A REPORT ON THE PROCEDURES USED TO IDENTIFY POST-PRIMARY SCHOOLS FOR INCLUSION IN THE SCHOOL SUPPORT PROGRAMME UNDER DEIS

The DES provided the ERC with a variety of post-primary databases (containing various educational and socioeconomic data, the details of which are given below) and asked that schools be ranked on the basis of levels of disadvantage for consideration for the post-primary dimension of DEIS. From the databases supplied, a single database was developed in which every school had data on at least one relevant variable. The variables provided by the DES were:

- Medical card data by school for JC candidates (including JCSP) for 2002, 2003 and 2004 (based on the number of students granted exam fee exemptions on the grounds that their families have medical cards)
- Medical card data by school for LC candidates (including Leaving Certificate Applied) for 2002, 2003 and 2004 (based on the number of students granted exam fee exemptions on the grounds that their families have medical cards)
- Junior Certificate retention rates by school for 1995, 1996 and 1997 entry cohorts
- Junior Certificate exam results (OPS scores) aggregated to school level for 2002 and 2003 cohorts (for an explanation of OPS scores, see Appendix 1)
- Leaving Certificate retention rates by school for 1995, 1996 and 1997 entry cohorts
- Free Books data for all schools for 2003, 2004, and 2005.

Including data on the numbers of Travellers, Non-nationals and Special Needs students in generating a rank order of schools was also considered. However, while such data exist for non-VEC schools, it is not possible at present to obtain such data on a school-by-school basis in the VEC sector. It is understood that the DES proposes to collect data for individual schools on all or some of the above for statistical purposes from 2005 onwards.

Some schools were excluded from the ranking exercise and a number of other complications arose in relation to handling the data. These complications will be described after the rationale and main features of the ranking exercise have been outlined.

Procedure used to rank schools

The development of an index by which schools could be rank ordered was guided by the wording in Section 32 (9) of the Education Act (1998), in which disadvantage is defined in terms of both learning outcomes and social and economic factors (i.e., educational disadvantage exists when poor educational outcomes are related to student background factors). On this basis, it was felt that, for a school to be eligible for extra resources under DEIS, there ought to be evidence that the school was experiencing educational problems (e.g., it was below average on the retention variables and/or the JC performance) **and** had above average percentage enrolment of students from poor backgrounds. Therefore, the index needed to contain at least one educational measure (e.g., Junior Cycle retention rate, Senior Cycle retention rate, Junior Cycle Examination performance) and at least one socioeconomic measure (e.g., % of students with medical cards at Junior Cycle level, % of medical cards at Senior

Cycle level, % of students in the school in receipt of a grant for Free Books). Preliminary analysis of the data revealed that the Free Books variable (which applies to students across the school) had a weaker relationship with the educational outcome measures than either of the other socioeconomic variables (medical card possession at Junior and Senior Cycle) (see Appendix 2). Therefore, it was decided to exclude the Free Books variable from the index altogether. However, the variable may be useful in terms of quality assurance and otherwise.

It was also decided to prioritize Junior Cycle data in the rank ordering process. This was done because it was felt that levels of disadvantage should be most obvious in schools with poor completion rates, or poor performance at Junior Cycle when combined with high numbers of students from families with medical cards.

In an effort to identify the most appropriate index, various combinations of the variables and weightings were tried. In the course of this process, two problems arose out of the requirement that the ranking should reflect both educational outcomes and the socioeconomic backgrounds of students. The first problem was that schools that had high percentages of medical card holders tended to move towards the top of the rank order even if they did not display significant educational problems as reflected in their retention rates or examination performance. This was particularly true where medical card possession at Junior Cycle level was assigned extra weight, or where medical card possession at both Junior and Senior Cycles were used to balance the contribution of socioeconomic and educational outcome measures. The second problem was that there was a small number of schools with low average achievement and/or attainment despite having relatively few students from poor backgrounds. Minimizing the numbers of instances of these two types of problem became a criterion in selecting an index.

In an attempt to meet this criterion and to optimize the accuracy of the estimate of the percentage of students from poor socioeconomic backgrounds, a further variable was derived from the existing data for use in the index. This variable is the percentage of medical cards at Junior Cycle added to the percentage of students that dropped out prior to completing Junior Cycle. This was done to take account of the fact that almost all students who did not complete a minimum of the Junior Cycle are known to come from poor backgrounds (see Gorby, McCoy & Williams, 2003). On this basis, this derived variable is a better estimate of the percentage of students at entry that would have been characterized by poor backgrounds. More information about this composite variable is provided in Appendix 3.

The index is based on adding the estimate of the total students at entry from poor backgrounds described in the previous paragraph (the percentage of medical cards at Junior Cycle plus the percentage of students that dropped out prior to completing Junior Cycle) to the following variables: the percentage retention rate to Junior Cycle; the average Junior Certificate Examination score (OPS); and the percentage retention rate to Senior Cycle. In the case of each of the variables, the average for all years was used in the ranking process. However, if a school was missing data in a given year or years, data for any available year/s was used in the ranking process. To take account of differences in the distributions of variables, the variables were transformed to standard scores (meaning that they were placed on a common scale). This helps to overcome problems resulting, for example, from ranking schools on the percentage of medical cards where scores are bunched around the mean. Following the placement of scores

on a common scale, the next step was to reverse (by multiplying by minus 1) the obtained values on the socioeconomic variables (the percentage of medical cards at Junior Cycle and the estimate of the percentage of students from poor backgrounds). This was done so that values on these variables could be meaningfully added to values on the educational variables. The final step involved summing each school's scores on all variables and ranking schools on the basis of the resulting total score.

A ranking based on the index as outlined above contains fewer instances in the top 150[1] of the two types of problem that we were trying to avoid (i.e., schools that do not appear to have **both** an educational problem and high proportions of students from poor backgrounds) than other indices that were considered. However, some instances of these problems remain in the top 150 on the ranking being proposed. An example of each type, which omits any identifying information, is given in the following table.

Data for the total population of schools (*N*=644) on all variables, and for two individual schools which illustrate, respectively, each type of problem.

	JC Med card %	JC retention %	JC exam score	JC total pov. estimate	LC med card %	LC retention %	Free Books %
Total Pop.	33.74	93.98	64.16	39.75	29.10	76.74	48.06
School 1	18.59	91.49	55.98	27.10	26.70	64.57	44.99
School 2	89.90	95.14	61.31	94.76	87.66	88.59	95.53

Some issues with the data

The population of schools

The ranking exercise was carried out initially for 644 schools. Clearly there are far more than 644 post-primary schools in the system (the DES database for 2004/2005 has 741 schools). The main reasons for the difference are

1. Fee-paying schools (58 in 2004/2005) were excluded.
2. A further 25 schools that, according to the DES, cater exclusively for adult students were also excluded.
3. It was not possible to include 10 recently established schools because retention data for 1995, 1996, 1997 and/or examination or medical card data for 2002/2003/2004 are not available for them.
4. Three schools that appear in the 2004/2005 database and one that appears in the 2003/2004 database have closed. The DES subsequently decided that three further schools scheduled to close in 2007 should be excluded. Therefore, only 641 schools appear on the list prepared by the ERC on February 14th 2006[2].. Subsequently, three further schools were removed from the list at the request of the DES reducing the total number of schools on the list to 638. This list was sent to the DES on 17th Feb 2006. Subsequently, five other schools that

[1] The DES originally intended to select the top 150 schools in the rank order for the School Support Programme, but subsequently increased the number to 200.

[2]It should be noted that the standardized values that were used in the computation of the index used to rank order schools were based on the population of schools before these schools were removed (i.e., on 644 schools).

were closing or amalgamating were removed from the list at the request of the DES.

Amalgamated schools and schools that changed management/sector

In some cases, schools were amalgamated since 2002/2003 (the years for which data were provided on a school-by-school basis on Examination results and Medical cards), and this meant that the new school did not have the relevant data associated with its roll number. However, rather than omit these schools altogether from the ranking process, data were extrapolated, where possible, from the profiles of schools prior to their amalgamation. Two schools were recently assigned new roll numbers because of changes of management. For the purpose of the present exercise, data associated with the old roll number were used.

Free Books data

Twelve schools had no data for Free books. Ten of these were adult education only, and one school had closed. One was a VEC school that offers Junior and Leaving Certificate, but had not previously applied for a Free Book grant. Contact between the DES and the relevant CEO led to data on Free Books being supplied for the *current* school year. For more detail on issues related to data on Free Books, see Appendix 4.

The use of the medical card variable in the rank ordering exercise

Medical card data were available on a school-by-school basis for Junior Certificate students and for Junior Certificate and JCSP students combined. It was decided to use the combined variable in the ranking process as it was thought it would better reflect the backgrounds of the populations of students served by the schools. An added advantage was that fewer schools were missing values on the combined variable.

The averaging of values for schools across two or more years

In most cases, schools that appear in the rank order have average values based on three years retention data, three years medical card data and two years Junior Certificate Examination (OPS) data (details of the years in question were given on page 1). However, in some cases, schools may only have data for two out of three years, or for one out of two years. For example, nine schools in the rank order do not have retention data for each of the entry cohorts in 1995, 1996 and 1997. Seven of these schools have data for 1997 only, while two have data for 1996 and 1997. In the case of OPS data, five schools were ranked on the basis of data from one year. In four of these cases, it appears that the schools were too recently established to have had students taking Junior Certificate in 2002, and in one very small school, the likely explanation is that there were no students in the relevant grade level in the year in question (2003). Therefore, it is assumed that where schools in the rank order are missing data for individual years, this is attributable to the date of establishment of the schools in question.

Concluding Comments

It is perhaps best to view the ranking exercise described here as the first of a number of phases in the selection of schools for DEIS. Apart from a quality assurance exercise similar to that carried out in the primary school ranking, at least two other phases would be worthwhile. The first of these relates to whether any or all of the

aspects of the DEIS initiative are viable in the schools at the top of the rank order. In addition, schools that have quite small enrolments but are not scheduled to close or amalgamate are likely to feature towards the top of the rank order. In the list compiled for the 16:1 exercise in 2002, 7 of the top 150 schools (in terms of assessed level of disadvantage) had fewer than 15 students taking the Junior Certificate Examination. While it would not be acceptable to exclude small schools (whether scheduled to close or not) from receiving any extra resources to tackle disadvantage, the inclusion of such schools in all aspects of DEIS would probably not be appropriate. It is planned to include total and/or cohort enrolment on the list of schools produced to facilitate a "viability check" of the top (about 200) schools in terms of assessed level of disadvantage.

Another phase in the school selection process arises out of a concern not to reduce the chance of schools being included in DEIS because they have been successful in recent years in improving their retention rates (e.g., as a result of their involvement in SCP). Although the fact that the retention data used is a few years old may reduce this concern, it does not invalidate it. Therefore, it is proposed that the list produced be examined with a view to identifying such schools. Schools ranked between 150 and 250, especially if they are in SCP, would need particular attention.

The relationship between the socioeconomic variable (overall estimate of medical card possession) and the educational ones (exam performance and Junior Certificate completion) is worth commenting on. The relationship is by no means perfect, but with correlations of between -.72 and -.76 across schools, there is evidence of a clear relationship between Junior Certificate achievement and attainment and the socioeconomic profile of incoming students. However, there is a small number of schools in which, despite enrolling large numbers of medical card holders, students are performing well (Figure 1), and are remaining in school (Figure 2). Conversely, it is possible to identify some schools in each figure that have relatively few entrants with medical cards and poorer educational outcomes than would be expected given their intake.

Figure 1. Scatterplot of performance in the Junior Certificate Examination against estimated medical card possession of students at entry.

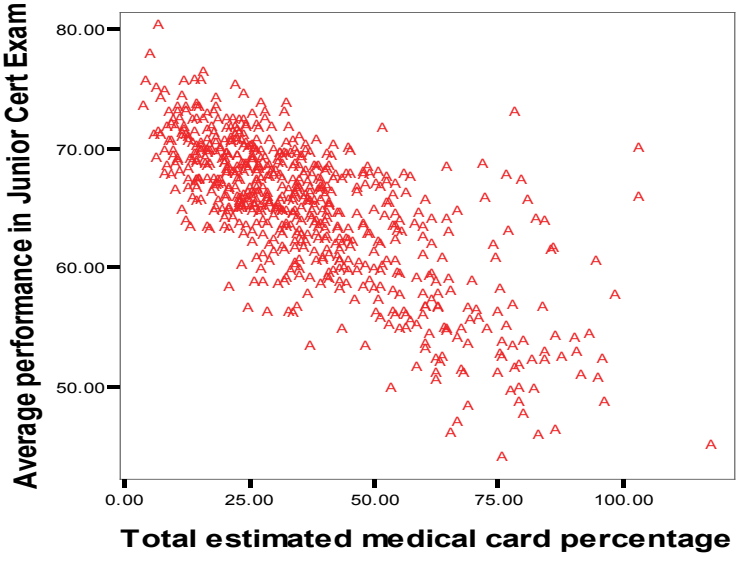
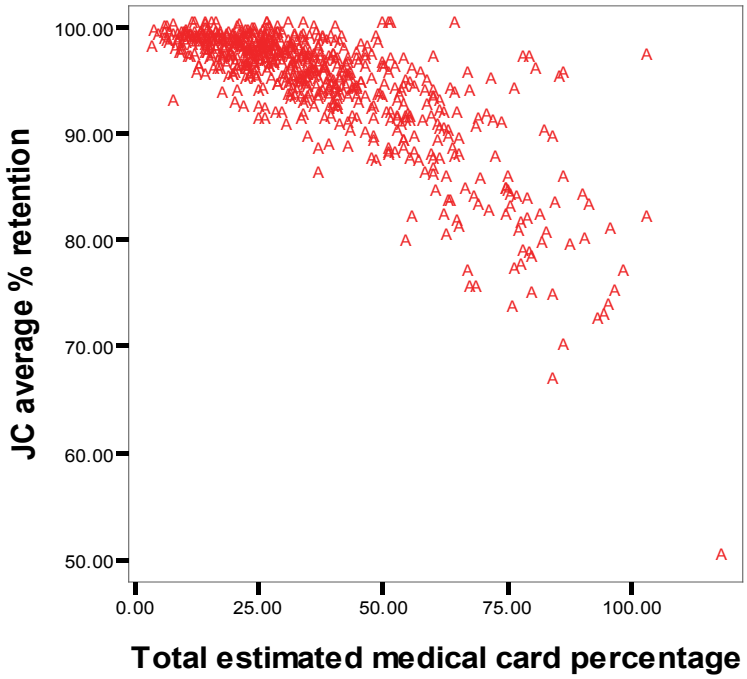


Figure 2. Scatterplot of percentage retention to Junior Certificate against estimated medical card possession of students at entry.



References

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Gorby, S., McCoy, S., & Williams, J. (2003). *"2002 annual school leavers' survey: Results of the school leavers' surveys, 2000/2001.* Dublin: Department of Education and Science / Economic and Social Research Institute.

Kellaghan, T., & Dwan, B. (1995). *The 1994 Junior Certificate Examination: A review of results.* Dublin: National Council for Curriculum and Assessment.

APPENDIX 1

OPS scores

Student performance in the JCE is described here using an overall performance scale (OPS) score which has been adopted directly from that used by Kellaghan and Dwan (1995) in their analysis of the 1994 Junior Certificate results. The OPS scale involves the allocation of numerical values to the alphabetical grades awarded to candidates, which when summed, produce an index of a candidate's general scholastic achievement (Table 1). The OPS score is based on a student's performance in the seven subjects in which he or she performed best. The maximum possible OPS score is 84 (which is achieved by a student who is awarded seven "A" grades on Higher Level papers), while the lowest possible OPS score is 0 (where a student fails to achieve at least a grade "F" on any of his/her best seven papers).

Table 1. Individual overall performance scale (OPS) scores corresponding to grade categories at each examination level.

Higher	Ordinary	Foundation	OPS score
A			12
B			11
C			10
D	A		9
E	B		8
F	C		7
	D	A	6
	E	B	5
	F	C	4
		D	3
		E	2
		F	1

APPENDIX 2

Correlations between key variables

Table 2. Correlations between socio-economic and educational variables in non-fee-paying post-primary schools with complete data (*N*=644).

	Junior Cycle Medical card %	**Junior Cycle retention %**	**Junior Cert. exam score mean**	**Composite poverty variable**[1]	**Free Books %**	**Senior Cycle Medical card %**	**Senior Cycle retention %**
Junior Cycle Medical card %		-.594**	-.631**	.974**	.522**	.916**	-.582**
Junior Cycle retention %			.754**	-.762**	-.275**	-.539**	.857**
Junior Cert. exam score mean				-.722**	-.327**	-.533**	.864**
Composite poverty variable[1]					.498**	.891**	-.712**
Free Books %						.516**	-.223**
Senior Cycle Medical card %							-.494**
Senior Cycle retention %							

[1] More detail on this variable is provided on page 2 of the main document and in Appendix 3.
**Correlation is significant at .01 level.

APPENDIX 3

The composite poverty variable

The reasoning behind the use of the composite variable in its current form is probably best explained by contrasting two hypothetical schools (Table 3).

In school A, 100 students enrol, 50 of whom have medical cards. No students drop out, so the school gets a value of 50% on our medical card variable (i.e., half of the intake are from poor backgrounds). However, in school B, which also has an intake of 100, 50 of whom are from poor backgrounds, 20 students have dropped out before Junior Certificate. All of those who dropped out were medical card holders, but, because they did not sit the examination, this is not reflected in our medical card percentage variable. Only 30 of the 80 examination candidates have medical cards, so the school gets a value of 37.5%.

Because School B has a greater intake of students from poor backgrounds, and has evidence of a significant educational problem, it is important that School B is above School A on the rank order of disadvantage. The creation of the new variable is an attempt to overcome this kind of anomaly. School B obtains a value of 57.5% (37.5% for its medical card percentage, plus 20 for the one-fifth of students who dropped out). In school A, the values for the medical card percentage and for the new variable are both 50.

Although the variable is a sum of two percentages, the school with the highest value is 119. This is because if a school had a 100% dropout rate, it would not be possible for that school to have any medical card holders at Junior Cycle. It would be possible to transform this derived variable to a percentage, but doing so would favour schools with high medical card percentages. For example, school A in the example would have a converted percentage of 50 but in school B, the converted percentage would also be 50 (i.e., 20 for the one-fifth of students who dropped out and 30 for the 37.5% of examination candidates who had medical cards divided by 100).

Table 3. Illustrative data on the composite poverty variable for two hypothetical schools with entry cohorts of 100 students.

	JC Medical card % (1)	**JC dropout % (2)**	**Composite poverty variable (1+2)**	**Composite poverty variable (1+2) expressed as a percentage**
School A	50%	0%	50	50%
School B	37.5%	20%	57.5	50%

APPENDIX 4

Issues related to data on Free Books

Some schools had values of more than 100% for students in receipt of Free books. There were 12 such schools in 2003, 7 in 2004 and 6 in 2005. This probably arose because schools apply for a Free Books grant on the basis of numbers of eligible students towards the end of the school year, but the enrolment from the previous September is used to arrive at a percentage (the DES does not compute a percentage as it does not require it for the allocation of grants). In all cases, the value for Free books for each of the schools involved was set at 100%. This is unlikely to misrepresent greatly the proportion of needy students in the schools involved, and is consistent with the procedure for dealing with a similar problem concerning too-high Free books percentages encountered in the 2005 Survey of Disadvantage in primary schools.

Post-script

Data on medical cards supplied by the DES were incomplete when the ranking was done in December 2005 (a list of the rank order using these data was sent to the DES on December 20th). It appears that, because 16-year-olds were to be excluded from the analysis for the 16:1 index in 2002, an attempt was made to exclude them from the DEIS analysis also. However, it seems that some students that were under 16 were also excluded from the DEIS database. (It has not been established, as yet, exactly what the exclusion criteria were). The discovery of this necessitated a re-ranking of the schools using medical card data for the complete cohort[3]. Data for the complete cohorts were received by the ERC on April 25th 2006. It is important to note a few points in relation to the re-ranking exercise:

- The re-ranking of schools involved only those schools that had not been excluded up to 6th April 2006 (i.e., 635 schools)
- The computation of standard scores was based on these 635 schools only. (Previous standard scores had been based on analysis of data from 644 schools).
- Data for three amalgamated schools that appear in the rank order were treated variously. In the case of some variables (e.g., OPS), data from the constituent schools were simply averaged to give a value for the new school. However, in some cases it was possible to compute a weighted average[4] for Junior Certificate medical card data and this was used in the newly amalgamated school's index. Retention data were supplied by the DES for some amalgamated schools, but no details on the procedure used to combine the data from the constituent schools were provided.

[3] Data were received for the complete Junior Certificate cohorts in 2002, 2003 and 2004 *with the exception* of VTOS students.

[4] Simple averages of values from the constituent schools were used in the case of all variables for amalgamated schools in the previous rank-ordering process.