

Student Performance Analysis

This analysis is of a large academy in an urban area of Nottingham of high deprivation, with 42% of students on pupil premium. This school was in special measures in 2014 and Educake was introduced to the science department by the new management team in that year.

This analysis is based on the 2016 GCSE results of their 246 year 11 students and their use of Educake in the 2015-16 academic year.

The purpose of this analysis is to determine if there is any link between how much students used Educake and their GCSE grades. In addition, the analysis takes into account the Progress 8 measure to control for performance at Key Stage 2.

The aim of the analysis was to answer two questions:

Question 1: How does the use of Educake affect Progress 8 scores?

Question 2: Is there a link between the number of Educake questions a student attempts and their GCSE grade?

Conclusion

Students who attempted more Educake questions achieved higher Progress 8 scores.

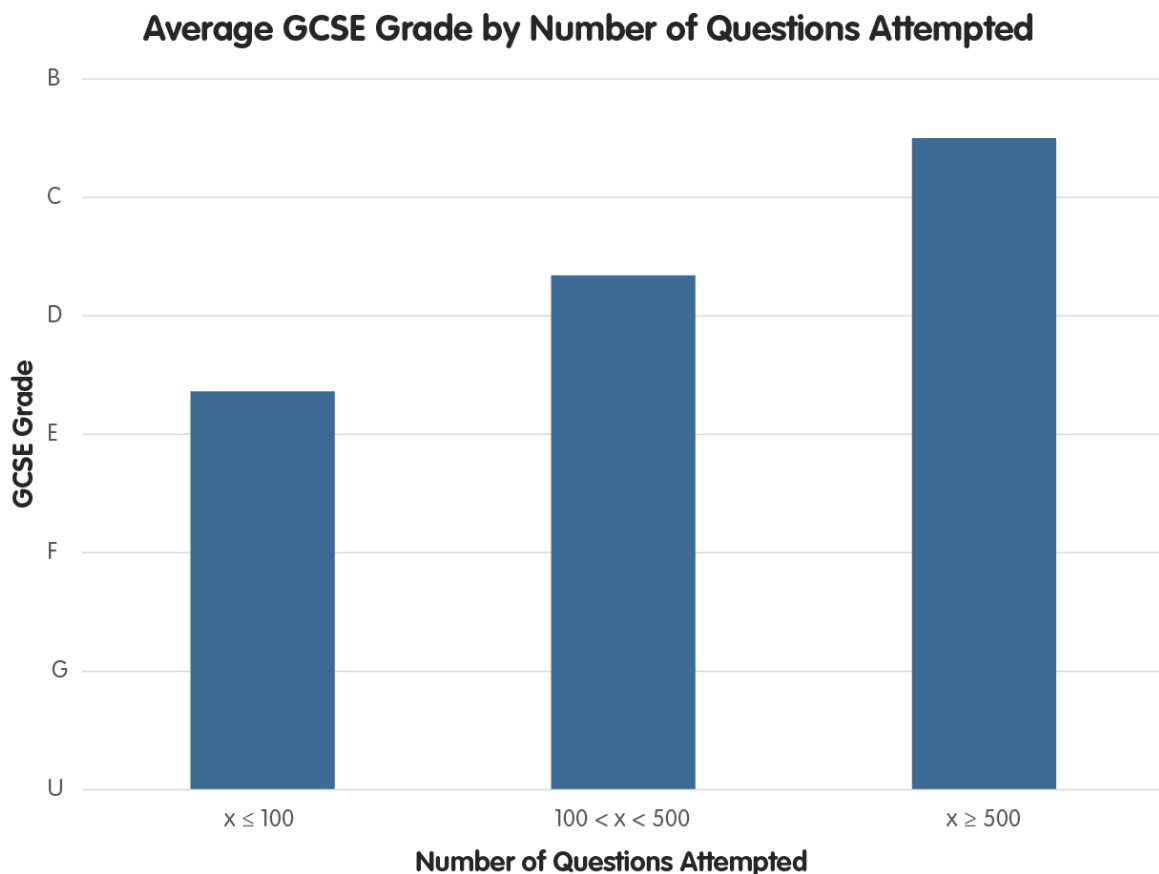
Students who attempted more Educake questions achieved higher GCSE grades.

Question 1: Is there a link between the number of Educake questions a student attempts and their GCSE grade?

First, we grouped students into three groups and calculated their average GCSE grade:

- Non-users of Educake (attempted less than 100 questions)
- Occasional users of Educake (attempted between 100 and 500 questions)
- Regular users of Educake (attempted more than 500 questions)

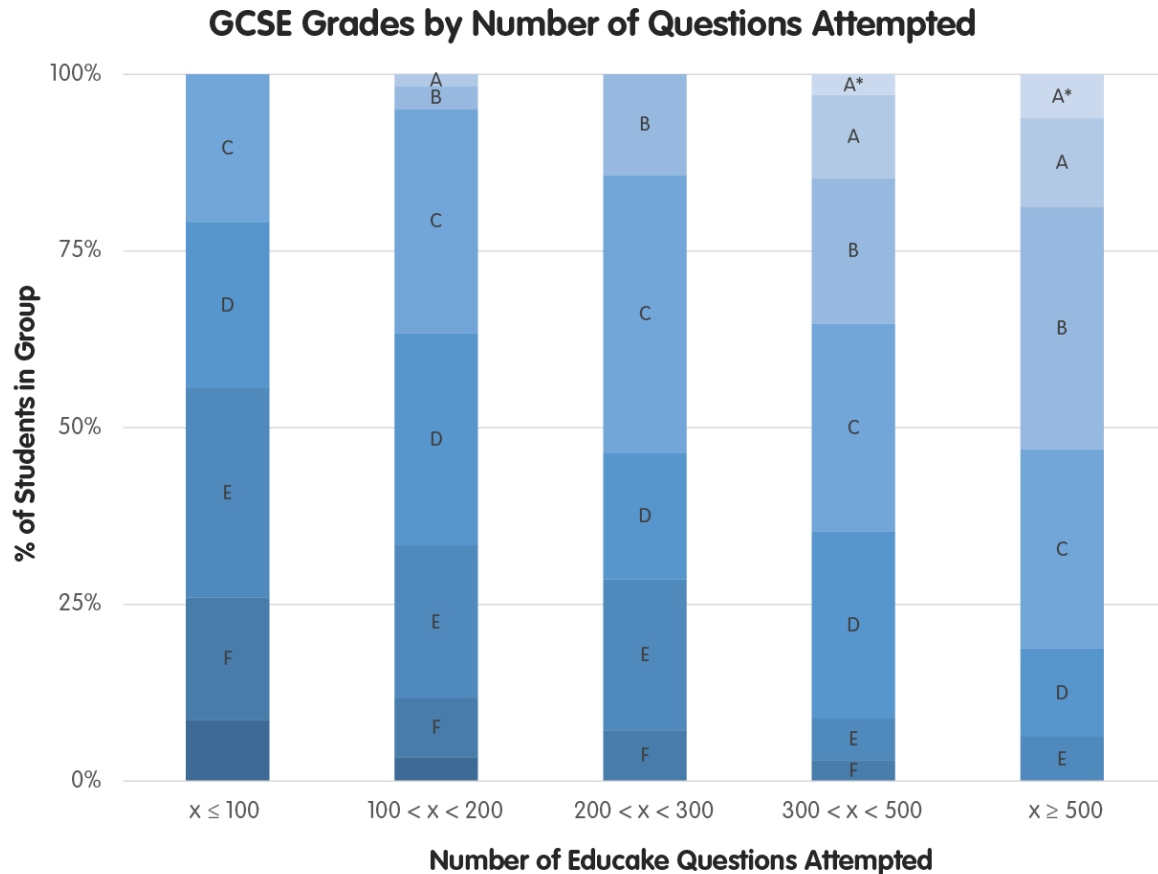
The results showed a clear link between use of Educake and GCSE grade, with regular users of Educake averaging GCSEs two grades higher than non-users of Educake.



Number of Educake Questions Answered	Average GCSE Grade	Number of Students
$x \leq 100$	3.36	83
$100 < x < 500$	4.34	123
$x \geq 500$	5.50	34

Note: The means are different with significance greater than 99%

Next, for more detail, we grouped students into five groups and looked at the distribution of grades within each group. Each column shows the grades achieved in that group.



Again, the link between GCSE grades and the number of Educake questions attempted by students is clear. This chart also shows that with each small increase in the number of attempted Educake questions, there is an improvement in grades.

It is clear to see that the proportion of students achieving a grade E is less in groups that attempted more Educake questions. Conversely, the proportion of students achieving a grade B is much greater in groups that attempted more Educake questions.

In particular, it is worth noting that of the students who attempted more than 500 Educake questions, 80% achieved a C or higher, compared to only 20% for non-users of Educake, who attempted less than 100 questions.

Number of Educake Questions Answered	G	F	E	D	C	B	A	A*
$x \leq 100$	7	14	24	19	17			
$100 < x < 200$	2	5	13	18	19	2	1	
$200 < x < 300$		2	6	5	11	4		
$300 < x < 500$		1	2	9	10	7	4	1
$x \geq 500$			2	4	9	11	4	2

Question 2: How does the use of Educake affect Progress 8 scores?

It might be expected that more able students tended to attempt more questions on Educake. Perhaps they found the questions easier and could do more, or perhaps they were more motivated to attempt questions.

We controlled for ability using the new Progress 8 school accountability system, introduced by the government for use in 2016.

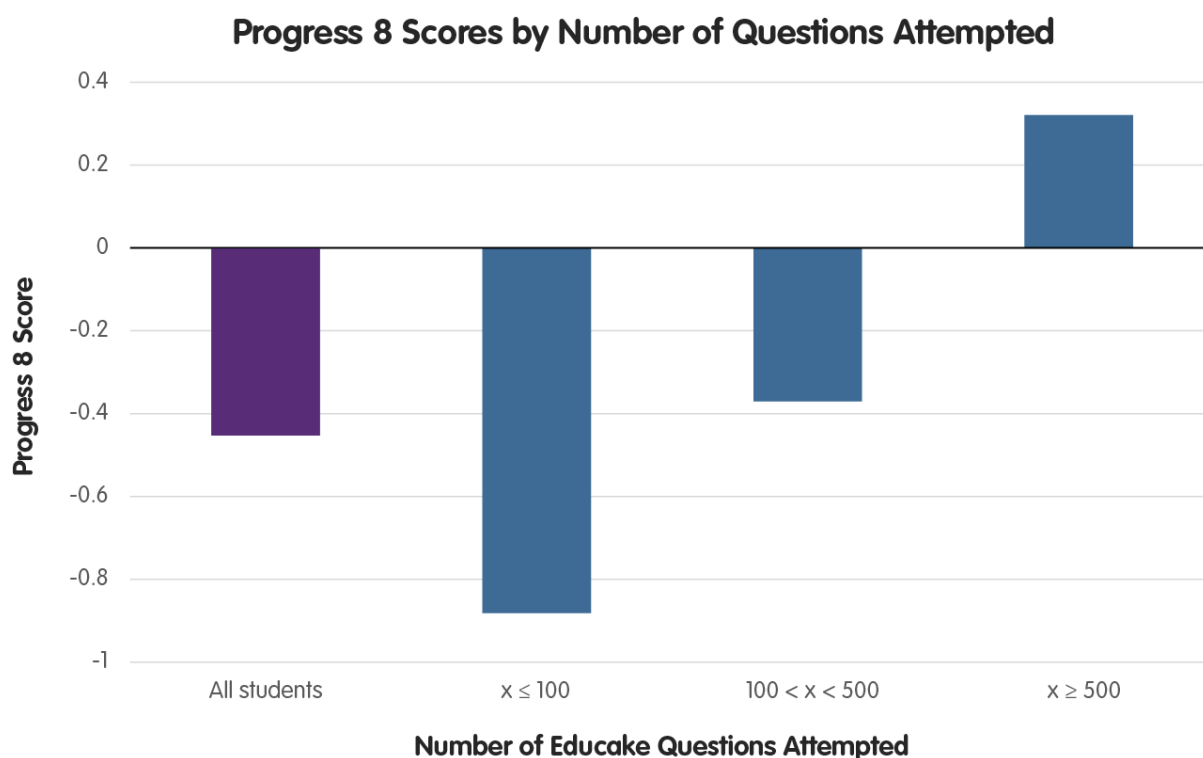
Progress 8 uses a student's Key Stage 2 average point score (APS) to produce an estimated GCSE grade, and then calculates a score showing how many grades above or below their estimated grade the student actually scored at GCSE.

For example, a student might be expected to achieve a grade C at GCSE based on their Key Stage 2 SATs results. If they were to achieve a grade B, they would have a Progress 8 score of 1. On the other hand, if they were to achieve a grade D, they would have a Progress 8 score of -1.

Normally, the GCSE grades of multiple subjects are used to calculate the Progress 8 score, but for this analysis we used the students' science grades.

Again, we grouped students into three groups and calculated their average GCSE grade:

- Non-users of Educake (attempted less than 100 questions)
- Occasional users of Educake (attempted between 100 and 500 questions)
- Regular users of Educake (attempted more than 500 questions)



Students who did not engage with Educake underperformed in their GCSE science grades by almost one grade. In contrast, students who used Educake regularly achieve one third of a grade higher than expected.

Number of Educake Questions Answered	Progress 8 (from Science)	Number of Students
All students	-0.45	235
$x \leq 100$	-0.88	81
$100 < x < 500$	-0.37	122
$x \geq 500$	0.32	32

Note: The means are different with significance greater than 99%

The exact calculations used to generate the Progress 8 scores for this analysis are included in the Appendix. Links to relevant documents are also included.

Appendix

Progress 8 Calculation Method

Progress 8 is a student's Attainment 8 score, minus their Estimated Attainment 8 score.

Attainment 8 Score

The Attainment 8 score is a student's average grade at GCSE (using new 9-1 grades), with double weighting given to English and Maths. For this analysis, we used a student's average science grade as their Attainment 8 score, and the recommended mappings from A*-G grades on to 9-1 grades.

For example, a student achieves a grade B for Core Science and a grade C for Additional Science. This is mapped to a grade 6 and a grade 5 for the new grading system. We average their grades to give them an Attainment 8 score of 5.5.

Estimated Attainment 8 Score

The Estimated Attainment 8 score is the average Attainment 8 score of all students nationally with the same KS2 Average Point Score. Because of this, we have excluded the three students who did not have a KS2 Average Point Score.

The Estimated Attainment 8 score is calculated as follows:

1. Divide KS2 Average Point Score by 6 to get the KS2 Fine Level
2. Use the table overleaf of provisional Attainment 8 estimates to retrieve the Estimated Attainment 8 for the KS2 Fine Level.
3. Divide the Estimated Attainment 8 by 10

For example, Jack achieved a KS2 Average Point Score of 26.7:

1. We divide this by 6 to get the KS2 Fine Level of 4.5.
2. Using the table below, we look up the KS2 Fine Level and get an Estimated Attainment 8 of 47.70.
3. We divide this by 10 to get 4.77.

This score would be subtracted from Jack's Attainment 8 score to get a Progress 8 score.

Provisional 2016 Attainment 8 estimates for each KS2 fine level

Key Stage 2 Fine Level	Estimated Attainment 8
1.5	14.30
2.0	19.87
2.5	21.05
2.8	22.31
2.9	24.39
3.0	25.20
3.1	26.21
3.2	27.46
3.3	29.08
3.4	29.95
3.5	31.29
3.6	32.96
3.7	34.39
3.8	35.91
3.9	37.80
4.0	39.15
4.1	40.78
4.2	42.52
4.3	44.31
4.4	46.07
4.5	47.70
4.6	49.82
4.7	51.71
4.8	53.78
4.9	55.72
5.0	57.56
5.1	59.80
5.2	61.90
5.3	64.02
5.4	66.40
5.5	68.67
5.6	71.37
5.7	73.75
5.8	75.95

(source: [DfE Progress 8 and Attainment 8 measure in 2016, 2017 and 2018](#))