Who does best at University?

Bahram Bekhradnia, currently Director of Policy at the Higher Education Funding Council for England (HEFCE) and shortly to take up a position as Director of the Higher Education Policy Institute, and John Thompson, data analyst at HEFCE – argue that performance in higher education has a close connection to previous attainment as measured by entry qualifications.

This is an extended version of an article by which first appeared in the Guardian on 15 October 2002.

1. Most agree that policies should be 'evidence based' , yet higher education policy development has its share of strongly held beliefs without any 'visible means of support'. Perhaps the most persistent of these is the assertion that students' achievements prior to higher education bear little relationship to what happens once they start a degree course. A particular variant of this general idea is that A-level achievement is especially poor as an indicator of success. Better, some say, to take almost any other measure: GCSEs, aptitude tests, etc. It is important to look hard at the evidence behind such claims, not only because of their importance for admissions policies, but also because of the implications for the cost of widening participation.

2. One can see how the impression that higher education performance is only weakly associated with entry qualifications could arise. At the departmental level, typically each cohort will be around a 100, or even less, and, because A-level grades are often used as the main means of selection, the range of grades will be small. Under these conditions it will be difficult to see the association between entry grades and what happens on the degree course. Also, we tend to remember those students who start with inauspicious beginnings, who seem to have things stacked against them, and then go on from strength to strength and do exceptionally well. Though these students are important to us, they are not typical, and so our overall impression can be distorted by our selective memory.

3. It should be possible to get away from these difficulties by using large scale data sets, but these are no guarantee against Chinese whispers. Many articles which assert that there is 'no or little association', can be traced back to an article published nearly 20 years ago, 'The correlation between A-level grades and degree results in England and Wales' (Kevin Sear, Higher Education, 12 (1983) 609). The author concluded that the correlation between A-level and degree results was 'relatively weak', which is what many have taken from the paper, though anyone reading it through it may well come to a different conclusion.

4. The first point is that the correlation coefficient statistic is quite unsuited to measuring the association between two ordinal scales with different numbers of values, something that the author in part acknowledged. His results showed that while 25% of graduates with weak A-levels (up to 8 points in the more recent points measure, up to approximately 140 using the new tariff system) got a first or upper second, 60% of those with good A-levels (24 to 30 points, tariff probably 300 or over) did. This is the 'half full' or 'half empty' question. Whether

you think that such an association is strong or weak depends on what you expect. 'Relatively weak' begs the question, relative to what? Success at university, at least three years later, and in a quite different environment, could not be expected to have the same association with A-levels, as, for example, A-levels were found to have had with O-levels, which is probably the association with which it was being compared.

5. Such measures are, in any case, going to under-estimate the efficacy of A-levels in predicting performance in higher education. Firstly, the data available then, and now, are far from perfect. The calculation of A-level points is not standardised, and data entry errors are quite common. Secondly, the summary A-level points discard a lot of the information that A-level results provide. For example, 18 points could be 'C C C', 'B B E', 'A B', etc, and this is before we consider the subjects that have been taken. (The evidence suggests that, all other things being equal, the 'A B' entrant would have the best chance of success though, perversely, it would equate to a tariff of 220 compared with 240 for all the other possible combinations.) Thirdly, graduates in different subjects are being compared, in which the pattern of A-level entry and degree class are quite different. Fourthly, we are only considering those students who go on to graduate. Students with weaker A-levels are more likely to drop out, switch to a diploma or certificate, or fail their finals. Finally, the implicit assumption is often that the differences between A-level and degree results are down to the unreliability of the A-levels, when at least part of the difference must be due to weaknesses in the degree classification.

6. Recently Dylan Wiliam reported such a comparison (Daily Telegraph, 15 August 2002). Much of what he wrote we would fully endorse. All should appreciate that A-level grades, like any other measurement, are not perfectly accurate. We also agree that admissions tutors should be trying to identify potential which has not been reflected in A-level results, particularly for applicants who may have been disadvantaged by attending poorly performing schools. Indeed, work is in progress at the HEFCE to identify and quantify the additional factors that could usefully be taken into account . We do, however, have some difficulty with the statement that 'A-levels don't predict performance at university very well'. The evidence cited is the relationship between degree class and A-level grades for graduates from King's College. He concludes that using A-levels to choose the graduate with a better class of degree is better than trusting to chance, 'but not much'. As with the work of Sears, this begs the question, 'what is not much'?

7. That said, we do find Wiliam's approach interesting – of expressing the predictive power of A-levels in terms of the chance of picking the graduate with the better degree. We have applied this approach to the national data sets produced by the Higher Education Statistics Agency (HESA).

8. We have restricted our analysis to young full-time students on degree programmes. There are several reasons for this. Firstly, the data quality of records for part-time entrants, and to a lesser extent for direct full-time entrants (which represent half of the full-time mature entrants) is much weaker. Secondly, for part-time students it is difficult to interpret what the results mean. Not all part-time students are really aiming for the qualification they are formally registered for. Finally, for full-time mature students the association between entry

qualifications in general, and A-level grades in particular, and higher education performance is much weaker, and this is what we would expect. The A-levels returned may have been awarded many years earlier, or gained under difficult conditions. Such special conditions have long been recognised by institutions.

9. In our population, there are 95,000 graduates. Suppose we picked two at random. Table 1 below shows the chances that one graduate would have a better class of degree than the other.

Table 1 Graduates selected at random: chances of one having a 'better' degree

Result	Probability
Graduate 1 had better degree	30%
Graduate 2 had better degree	30%
Graduates 1 and 2 same class of degree	40%
(Probability student 1 had better degree) divided by (Probability student 2 had better degree)	1.0

Note to Table 1

Population: home graduates who gained a first, upper second, lower second or third, from a full-time degree programme in 2000-01, who where under 21 when they commenced their course, whose highest qualification on entry was A-level and who had A-level points returned.

Probability: based on random sampling with replacement.

10. Both graduates, of course, have exactly the same chance of having a better class of degree than the other, reflecting the fact that we know nothing extra about them.

11. Now suppose we were told that the first graduate had 24 points, and the second had 18 points. Table 2 shows the revised probabilities that the first student would get a better class of degree.

Table 2 Graduates (24, 18 points) selected at random: chances of having a 'better' degree

Result	Probability
Graduate 1 (24 points) had better degree	39%
Graduate 2 (18 points) had better degree	19%
Graduates 1 and 2 same class of degree	42%
(Probability graduate 1 had better degree) divided by (Probability graduate 2 had better degree)	2.0

Note to Table 2

Population as in table 1.

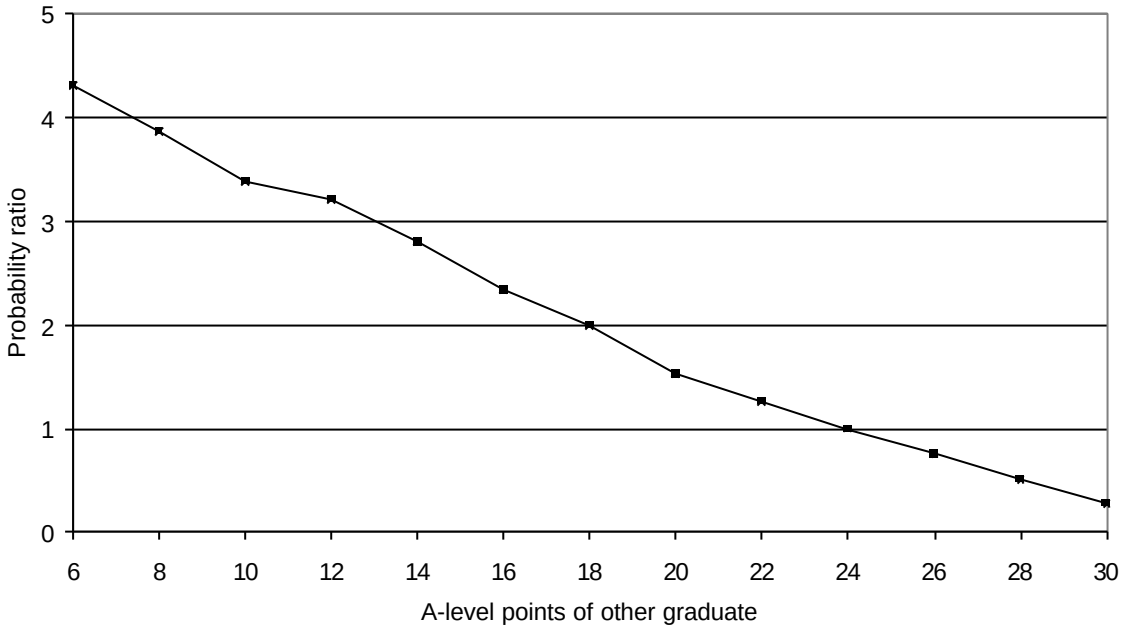
A-level points: 18 points includes graduates returned with 17 or 18 points,
24 points with 23 or 24 points.

Probability: based on random sampling with replacement.

12. There is nothing special about 24 and 18 points, they represent entrants just below and just above the median value which is around 20 to 22 points. For the graduates with three A-levels the difference represents one grade per subject (say 'B B B' and 'C C C') a significant but not huge difference. The probability ratio shows what a big effect knowing the entry grades has, with the chance of graduate 1 having a better degree being twice that of graduate 2. As we saw in Table 1, without this information, the ratio would be 1.0. Of course, the prediction is not perfect, but we know of no other measures which would make such a big difference to the result .

13. Figure 1 below shows how our 24-point graduate compares with the whole range of graduates with different grades. We can see that the probability ratios go from 4.3 when compared to graduates with low A-level points (six points or less), down to 0.28 when compared to graduates with 30 points.

Figure 1 Chance of graduate with 24 A-level points having a better degree than another graduate



Notes to Figure 1

Population as in table 1.

A-level points: Odd numbers of points rounded up; 1 to 5 points included with 6 points.

Probabilities: based on random sampling with replacement.

Probability ratio:

(probability graduate getting better class of degree than 'other graduate') /

(probability 'other graduate' getting better class of degree than graduate)

14. This further illustrates that knowing the A-level grades has a very large effect on the probability of selecting a graduate with a better class of degree. (For a table of the probabilities of all the possible parings of two graduates, see Annex A Table A1).

15. In most cases the graduates we selected were from different higher education institutions. We know that different institutions award different proportions of good degrees, and that the A-level grades largely determine which institution a student goes to, so it could be that the probabilities reflect the differences between institutions, rather than the differences between graduates. To answer this, we repeated the calculations and added the condition that the two students compared must be from the same institution. Table 3 below shows the same probabilities given that the two students are from the same institution.

Table 3 Graduates (24, 18 points) selected at random: chances of one having a 'better' degree, given they are from the same institution

Result	Probability
Graduate 1 (24 points) had better degree Graduate 2 (18 points) had better degree Graduates 1 and 2 same class of degree	41% 18% 41%
(Probability graduate 1 had better degree) divided by (Probability graduate had better degree)	2.3

Note to Table 3
Population as in Tables 1 and 2.
A-level points as in Table 2.
Probability: based on random sampling with replacement.

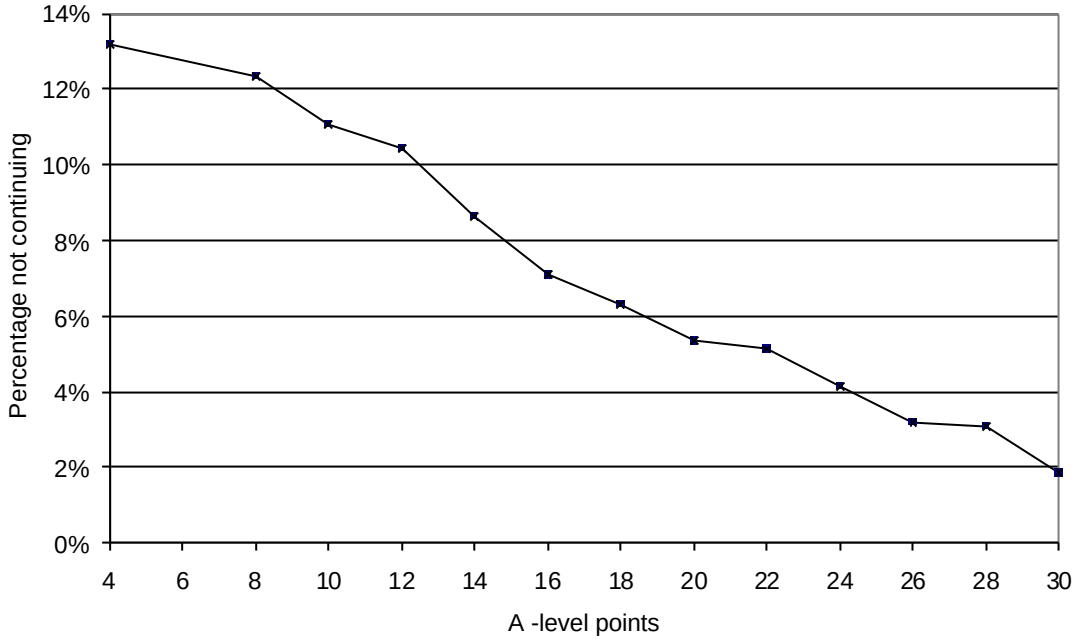
16. We see that the probabilities are very similar to those found when the students can be from different institutions, with the probability ratio of having a better class of degree being slightly greater. The graduate with 24 points now has more than twice the chance of having a better degree than the graduate with 18 points. (This is what we find in general, apart from pairs with very different grades, where the numbers of pairs are very small so that the results could be due to very particular conditions or even simply data errors. S see Annex A Table A2.)

17. This increase in A-level differential, when we confine the comparisons to graduates at the same institutions, could be interpreted in different ways. Some may be tempted to interpret it as showing slightly less stringent assessment at less selective institutions, but a small difference like this could easily be due to complex effects of different subject mixes, or some other factor. Whatever the cause, the difference between the overall comparison and the within-institution comparison is small, and this is good evidence that the differences we see are not due to systematic differences in the institutions.

18. For the reasons already discussed, using the class of degree in this way will understate the predictive power of A-levels, or any other measures. In particular, we have only considered those students who graduate.

19. Progressing from the year of entry is a critical part of gaining a degree. In Figure 2 below we show the relationship between the percentage of entrants not continuing from their year of entry, and their A-level points.

Figure 2 Percentage of entrants not continuing from year of entry by A-level points



Notes to Figure 2

Population: young home entrants 1998-99.

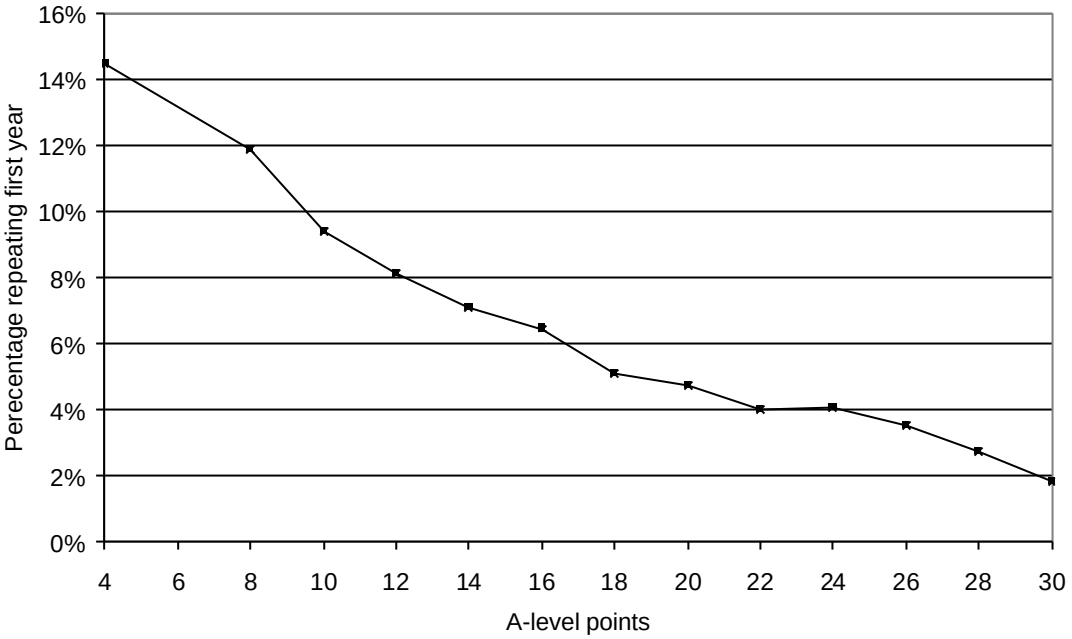
A-level points: 4 = 4 points or less, 8 = 5 to 8 points. Odd points rounded up. Scottish Highers and Baccalaureate entrants grouped with A-level entrants.

See 'Performance indicators in higher education in the UK', HEFCE 01/69, December 2001, Tables B6, page 125 and B13, page 132.

20. In Figure 2 we see the strong association between A-level points and non-continuation rates, which vary between 13.2% for students with four points or less, down to 1.8% for those with 30 points, more than a seven-fold difference.

21. Among those students who do progress, students with lower A-level grades do so, on average, with more difficulty. Figure 3 below shows that the proportion of students who continue at an institution who repeat the first year varies from 14.5% for students with four points or less, down to 1.8% for those with 30 points, more than an eight-fold difference. While some of these repeat years may be due to, say, a change of subject interest, it is reasonable to assume that the trend shown in Figure 3 reflects differing performance between students with different A-level grades.

Figure 3 Percentage of students repeating the first year by A-level points



Notes to Figure 3

Population: young home students who start in the first year and continue at the same institution in the following year in the first or second year.

This is a sub-set of the population used for Figure 2.

A-level points: as figure 2.

22. To sum up, entrants with lower A-level points are more likely to drop out, to repeat years and, if they graduate, they are less likely to get a good degree. What does this all add up to? It certainly does not mean that admissions tutors should mechanistically select applicants on the basis of A-level grades. Most never have done so, and all should be exploring new ways to identify potential. That said, there is good evidence to back the practice of using grades for A-levels and other qualifications, either individually specified or summarised in a tariff, as a condition for entry to higher education courses.

23. It also does not mean that the development of A-levels and other qualifications should not continue. We are not taking sides in the 'A-levels versus baccalaureate', or other debates. In this discussion we have focused on A-levels, in part for brevity, and in part because we have necessarily had to look back. So, for example, when these graduates were at school the take-up of GNVQs was still on a small scale, and there were fewer than 2,000 GNVQ entrants in our graduate population. (Overall the GNVQ students are slightly less successful than those with the lowest A-level grades. However, we have no information about the GNVQ scores they obtained, so that true comparisons are difficult. Tariff scores of GNVQ entrants will be introduced with an enhanced HESA record to be introduced for 2002-03.) However, we would argue that the development of A-levels and other qualifications will

not be helped if we have a distorted picture of the relationship between A-levels, and other qualifications, and performance in higher education.

24. Finally there is the issue of the costs of widening participation. The idea that there is little or no association between previous educational attainment, and success in higher education, fits very well with the idea that widening participation can be achieved with no additional unit costs. A perfectly logical deduction from a false premise. If universities are going to take students from a wider range of educational backgrounds, maintain standards, and give students a good chance of succeeding, more resources will be required.