

## SCOTTISH PERFORMANCE IN THE PROGRAMME FOR INTERNATIONAL STUDENT ASSESSMENT, 2006–2022: FALLING ATTAINMENT AND RISING INEQUALITY

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### **Abstract**

The Programme for International Student Assessment (PISA), run by the Organisation for Economic Cooperation and Development (OECD), is the largest regular investigation of school students' attainment globally. It has been conducted usually every three years since 2006, measuring attainment of 15-year-olds in reading, mathematics and science. It also records wide-ranging information about students' social characteristics and about their experience of school. The most recent round, in 2022, showed Scottish attainment to have fallen in all three domains. Although the decline since 2018 was partly due to the disruption caused by the Covid pandemic, this was not the whole explanation because Scottish scores have been falling since 2006. At the same time, social inequality has been widening. The paper summarises the evidence on this, and, by comparing the Scottish results with those in England, considers whether part of the explanation might be the different policies on the school curriculum in the two systems.

**Keywords:** Secondary school; attainment; socio-economic status; curriculum; knowledge; skills

### **Introduction**

Much controversy arose in Scotland when the most recent results of the OECD's Programme for International Student Assessment (PISA) were announced in December 2023, reporting tests that had been done in autumn 2022.

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Compared to the previous round of this regular study in 2018, the attainment of 15-year-old students in Scotland was sharply down in all three domains which it investigates – reading, mathematics and science. Social inequality of attainment had risen, despite the consensus in Scottish policy that it was already undesirably high. The Scottish Government officially blamed the disruption caused by the Covid pandemic, a complacency that did not sit well with the OECD’s own conclusion that Covid was at best a partial explanation of the world-wide fall in attainment between 2018 and 2022 (Schleicher, 2023). Not all countries did show a fall. For example, attainment rose in Japan and Korea in all three domains, and rose in two of the three in several others, for example Singapore, Italy and Israel. The OECD pointed out that there was only a weak overall relationship between countries’ change in score and the extent of their school closures during the Covid period. Most immediately relevant was that the fall in England in mathematics was less than in Scotland even though the experience of Covid had been very similar in the two countries.

The most telling complaint about the Scottish decline was that it had been going on for a decade and a half in these mostly triennial studies. Because, moreover, the decline was greatest in science, next in mathematics, and smallest in reading, the suspicion arose that it had something to do with what was happening in schools. To some extent reading can be taught by parents, but fewer parents are likely to remember enough mathematics to teach their children beyond the end-of-primary stage. Science knowledge is even rarer, and in any case learning science needs access to specialist equipment. Because the starting point for the decline was around the 2012 study, and because that was the first to cover students who had had some of their schooling since the development of Scotland’s new Curriculum for Excellence (which had been officially inaugurated across Scotland in 2010) the debate about the 2022 results therefore focused on that. The 2022 cohort was the first PISA group to have had their whole schooling shaped by this curriculum.

These explanations remain speculative. This article’s main purpose is to outline the Scottish results in PISA in greater depth, stretching back to 2006 and comparing Scotland with England and with the countries of the European Union. This analysis also looks at other aspects of students’ experience as measured by the 2022 and 2018 surveys – at whether they felt supported by their school, how motivated they were to learn independently, and whether they had liberal views about what the OECD calls global interconnectedness. Supporters of the Curriculum for Excellence point out that its aim has not primarily been to improve attainment as measured in PISA’s cognitive domains, but has rather been to strengthen these other characteristics. The article

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concludes by returning to the curriculum as a possible explanation for the decline, but only to explain further why that might seem plausible, not to show definitively that it is.

## **Data and methods**

This PISA study is the most rigorous source of international comparative research on school education that is available. It has been run by the Organisation for Economic Cooperation and Development since the turn of the century. Under the leadership of Dr Andreas Schleicher, it has sought to use reliable statistical measurement to understand what 15-year-olds know and can do (Grek, 2009; Schleicher, 2017). Every three years, it measures their attainment in mathematics, reading and science, and collects a wide range of background information that might help to explain how that attainment is distributed across social groups, and how it is changing over time. 81 countries took part in the 2022 round (which was postponed for a year because of Covid), giving a total sample of nearly 700,000 students (OECD, 2023a). Scotland has taken part in every round since the start. Changes in the design of the assessments make comparison back beyond 2006 less valid in mathematics and science, and so all the time series used here start in that year. The 2018 survey also included an investigation of students' understanding of global issues, for example on the environment and on economic interconnectedness (OECD, 2020). This covered 66 countries, of which 27 took the full tests of global competence. Scotland took part fully, but not the rest of the UK.

The Scottish sample size in each year has been around 3,000 students, from around 100 secondary schools. Other countries had a sample size at least as large as this (and in several, as in the UK, it was large enough to conduct analysis of different federal units). As in all the countries which take part, the Scottish samples were randomly selected within strata to reflect the range of types of school and of the social circumstances which they face. In particular, the samples cover independent schools as well as schools that are managed by the local authorities. The full technical specification of the sample design is described by, for example, Caro and Biecek (2017), Jerrim et al. (2017), OECD (2023b) and Scottish Government (2023).

The OECD notes that the aftermath of Covid, and other factors, made it difficult to conduct the 2022 study to the same standard as previously. In particular, for Scotland, they note that student absenteeism probably means that all the estimates err in an optimistic direction (because persistent

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absentees tend to have lower attainment). Nevertheless, the OECD also notes that this problem pre-dated Covid to some extent, and so they conclude for Scotland that

... given the similarity of response rates between 2018 and 2022, it cannot be excluded that a similar bias might be present in 2018 as well ... For this reason, data were deemed to be comparable to previous cycles.

(OECD, 2023a: 17)

They also note that any such bias is likely to be similar in the rest of the UK, so that comparison between Scotland and the rest of the UK is also probably not biased.

Comparison with other parts of the UK are the most valid for drawing inferences about the possible effects of education policy (Raffe et al., 1999). UK comparisons hold constant a large part of the social and political context of education, and so any differences are more likely to be due to specific features of the education systems. For example, the nature of social inequality arising in the labour market is similar across the UK, and so any different patterns of educational inequality are unlikely to be due to variation in the meaning of these background characteristics (Paterson and Iannelli, 2007). Likewise, the policy response to Covid was very similar in all parts of the UK (Sibieta and Cottell, 2021). Here we focus on the comparison with England because policy on the curriculum in Scotland and England in the past two decades has been sharply different. Scottish policy – in the Curriculum for Excellence – has concentrated on developing applied skills, whereas English policy has sought to strengthen students' knowledge. This contrast is discussed further in the final section.

Nevertheless, despite the potential cogency of comparison with England, some wider context is also useful. The official publications from PISA and from the Scottish Government usually compare Scotland with the whole of the OECD, which can be informative, but the range of countries in the OECD is very broad, many with current and historical circumstances that are very unlike those of Scotland. Here we use the European context instead, comparing Scotland with 24 of the 27 countries that were members of the European Union in 2022: Austria, Belgium, Bulgaria, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, Greece, Croatia, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, and Sweden. The same 24 are used for each survey (back to 2006), thus before several of these countries had joined the EU; so they are referred to here as 'EU countries' rather than simply as the EU. Three current members of the EU have

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not been included in the comparison because they did not take part in every PISA survey (Republic of Cyprus, Luxembourg and Malta).

The datasets from the PISA studies were downloaded from the OECD website.<sup>1</sup> The design of the PISA tests and sample is highly complex, and so the analysis requires specialist statistical software (Jerrim et al, 2017). The analysis here was carried out in the computing environment R, using the specialist package ‘intsvy’ which was developed for international surveys of this kind by Caro and Biecek (2017). The results of the analysis are shown as means (of attainment) and percentages (of students’ reporting their experiences). These are subject to sampling error, the size of which is measured by the standard errors that are shown in the tables and graphs. Each reported mean or percentage may be thought of as being accurate to within approximately plus or minus twice its standard error.

## **Attainment**

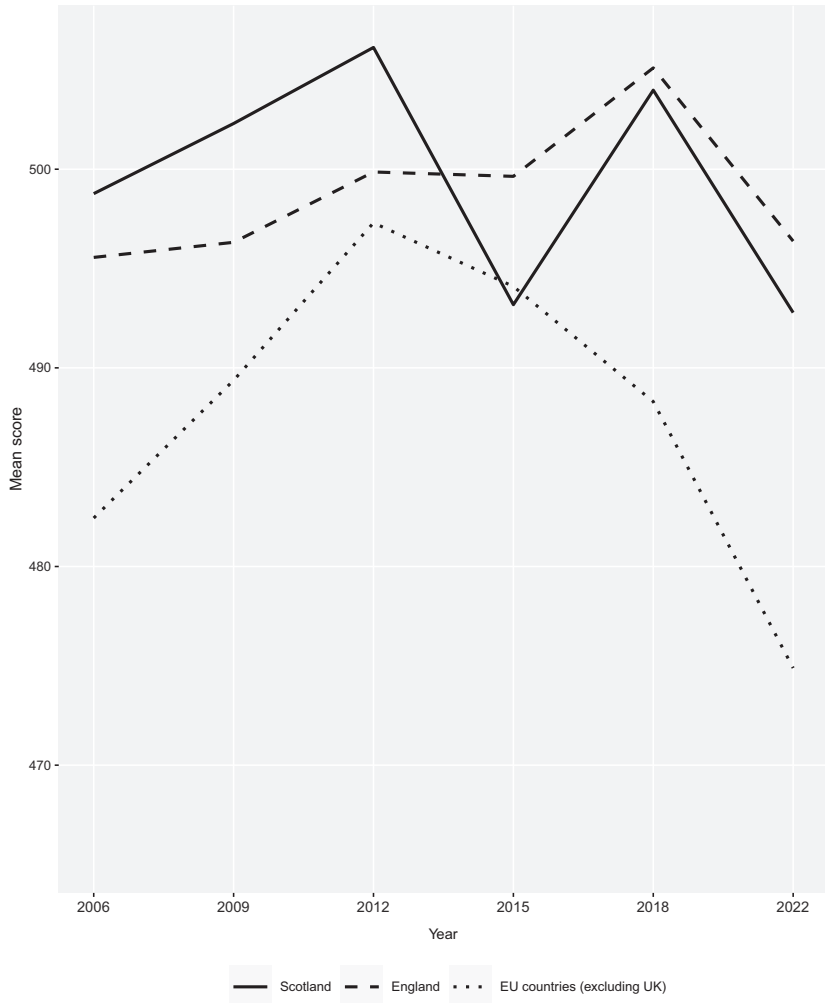
### Overall mean performance

Below are three charts showing the headline trends – for reading, mathematics and science, comparing Scotland (solid line), England (broken line), and the European Union countries, excluding the UK (dotted). In each subject area, all three lines decline from 2018. Scotland’s position compared to England and to the other EU countries has deteriorated compared to the early years of the century.

In reading (Figure 1) Scotland essentially has stagnated since 2006 (after a sharp fall from the beginning of the century, which is not shown in the graph: the mean was 527 in 2000). The recovery in 2018 did not fully compensate for the fall between 2012 and 2015, and in any case 2022 fell back again to the 2015 level. So 2022 was equal lowest since 2000. The fall 2018–22 was similar to England (down about 9 points) and the EU (down about 13 points). But both Scotland and England remain above the average of the EU countries.

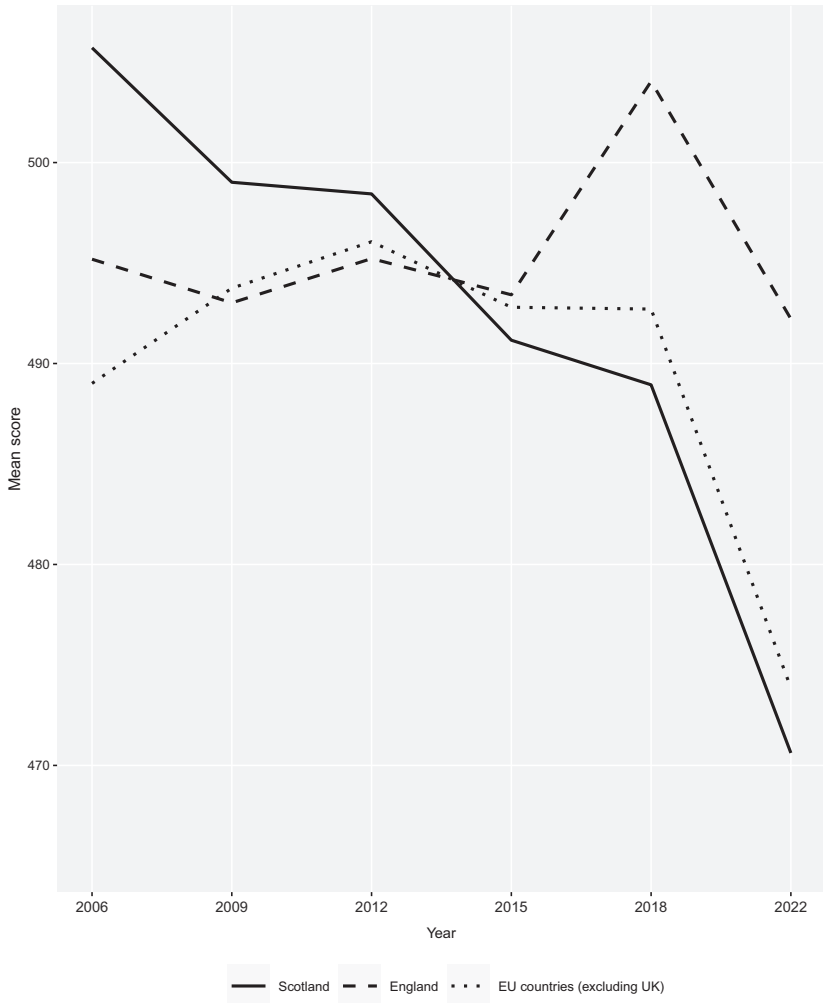
The picture for mathematics and for science is more clearly discouraging for Scotland. In mathematics (Figure 2), the Scottish line declines steadily, from 506 in 2006 to 489 in 2018, and then, with extra push from Covid, to 471 in 2022. England actually was going in the other direction up to 2018, and the decline from 2018 to 2022 was smaller (minus 12 compared to Scotland’s minus 18). The line for the EU countries was quite flat till 2018, then fell like Scotland’s. As a result, Scotland was perhaps below the average of the EU countries in 2022, whereas England was well above.

**Figure 1:**  
**Reading attainment, PISA 2006–2022, Scotland, England and EU countries**



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**Figure 2:**  
**Mathematics attainment, PISA 2006–2022, Scotland, England and EU countries**



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In science (Figure 3), there has been steady decline in Scotland since 2006, gently at first and then steeply, and with no evidence that Covid affected the rate. The decline for England has been more gradual. Scotland is now merely at the average for the EU countries, whereas England is clearly above.

## High and low attainment

Variation in average attainment can conceal different patterns at various points in the distribution of attainment. Here we compare students at low and high attainment, defining these as being at the 10<sup>th</sup> and 90<sup>th</sup> percentile. These are calculated separately for each domain, and for each country. For example, in 2022, the mean science performance in Scotland in 2022 was 353 at the 10<sup>th</sup> percentile and 614 at the 90<sup>th</sup>. Another way of putting this is that 10% of students had attainment of 353 or lower, and that 10% had attainment of 614 or higher.

The general pattern is illustrated for science in Figure 4. From 2006, Scotland was always behind England for high attainers. The gap was under 10 points in 2006–9, and then rose; it was 23 points in 2022. At first, up to 2012, Scotland was ahead for low attainers, but then Scotland steadily fell behind so that the deficit was 9 points in 2018 and 12 points in 2022.

The trajectory was somewhat similar in mathematics, although Scotland was ahead at high attainment until 2009. In 2022, Scotland was 14 points lower than England at low attainment, and 22 points lower at high attainment. In reading, Scotland and England have converged at both high and low attainment, but Scotland was ahead at low attainment up to 2012.

In short, the Scottish-English gap for high attainers has been greatest for science, next for mathematics, and negligible for reading. Again, the pattern corresponds to increasing scope for home learning, and thus decreasing relative importance of the school.

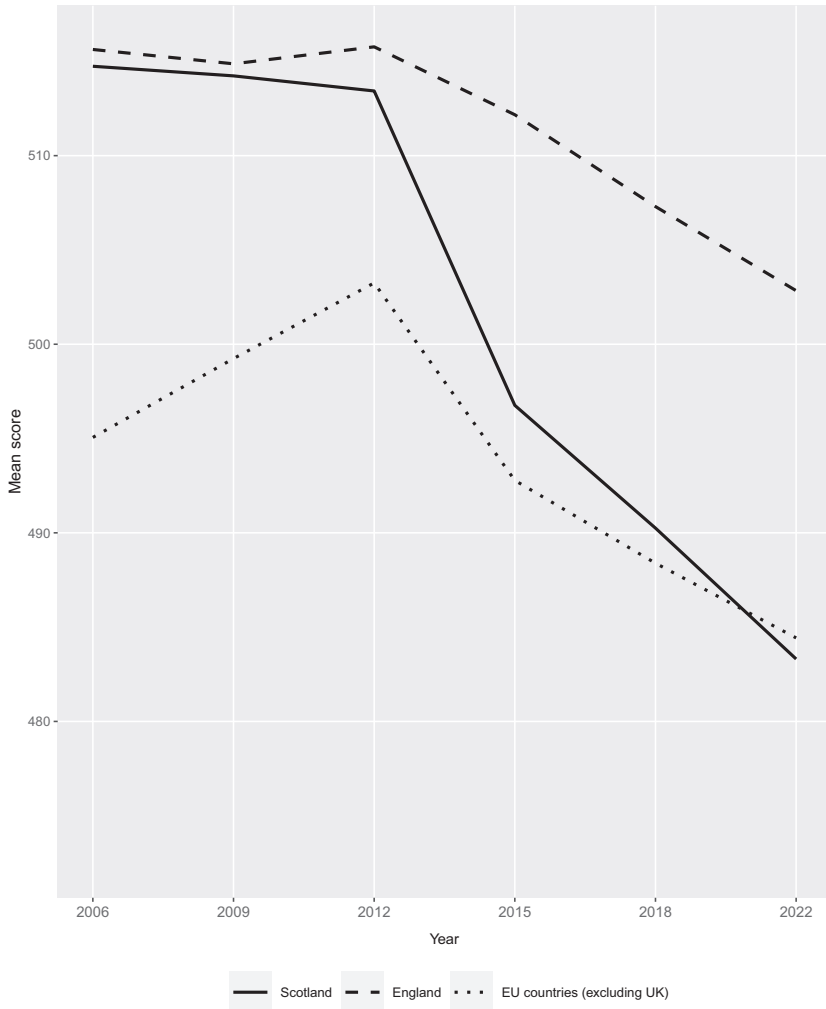
## Sex

The sex difference in each domain has been similar in Scotland and England since 2006. Girls have higher attainment than boys in reading, by over 20 points up to 2012, then narrowing slightly to around 15–20 after that (standard errors for these averages are around 4.5 points). The narrowing in Scotland was because the female score fell by more than the male score: in the period 2012–22, the decline was 9 points fall for boys, but 18 points for girls. The

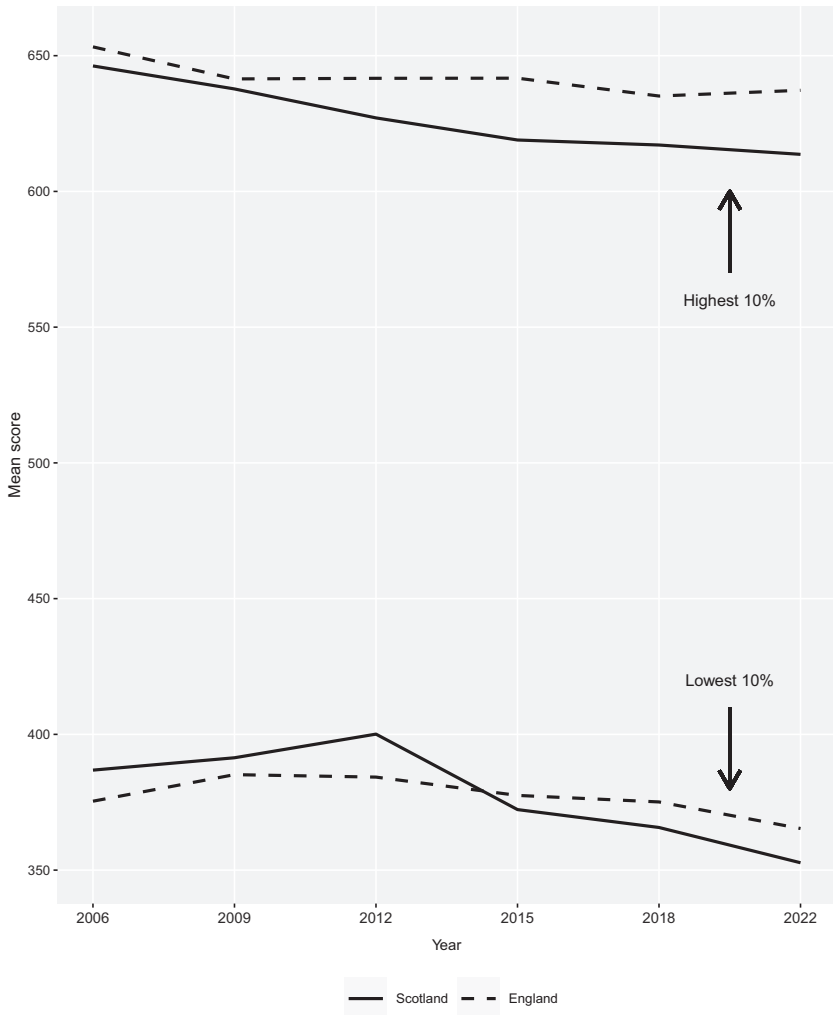


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**Figure 3:**  
Science attainment, PISA 2006–2022, Scotland, England and EU countries



**Figure 4:**  
**Science attainment in the highest-attaining 10% and lowest-attaining 10%, PISA 2006–2022, Scotland and England**



Average standard errors: 4.7.

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narrowing in England was for opposite reasons – differential improvement. From 2012 to 2018, the male score rose faster than the female (8 points compared to 3 points), a difference that was not wiped out by Covid. Thus in 2022 the means were 488 for boys and 505 for girls, a difference of 17 points, which was the same as in Scotland but reached by these different routes – relative male improvement in England, and relative female deterioration in Scotland.

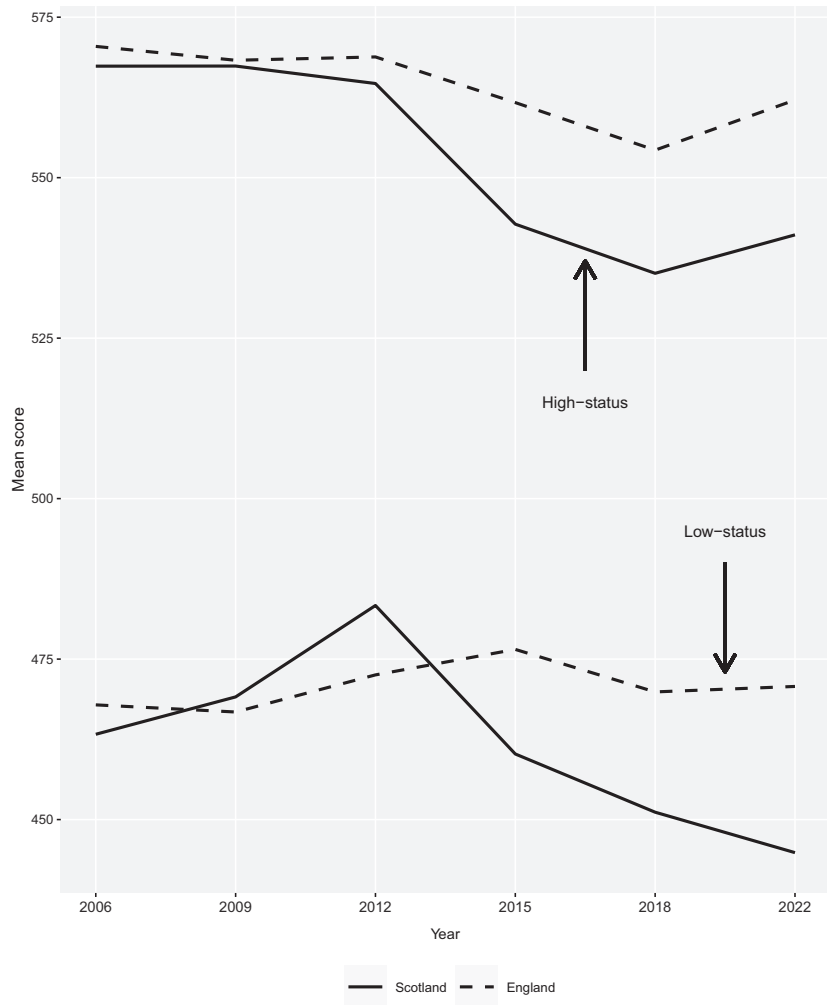
In mathematics and in science, the sex difference was the other way round. Boys were ahead by a fairly stable 15 points in mathematics and under 10 points in science. The fall 2018–22 was similar for male and female in each country.

### Socio-economic inequality

The OECD uses an index of economic and cultural resources in the student's family, labelled ESCS in the reports (OECD, 2023a: 115). Unlike all the Scottish Government measures of socio-economic circumstances, this records children's actual home circumstances, not the circumstances of their neighbourhoods (Paterson et al., 2019). Thus this index is much more valid as a measure of actual inequality than anything which the Scottish Government uses in its other publications. A simple measure of inequality is the gap between attainment in the top and bottom quarters of this index. But it is important to look not only at the gap but also at the levels of attainment in each of these two groups. It would be possible to have low inequality because everyone is mediocre. The calculations used here define the top and bottom quarters across the UK, not separately within each UK nation. Thus some of the details differ from government reports in Scotland and England, which calculate the distribution within each country.

As in all countries, there is a strong association between attainment and this index, and so it is not surprising to find that the patterns here are similar to those between low and high attainers. Science is illustrated in Figure 5, which has a similar pattern to Figure 4. (Note that the vertical scale is much longer in Figure 4 than in Figure 5.) Scotland became increasingly lower than England for high-status students, stretching to 21 points in 2022. For low-status students between 2006 and 2012, Scotland was close to England, or even perhaps ahead in 2012, a difference of 10 points. But after that Scotland fell behind England, with a 26-points deficit in 2022. (The fall between 2018 and 2022 was greater in England for the two intermediate quarters of the scale than for the two shown in the graph, which is why the English lines in Figure 5 do not fall whereas the overall English mean in Figure 3 did fall slightly.)

**Figure 5:**  
**Science attainment in the highest-status and lowest-status socio-economic groups, PISA 2006–2022, Scotland and England**



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Mathematics had broadly similar patterns to science. Scotland was slightly ahead for both high and low status students up to 2012, though by under 10 points. Scotland fell behind after that, so that in 2022 the Scottish deficit was 16 points at high status and 34 points at low status. Indeed, between 2012 and 2022, mathematics performance in England rose slightly between 2012 and 2022 for both high-status and low-status students (respectively by 3 points and 5 points), but fell sharply in Scotland for both these groups of students (minus 19 and minus 37 points). Back in 2012 in mathematics, low-status students had higher attainment in Scotland than in any of the four parts of the UK (464, compared to 456 in England, 452 in Wales and 458 in Northern Ireland). In 2022, low-status students in Scotland were the lowest-attaining in the UK (429 compared to, respectively, 463, 436 and 443).

Reading was similar, but neither the advantage to 2012 nor the deficit after that were as great as for mathematics. Once more, therefore, the gradient of inequality was largest for science, next for mathematics, and smallest for reading.

### Interactive effect of sex and SES

The effect of socio-economic status on attainment is also mediated by sex. In all years up to 2018, the socio-economic effects were similar for each sex, but not in 2022 in Scotland. Compared to 2018, low-status females fell 26 points in reading, compared to a fall of 6 points for low-status males. High-status males and females both rose slightly. The result was that, in 2022, low-status females in Scotland had reading scores that were now close to the scores of low-status males (respectively 459 and 454), whereas in all other groups defined by sex and status female students were ahead of male students. The pattern was similar in mathematics: between 2018 and 2022, low-status females fell 35 points while low-status males fell 20 points; again, there was a slight rise for high-status males and females. The contrast was even more pronounced in science: low-status females fell 16 points while low-status males rose slightly, as did high-status students of each sex.

There was no such interactive effects in England, and even in the low-status group female students remained ahead of male students for reading. So low-status females in Scotland did particularly badly between 2018 and 2022 – badly compared to their male or high-status counterparts in Scotland, and badly compared to all sex-by-status groups in England. That this setback for low-status females extended even to reading, where female advantage over

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males has been long established, shows that gains in educational outcomes are not irreversible. In some highly disrupted conditions, some vulnerabilities can re-emerge. The PISA data do not give any clues as to why this has happened, but the patterns show that nothing in the way of widening opportunity can be taken for granted.

### High-attaining low-SES students

A second complication in the effect of socio-economic status is that, in England, high attainment could partly overcome the effects of low status, whereas in Scotland that did not happen. This is illustrated in Figure 6, for science. The graph is restricted to students in the lowest quarter of socio-economic status. In England (the broken lines) the highest-attaining 10% of students in this low-status group showed steady improvement, even between 2018 and 2022. But the corresponding group steadily deteriorated in Scotland. The pattern was similar for mathematics and reading. So Scotland is not serving very well those low-status students who have relatively high attainment.

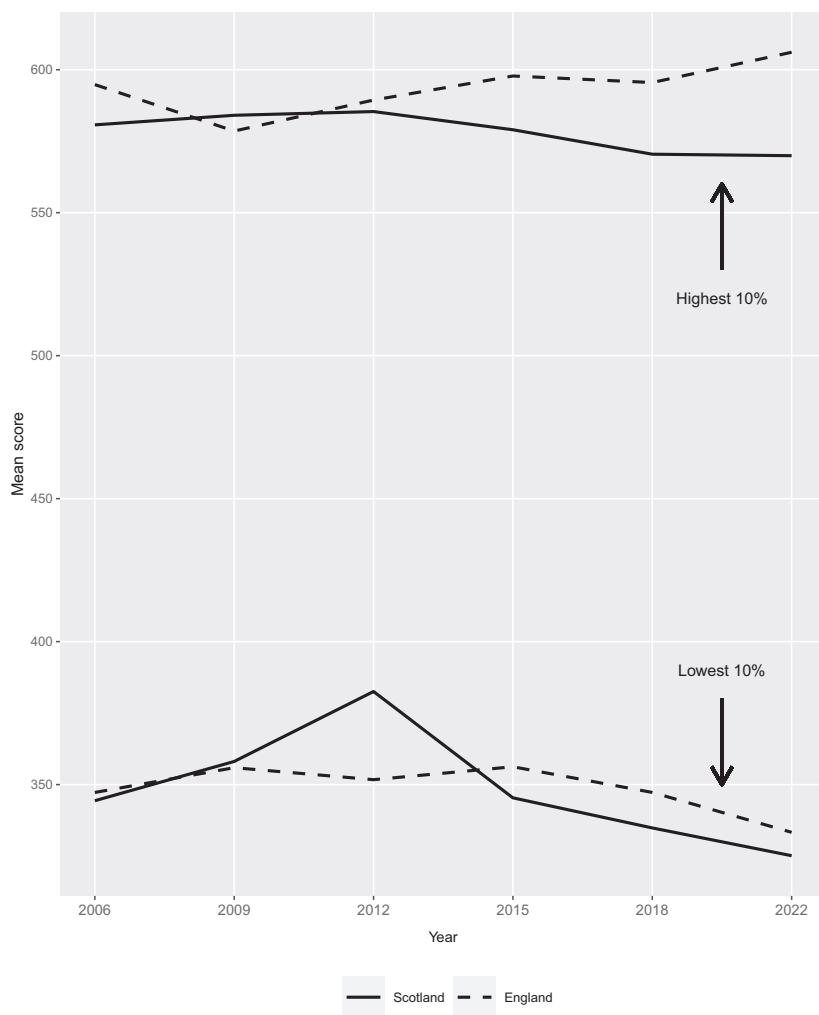
### Experience of school

When declining school attainment in Scotland has been pointed out previously, the reply from defenders of the Scottish curriculum is that it nevertheless is better at promoting students' self-confidence and autonomy, and for their general well-being (for example, Hedge and MacKenzie (2016); see also Humes (2013) and Priestley and Humes (2010)). Tables 1, 2 and 3 show a selection of questions from the 2022 PISA data which relate to these points, comparing the responses with England, and showing how the responses vary by sex and social status. It is also claimed that Scotland does better than other places in educating its students for global citizenship (for example, Wishart (2023)). This is discussed in the next section.

Students' feelings about the school as a community are illustrated by the three examples in Table 1. Although the Scottish percentages are slightly more indicative of a supportive environment than those in England, the differences are small: for example, 67% of Scottish students felt they belonged at school, compared to 63% of English students. The sex differences were very similar in the two countries, with a slightly lower proportion of female than of male students feeling at home in school. The differences by social status are also quite similar: the percentage who felt at home was quite a lot higher among

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**Figure 6:**  
Science attainment in the highest-attaining 10% and the lowest-attaining 10% in the lowest-status socio-economic group, PISA 2006–2022, Scotland and England



Average standard errors: 7.9.

**Table 1:**  
**Aspect of school community, by sex and by social status: Scotland and England, PISA 2022**

		Percentage agreeing or strongly agreeing		
		I feel like an outsider at school	I feel I belong at school	Other students seem to like me
All	Scotland	16	67	87
	England	20	63	84
	<i>Average s.e.</i>	<i>0.86</i>	<i>1.1</i>	<i>0.85</i>
By sex	Scotland			
	Male	13	71	90
	Female	20	63	84
	England			
	Male	16	67	85
	Female	24	59	83
	<i>Average s.e.</i>	<i>1.2</i>	<i>1.6</i>	<i>1.2</i>
By social status	Scotland			
	Low status	22	61	81
	High status	13	77	92
	England			
	Low status	24	57	78
	High status	16	71	88
	<i>Average s.e.</i>	<i>1.6</i>	<i>2.2</i>	<i>1.6</i>

*'Low status' is the lowest quarter of the index of economic, social and cultural capital, and 'high status' is the highest quarter of that index, defined across the UK.*

high-status students than among low-status students, to similar extents in Scotland and England.

Table 2 shows the percentages of students feeling confident or very confident in specified educational tasks – planning work, finding resources, motivating themselves to complete work, and working independently. The responses in Scotland and England are again very similar, and in each there is



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**Table 2:**  
**Aspect of student motivation, by sex and by social status: Scotland and England, PISA 2022**

		Percentage feeling confident or very confident in the task			
		Planning when to do school work on my own	Finding learning resources online on my own	Motivating myself to do school work	Completing school work independently
All	Scotland	67	73	47	71
	England	66	73	47	70
	<i>Average s.e.</i>	1.6	1.6	1.5	1.5
By sex	Scotland				
	Male	66	73	48	71
	Female	69	74	45	70
	England				
	Male	66	71	50	70
	Female	66	74	44	70
	<i>Average s.e.</i>	2.1	2.1	2.1	2.0
By social status	Scotland				
	Low status	57	65	39	59
	High status	74	81	53	78
	England				
	Low status	59	67	48	62
	High status	73	81	51	76
	<i>Average s.e.</i>	3.0	2.8	3.1	2.9

*'Low status' is the lowest quarter of the index of economic, social and cultural capital, and 'high status' is the highest quarter of that index, defined across the UK.*

hardly any difference between male and female students. In each country, too, there is a lower proportion of low-status than of high-status students with confidence in planning and working. The only possible difference between

**Table 3:**  
**School behaviour, by sex and by social status: Scotland and England, PISA 2022**

		Percentage saying		
		In the last two weeks of school, I skipped at least one whole day of school	There is noise and disorder every or most lessons	In last four weeks, I observed a fight on school property in which someone got hurt
All	Scotland	29	30	36
	England	26	35	39
	<i>Average s.e.</i>	<i>1.1</i>	<i>1.5</i>	<i>1.7</i>
By sex	Scotland			
	Male	27	29	37
	Female	31	31	34
	England			
	Male	23	37	40
	Female	29	33	37
	<i>Average s.e.</i>	<i>1.5</i>	<i>1.9</i>	<i>1.9</i>
By social status	Scotland			
	Low status	36	37	35
	High status	23	25	33
	England			
	Low status	28	33	44
	High status	23	35	32
	<i>Average s.e.</i>	<i>2.0</i>	<i>2.5</i>	<i>2.4</i>

*'Low status' is the lowest quarter of the index of economic, social and cultural capital, and 'high status' is the highest quarter of that index, defined across the UK.*

Scotland and England in that respect is for motivation, where the percentage for low-status students is lower in Scotland (39%) than in England (48%). There is certainly no evidence here that students in Scotland feel more autonomous in their learning than students in England.

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Table 3 shows evidence relating to school attendance and behaviour. Levels of persistent absence are similar in the two countries (but possibly somewhat higher in Scotland). In each, a slightly lower proportion of male students than of female students reports having been absent for at least a day in the past fortnight. In each country, low-status students report more such absence than high-status students, but the rate for low-status students is higher in Scotland (36%) than in England (28%). Disruption in class is higher in England (35%) than in Scotland (30%), the main factor in which is greater disruption reported by high-status students. This could, of course, reflect either more disruption or less patience with disruption. Levels of reported violence are similar in the two countries, the only notable difference being a higher reported rate by low-status students in England than in Scotland.

### **Global interconnectedness**

The second defence of the Scottish curriculum invokes the special investigation of what the PISA researchers called ‘global interconnectedness’. This has happened only once, in 2018 (despite misleading comments in some of the Scottish news media in December 2023 when the 2022 attainment results were published). The aim of the investigation was to assess students’:

... acquisition of in-depth knowledge and understanding of global and intercultural issues, the ability to learn from and live with people from diverse backgrounds, and the attitudes and values necessary to interact respectfully with others.

(OECD, 2020: 5)

The data are of two kinds – a test of global competence (analogous to the tests of reading, mathematics and science), and questionnaires about students’ attitudes to various aspects of global interconnectedness, about their self-evaluation of their own competence on these matters, and about whether they learnt about global issues at school. Illustrations of the test items are available in the OECD’s report on this study (OECD, 2020: 394–416). One example tested students’ knowledge and understanding of the effects of rising sea levels on low-lying islands. Another example asked questions about a passage extracted from a lecture by the novelist Chimamanda Ngozi Adichí, relating to ‘preconceived assumptions about Africa and African life’ (Adichí, 2016).

Only 27 countries took part in the cognitive tests of understanding of these issues. These included seven European Union countries (other than Scotland) –

Spain, Croatia, Greece, Latvia, Lithuania, Malta and the Slovak Republic. The other parts of the UK did not take part.

Scotland did perform well in these tests, behind only Canada and Singapore, and ahead of all these seven European Union countries (Scotland Government, 2020: 13). But comparing Scottish students' global competence with the rather small group of countries which took the full test is not as informative as the much wider comparisons that are available for the tests of reading, mathematics and science. On these attainment tests in 2018, in almost all respects Scotland also performed better than the EU countries which took the test of global competence; the only exception was that Latvia did better than Scotland in mathematics. Scotland's results on global competence might therefore merely be reflecting its results in attainment. Only if we had global-competence results from countries that performed better than Scotland in several aspects of attainment – such as Estonia, England and Ireland – could we reasonably conclude that Scotland's global competence was relatively better than Scotland's attainment.

Nevertheless, the test results were supplemented by questionnaires that asked students about their attitudes to various aspects of global interconnectedness. The questionnaires were used in 66 countries (including the 27 that took the cognitive tests, and again not including the rest of the UK).<sup>2</sup> In comparison to the EU countries that used this questionnaire, Scotland mostly had slightly higher proportions holding respectful, tolerant and liberal views. The most positive dimension for Scotland was respect for other cultures. The percentage respecting other people as equal was slightly higher than the average in the participating EU countries (87% compared to 83%). The same was true of treating people with respect (86%/81%), giving people space to express themselves (85%/78%), respecting the values of other cultures (85%/79%), and valuing the opinions of others (85%/75%). Scotland also had more positive attitudes to immigrants, on all aspects of the question – equal opportunities for immigrant children, right to vote, right to a distinctive culture, general rights – where the proportions in support of the liberal position were around 88% in Scotland but around 13 points lower across the participating EU countries.

However, the relatively strong Scottish performance in relation to respect and to attitude to immigrants is not so common on questions about students' perceptions of their own knowledge, as Table 4 illustrates. For example, in self-rated understanding, Scotland was slightly below the participating EU countries for climate change's differential global impact (68% compared to 72%), and for the global connectedness of economies (52%/60%). Scottish students were clearly less likely than students from other participating EU countries to feel

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**Table 4:**  
**Knowledge of global interconnectedness: Scotland and EU countries, PISA 2018**

<i>Percentage reporting that could do the task 'easily' or 'with a bit of effort'*</i>	Scotland	EU countries (excluding Scotland)
Explain how carbon-dioxide emissions affect global climate change	61	60
Establish a connection between prices of textiles and working conditions in the countries of production	46	61
Discuss the different reasons why people become refugees	79	78
Explain why some countries suffer more from global climate change than others	68	72
Explain how economic crises in single countries affect the global economy	52	60
Discuss the consequences of economic development for the environment	51	64

*\*The other options were 'couldn't do this' and 'would struggle to do this on my own'.*

*Approximate standard errors: Scotland, 1.1; EU countries, 0.3.*

*The EU countries taking part are listed in the endnote. The EU data here exclude Scotland. England, Wales and Northern Ireland did not take part in the 2018 study of global interconnectedness.*

able to explain why workers' conditions of employment affect the price of clothes (46%/61%), or to explain the impact of economic development on the environment (51%/64%).

Scotland did not do well in students' reports of what they learnt in school about these matters (Table 5). On a few aspects of this, the difference between Scotland and the participating EU countries was negligible, or slightly in Scotland's favour, notably events celebrating cultural diversity (38% in Scotland and 33% across the EU countries). But for most the Scottish proportion was somewhat lower. For example, for learning about different cultures, the proportions were 70% in Scotland but 76% across the EU countries. For learning about solving conflicts, they were 52% and 61%. For learning about the interconnectedness of economies, they were 40% and 56%.

We can sum up this evidence about global interconnectedness by saying that, when compared to students from other countries of the European

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**Table 5:**  
**Learning in school about global interconnectedness: Scotland and EU countries, PISA 2018**

<i>Percentage reporting that the topic is learnt about or experienced at school</i>	Scotland	EU countries (excluding Scotland)
Interconnectedness of countries' economies	40	56
How to solve conflicts with other people in our classrooms	52	61
Different cultures	70	76
Teachers often invite my personal opinion about international news	41	47
Events celebrating cultural diversity	38	33
Classroom discussions about world events	56	56
Analyse global issues	43	46
People from different cultures can have different perspectives	56	59
Communicate with people from different backgrounds	53	59

*Approximate standard errors: Scotland, 1.1; EU, 0.3.*

*The EU countries taking part are listed in the endnote. The EU data here exclude Scotland. England, Wales and Northern Ireland did not take part in the 2018 study of global interconnectedness.*

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Union, Scottish students have higher proportions who have liberal values. From the analysis of global competence, Scottish students are clearly above students in the few EU countries that took part, but these were countries which also performed less well than Scotland in reading, mathematics and science. Lower proportions of Scottish students than of students in the participation EU countries have strong confidence in their own understanding (Table 4), and lower proportions think they are learning about global matters in school (Table 5). These patterns do not suggest that the Scottish curriculum is responsible for student's liberal views, or that schools are enabling Scottish students to have confidence in deploying their knowledge. It is more likely that these liberal views are being formed by Scottish students' own networks.

## **Conclusions**

There are thus only a few encouraging conclusions for Scottish education policy from this summary of a decade and a half of results from the PISA study. In all three domains of attainment, Scottish performance has declined since 2006. In common with most countries, part of the decline since 2018 has probably been due to the disruption caused by the Covid pandemic. But in mathematics, Scotland declined more than England between 2018 and 2022, despite the Covid disruption being similar. The OECD's own analysis notes that attainment declined between 2018 and 2022 in most countries, and suggests that the disruption caused by Covid is one of the explanations (Schleicher, 2023). However, the OECD also notes that this cannot be the sole explanation, for three reasons: some countries did not decline, the extent of decline seemed to be only weakly related to the extent of school closures during the Covid period, and in many countries the decline started long before 2018.

The comparison with England is particularly relevant because it holds constant not only the Covid disruption, but also much of the wide social context of education, and so any differences can be more readily attributable to differences in policy. Compared to England, Scotland is not serving either its most able or its least able students well in mathematics and science. In these domains, Scottish performance was lower than England for both the best 10% and the weakest 10% of students. Scottish inequality with respect to socio-economic status was greater than in England for mathematics and for reading, and similar to England for science. Both low-status and high-status students have lower attainment in Scotland than in England. But whereas low-status students improved (reading and mathematics) or held steady (science) in England between 2006 and 2022, and fell only slightly with Covid, low-status students in Scotland declined. The reading attainment of low-status female students fell particularly sharply between 2018 and 2022 – more than by high-status Scottish males and more than by low-status females in England.

There was no compensating encouragement for Scottish policy in other aspects of students' experience. Although there was evidence for 2022 that Scottish schools may have had a slightly more supportive environment than those in England, the differences were very small. There was no sign that Scottish students are more autonomous or self-confident than English students.

It is true that, from data collected in 2018, Scottish students appeared to do well on the cognitive aspects of global understanding compared to other countries that took these tests, but the distinction was probably only because none of the high-performing European countries took part in that aspect of the

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study. A clear majority of Scottish young people did have strongly global attitudes, but only a minority feel that they are getting school lessons on the foundation of these beliefs. Thus their liberal views were probably not formed by the schools.

The purpose of this analysis has been merely to describe some of PISA's main findings for Scottish schooling between 2006 and 2022. Explanations of the trends of declining attainment and rising inequality require much fuller analysis, and are probably not available from just one data series, high though its quality is. But, as a speculative explanation, it is impossible to avoid the conclusion that Scotland's school curriculum has serious weaknesses. The Curriculum for Excellence was implemented in all schools from 2010, although schools had been encouraged to use it from around 2006. This curriculum has commendable aims. It tries to prepare students for life – work, families, citizenship. It takes students' attitudes to their learning seriously. But it also neglects systematic knowledge, and its progenitors regarded that kind of structured learning as harmful to students' progress. Yet assessing students' applied skills is precisely what the PISA tests are intended to do.

In the same period – and for more than two decades – English policy on the school curriculum has taken quite a different direction. It has focused much more strongly on knowledge, following research which shows that knowledge is empowering (Christodoulou, 2014; Didau, 2015; Hirsch, 2019; Robertson, 2020). This is especially true of students who cannot get access to knowledge from home, because their parents have not themselves had access to it, or because they cannot afford the kind of equipment and experiences – books, computers, educational activities – that underpin the acquisition of it. This English approach has been criticised for being harsh, and for being too abstract – the very characteristics that Scotland's curriculum rejects.

The evidence from the 2022 study is that there is little to choose between the two approaches for students' motivation and well-being, but the trajectory since 2012 suggests that the English approach has led to better outcomes in attainment. Attainment matters. Students' sense of fulfilment is actually aided by learning being difficult in a properly planned way (Bjork and Bjork, 2014; Schunk, 2005). Attainment is then the route to worthwhile employment and to social mobility. Over the past century, objectively measured cognitive achievement in Scotland, as elsewhere, has enabled all kinds of social groups to escape from invidious discrimination – women, Catholics, minority ethnic groups, even, to some extent, the working class (Paterson, 2023; Wooldridge, 2021). The results from PISA suggest, though they do not prove, that Scottish education has forgotten why meritocracy has been one of the great humanising and liberating forces of the past century.



## Scottish Performance in PISA

### Notes

1. See <https://www.oecd.org/pisa/data/>.
2. The 20 EU countries (other than Scotland) in the 2018 PISA study of global knowledge and attitudes were Austria, Bulgaria, Croatia, Cyprus, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovak Republic, Slovenia and Spain. For consistency with the analysis above, Cyprus and Malta are omitted from this analysis. The resulting 18 EU countries had lower average attainment than the whole of the EU (in the dimensions described earlier in the article). In reading in 2018, the 18 countries in the global study had an average score of 486, whereas the average was 500 for those not in this study. In mathematics, the averages were respectively 490 and 506, and in science they were 486 and 503.

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