and improve subject and student progress within one’s own school.

Reference


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Table 1: Year 2000 TFEA Funding at different decile levels for a school with 400 students.

<table>
<thead>
<tr>
<th>Decile</th>
<th>$NZ</th>
</tr>
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<tbody>
<tr>
<td>1 A</td>
<td>135,884</td>
</tr>
<tr>
<td>1 B</td>
<td>118,580</td>
</tr>
<tr>
<td>1 C</td>
<td>100,856</td>
</tr>
<tr>
<td>2 D</td>
<td>83,552</td>
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<td>2 E</td>
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<td>3 H</td>
<td>38,824</td>
</tr>
<tr>
<td>3 I</td>
<td>32,912</td>
</tr>
</tbody>
</table>


Figure 1: 2001 Year 9 intake for each of the four decile groups (1-3, 4-6, 7-8 and 9-10)

Figure 2: 2001 beginning of Year 11 comparisons for each decile group
Table 2: A comparison of standardised residuals for a low decile school.

<table>
<thead>
<tr>
<th>Subject</th>
<th>All Deciles</th>
<th>Decile 1-4</th>
</tr>
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<tbody>
<tr>
<td>Accounting</td>
<td>0.0</td>
<td>-0.1</td>
</tr>
<tr>
<td>Art</td>
<td>-0.5</td>
<td>-0.4</td>
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<tr>
<td>Economics</td>
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<td>-0.7</td>
</tr>
<tr>
<td>English</td>
<td>-0.6</td>
<td>-0.5</td>
</tr>
<tr>
<td>Food&amp;Nutr.</td>
<td>-0.7</td>
<td>-0.6</td>
</tr>
<tr>
<td>Geography</td>
<td>-0.7</td>
<td>-0.5</td>
</tr>
<tr>
<td>Graphics</td>
<td>-0.2</td>
<td>-0.2</td>
</tr>
<tr>
<td>History</td>
<td>-0.6</td>
<td>-0.2</td>
</tr>
<tr>
<td>Mathematics</td>
<td>-0.4</td>
<td>-0.3</td>
</tr>
<tr>
<td>Science</td>
<td>-0.7</td>
<td>-0.6</td>
</tr>
<tr>
<td>Typing</td>
<td>-0.7</td>
<td>-0.7</td>
</tr>
</tbody>
</table>

Figure 3: A scattergram of residual scores for Year 2000 Decile 1–3 schools showing Year 11 baseline scores in mathematics versus corresponding Year 11 Value Added scores.

Figure 4: A scattergram of residual scores for Year 2000 Decile 9–10 schools showing Year 11 baseline scores in mathematics versus corresponding Year 11 Value Added scores.
Figure 5: A scattergram of residual scores for Year 2000 Decile 1–3 schools showing Year 11 baseline scores in English versus corresponding Year 11 Value Added scores.

Figure 6: A scattergram of residual scores for Year 2000 Decile 9–10 schools showing Year 11 baseline scores in English versus corresponding Year 11 Value Added scores.