Teacher Retention and Turnover Research

Research Update 1

Teacher Retention by Subject

Evidence for Excellence in Education

Nuffield Foundation

Teacher Retention and Turnover Research

Research Update 1: Teacher Retention by Subject

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About this research

Do teacher retention rates differ by subject?

In this Research Update we present differences in teacher retention rates by the subject they teach. We found that rates of early-career teachers in science, maths and languages leaving the profession are particularly high. We also found that high leaving rates of science and modern foreign languages teachers, and shortfalls in the number of entries to teacher training in these subjects compared to the Government's target, may make it difficult for the Government to achieve its aim for 90 per cent of pupils to be entered for the EBacc.

This Research Update is the first publication in a series that is part of a major new research project by the National Foundation for Educational Research (NFER), which is funded by a grant from the Nuffield Foundation. The project aims to gain a deeper understanding of the dynamics within the teacher workforce in England. The study will inform policy makers and system leaders to help formulate effective responses to this complex issue and meet the challenge of increasing demand for teachers. We will produce a series of evidence-based outputs throughout 2017 to share knowledge about where policy interventions and practice might usefully focus in future.

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Rising pupil numbers in England's schools and shortfalls in the number of new teacher trainees mean that retaining teachers who are already in the profession is all the more important for managing the future supply of teachers.

Our analysis highlights important differences in the retention rates of teachers of different subjects. We found that high leaving rates of science and modern foreign languages teachers may make it difficult for the Government to achieve its aim for 90 per cent of pupils to be entered for the EBacc.

Key findings and conclusions

Leaving rates are particularly high for early-career teachers in science, maths and languages

Rates of teachers leaving the profession are particularly high among early-career teachers of science, maths and languages. The number of trainees for these subjects has also been consistently below the Government's entry targets for the last 4 years. These factors have made finding suitable staff in these subjects increasingly difficult for secondary schools and may store up problems for future teacher supply.

Several Government initiatives (NCTL, 2017a; 2017b) aim to attract new and returning teachers into these subjects to fill the supply shortfalls. However, greater policy attention should be focused on how existing teachers in these subjects, particularly early-career teachers, could be retained. More research is needed to identify what the specific issues are for these subjects and what initiatives might help to improve early-career retention rates. One potential factor is teacher pay, which could be below the pay that science and maths graduates could earn elsewhere.

Both the accountability system and teacher supply may be influencing teaching time for different subjects

The Government's aim is for 90 per cent of pupils to be entered for GCSEs in EBacc subjects. It aims to incentivise schools to increase the take up of EBacc subjects, increasing curriculum time spent teaching these subjects through the main Progress 8 accountability measure. Despite this incentive, curriculum time for science and languages has not increased since 2011. In addition, teachers of these subjects have high rates of leaving the profession and the number of new trainees has been below the Government's targets. The lack of growth in curriculum time could be due to lack of teacher supply constraining schools from expanding provision in these subjects. However, school and pupil preferences may also be influencing these trends.

The accountability system seems to have encouraged schools to increase history and geography teaching time, perhaps enabled by a relatively plentiful supply of teachers. High retention rates and the number of trainees meeting the Government's entry targets may have made history and geography the path of least resistance for schools to increase their Progress 8 scores.

Teaching time and leaving rates for technology subjects may be a warning for non-EBacc subjects

Curriculum time for technology subjects has fallen dramatically since 2011. The higher leaving rate for technology teachers may be driven by schools' reduced demand for teachers as well as teachers' own career decisions. The relatively high retention of early-career teachers of technology subjects and the relatively low retention of more experienced technology teachers may also be a sign that schools have been looking to reduce expenditure on technology, since experienced teachers are more expensive to employ. However, it could also be a sign of schools preferring teachers with more up-to-date subject knowledge.

School budgets are expected to fall in real terms over the next few years (Belfield *et al*., 2017) and Progress 8 will continue to be the main accountability measure for secondary schools. Therefore, unless they are protected, other non-EBacc subjects that have not seen such large falls in curriculum time, particularly arts subjects, may see reductions in staff numbers over the next few years.

Cost-effectiveness evaluation of bursaries for shortage subjects is urgently needed

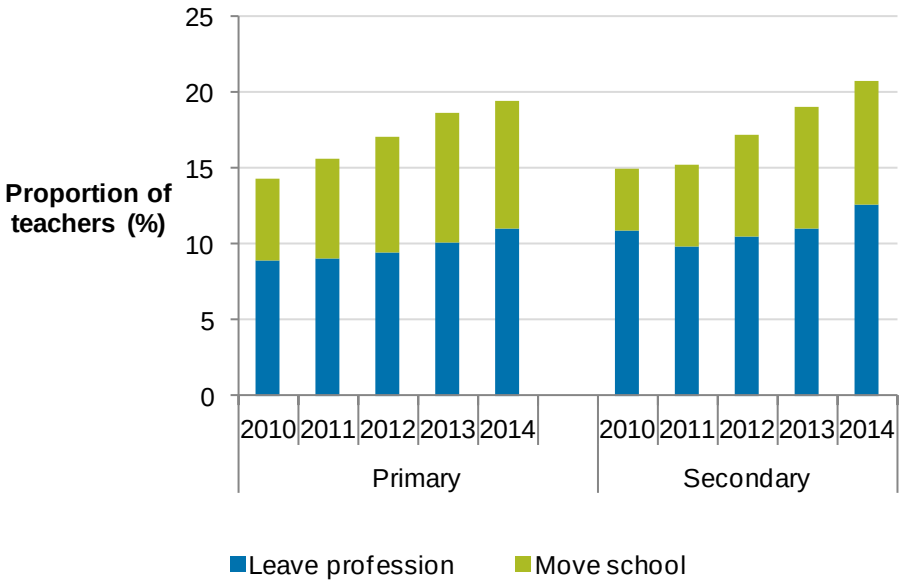
Teacher training in physics, maths and languages attracts a £25,000 bursary. Our research has found that teachers of these subjects have higher than average leaving rates in the first few years after training. In isolation, leaving rates are not evidence of the impact of bursaries as we don't know what entry rates or retention rates would have been otherwise. However, evaluation of the impact of bursaries on entry and retention rates is urgently needed to assess their cost effectiveness. Bursary payments may be more effective if they are restructured to explicitly incentivise retention in the teaching profession during the first few years after training.

Many trainees who are paid a bursary are likely to have entered teacher training anyway, which means there is almost certainly a large deadweight cost associated with the policy. The trainees attracted by the bursary who wouldn't have trained otherwise may also be those who are more likely to leave teaching in the first couple of years, reducing the long-term cost effectiveness of bursaries.

Retaining working age teachers is getting harder

Rising pupil numbers in England's schools and shortfalls in the number of new teacher trainees mean that retaining teachers who are already in the profession is all the more important for managing the future supply of teachers. Policymakers have paid far less attention to retaining teachers currently employed in state schools than to recruiting new ones. The House of Commons Education Committee has recently called on the Government to "place greater emphasis on improving teacher retention" as a more cost effective way of managing the supply of teachers (GB, Parliament. HoC. Education Committee, 2017).

The proportion of working age teachers[1] leaving the profession each year has increased since 2010 in both primary and secondary schools (blue bars). This has important implications for system-level workforce planning because more teachers leaving the profession mean that more teachers need to be recruited to replace them, if maintaining class sizes remains an important objective for policymakers.



Source: NFER analysis of School Workforce Census data

The turnover rate – teachers leaving the school they are in, whether to move school or leave the profession – has increased more rapidly. This has been driven by the number of teachers moving between schools doubling between 2010 and 2014 (green bars). Greater churn means schools have had more vacancies to fill each year, which leads to school leaders having more staffing uncertainty to deal with and higher costs of recruiting replacements.

A rapid rise in the rate of teachers leaving their school in contrast to a modest rise in those leaving the profession may have caused a divergence between system-level and school-level perspectives on the current teacher supply situation. Both are important for understanding the teacher labour market, but have different implications for policy: the leaving rate affects the overall supply of teachers whereas the churn rate affects how teachers are distributed between different schools, and the impact could disproportionally affect certain types of schools.

Looking beneath the surface

The overall system-level numbers mask a more detailed picture underneath, which is critical for gaining a better understanding the nuances of England's teacher supply situation. The House of Commons Education Committee has called for more information to be available on teacher retention by subject, region and route into teaching. Recent research has found some important differences in the retention rates of teachers in different regions (DfE, 2016a) and teachers who take different training routes (Allen *et al*, 2016) and we will be exploring this detailed picture further throughout this research project.

This NFER Research Update explores differences in retention rates by the subject teachers teach. Having sufficient numbers of teachers with the right subject expertise is vital for schools to deliver the curriculum they want to offer pupils. High rates of teachers who teach certain subjects leaving the profession constrains the curriculum that schools can effectively offer, and constrains policymakers' ability to incentivise schools to make curriculum changes. It may also affect pupil outcomes if curriculum change prioritises teaching quantity, i.e. increasing teaching hours and staffing, rather than quality.

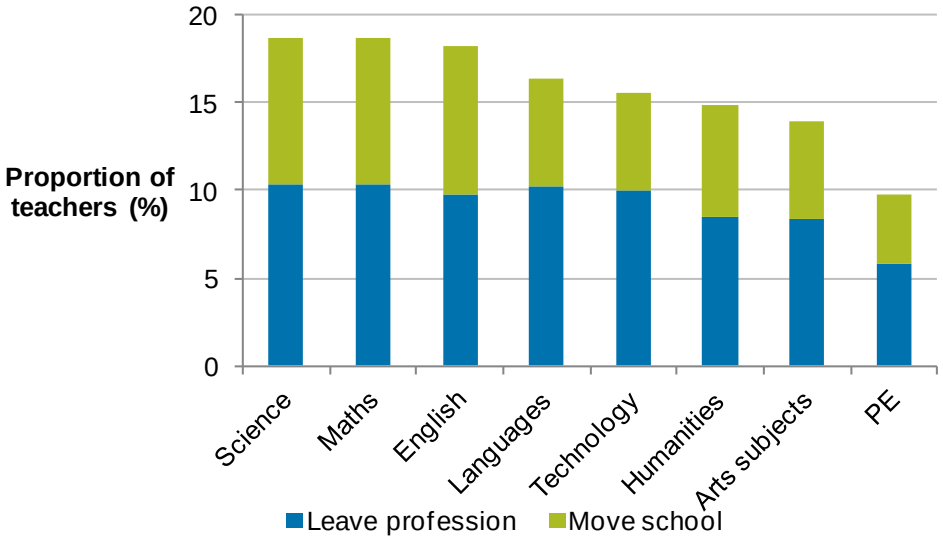
[1] Defined as teachers under age 60.

Turnover rates are higher for teachers of core subjects

Our analysis of School Workforce Census (SWC) data highlights some important differences in the rates of teachers leaving the profession and moving school between teachers of different subjects in secondary schools. The subject groups that follow are defined in the appendix.

Teachers of core subjects have high turnover rates

Turnover rates are highest for teachers of core subjects: science, maths and English. Science and maths teachers have the highest rates of leaving the profession and of moving school, although they are only slightly higher than English, languages and technology teachers. However, subtle differences in leaving rates are important as they mount up over time: to illustrate, a ten percent attrition rate per year compared to an eight percent attrition rate per year may only be a two percentage point difference, but leads to a seven percentage point difference in the number of teachers still in the profession after five years[2]. Better employment prospects outside of teaching for those with training in a STEM subject are likely to raise the leaving rate, but other subject-specific factors may also have an influence.



Source: NFER analysis of School Workforce Census data

The high rate of core subject teachers moving between schools may indicate shortages in these subjects: in a seller's market, teachers can 'shop around' for a preferred school, pay uplift or more senior position. However, it may also reflect greater opportunity to move school because all schools teach these subjects: other subjects, or a particular teacher's specialism within those other subjects, may not form part of the curriculum at some schools.

Leaving rates of languages and humanities teachers are very different

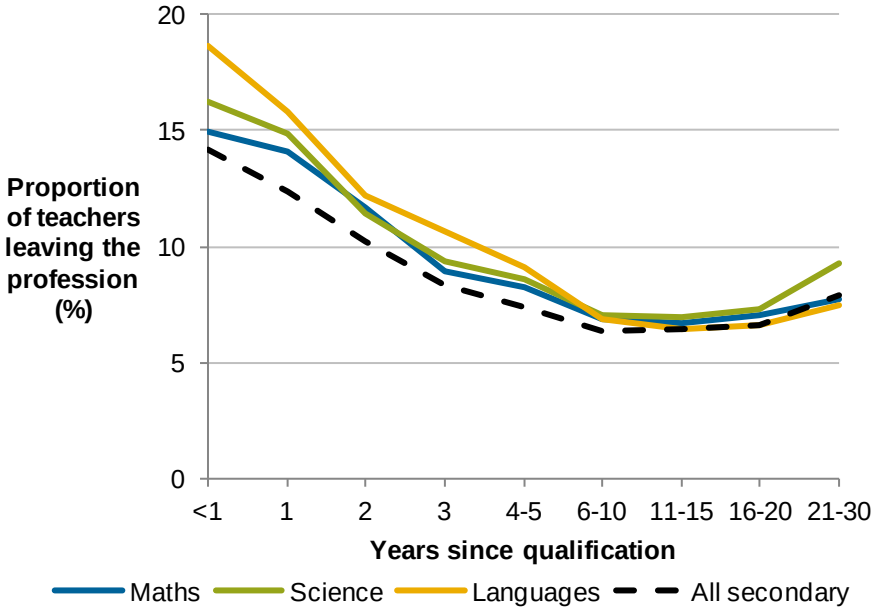
Humanities teachers (mostly history and geography) have some of the lowest rates of teachers leaving the profession whereas leaving rates for language teachers are as high as those for science and maths teachers. Entries for teacher training in languages are below the Government's target, whereas there is a surplus of entries for history and geography (DfE, 2016b). Both are non-compulsory subjects at Key Stage 4, but the Government aims to incentivise schools to increase teaching these subjects to GCSE through its EBacc and Progress 8 accountability measures. Yet schools' ability to retain staff with teaching expertise in these subjects seems to be quite different.

Data on which subjects teachers regularly teach each week is collected in the curriculum module of the School Workforce Census. The data is only collected from secondary schools with computerised timetable systems that interface to their Management Information System (MIS). As a result, teachers in around a third of secondary schools do not have curriculum data. However, we do not anticipate there are any systematic differences between schools which have or do not have the curriculum module. We therefore used the curriculum data of two-thirds of secondary schools to identify teachers of different subjects.

We define a teacher of a subject as someone who spends more than half of their teaching time, and at least 10 hours per week, teaching lessons in that subject area. Extensive crossover in the subjects many teachers teach within these areas (e.g. individual sciences) makes it difficult to identify teachers of these distinct subjects, so our analysis uses subject groups. We use the contracts data for these teachers to identify how many remain in their school from one year to the next, how many move school and how many leave teaching. A full explanation of our methodology will be published as part of the interim report for this project in summer 2017.

[2] However, this illustration doesn't account for teachers who return to teaching.

Early-career maths, science and languages teachers have high leaving rates



Source: NFER analysis of School Workforce Census data

Leaving rates are higher among early-career teachers

Rates of teachers leaving the profession are highest in the first few years after qualifying to teach, for teachers of all secondary subjects and for primary school teachers. This has consistently been the case for at least 15 years. Switching career is easiest when an individual has invested relatively little in a particular career path.

Leaving rates are particularly high for early-career teachers in shortage subjects

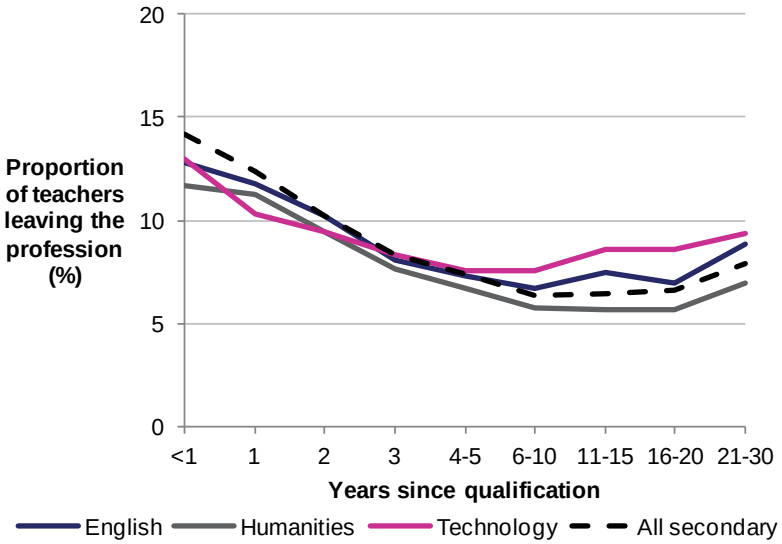
The leaving rates of maths, science and languages teachers are above average in their first five years in the profession, while mid-career teachers are more similar to the average. This means more trainees or returning teachers are needed to maintain a particular level of supply.

Leaving rates of technology teachers suggests a shift towards less experienced teachers

The leaving rate for early-career teachers of technology subjects (a non-EBacc subject) is below average, whereas the rate for those with more than five years' experience is above average. This suggests that the profile of technology teachers is shifting towards early-career teachers and away from more experienced teachers. This could be driven by schools reducing spending (experienced teachers are more expensive to employ) or demanding teachers with more up-to-date subject knowledge.

Teachers with more than twenty years' experience have a relatively high leaving rate

The leaving rate for secondary school teachers who qualified more than twenty years ago, a proxy for experience, is slightly higher than mid-career teachers. This is evidence of experienced teachers leaving before normal-age retirement, as our analysis only includes working-age teachers. Overall, the proportion of classroom secondary teachers in the workforce aged 50 or over has fallen from 21.6 per cent in 2010 to 16.4 per cent in 2015.



Source: NFER analysis of School Workforce Census data

Both the accountability system and teacher supply are influencing curriculum change

A number of different forces have influenced secondary schools' curriculum over the last five years. **New accountability measures** introduced by the Government – EBacc and Progress 8 – have provided schools with an incentive to particularly prioritise teaching of EBacc subjects. School **spending per pupil** has been stable in real terms, so increases in a particular subject area may have often meant reductions in other subjects (Belfield *et al*, 2017). **Teacher supply** in particular subjects has also acted as a constraint on the ability to expand teaching in some subjects.

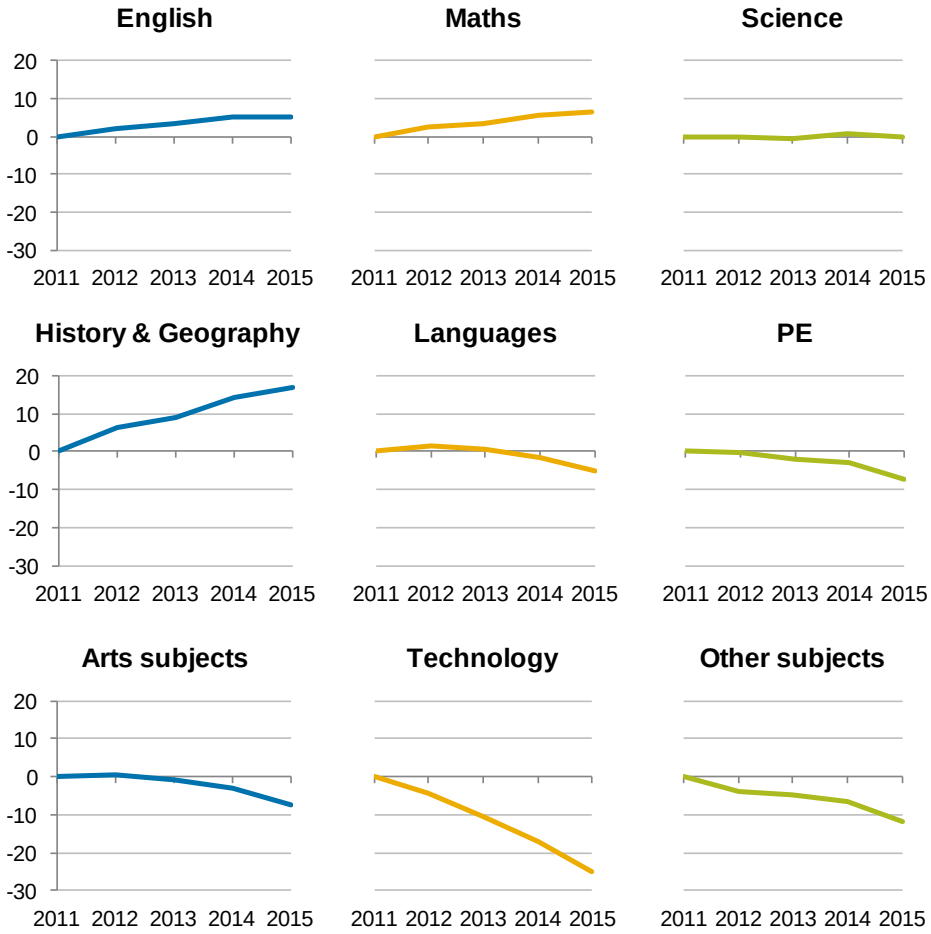
Disentangling the effect of each of these factors is a challenge, but some inference is possible using the data presented above and what effect we expect policy changes to have through the incentives they create. The figure opposite shows the percentage change in total curriculum hours since 2011 for each subject group, after accounting for changes in pupil numbers.

Science is a statutory subject up to age 16, but Progress 8 provides an additional incentive for schools to offer more science teaching to fill EBacc slots. However, total curriculum hours have been unchanged since 2011. This could be because schools had spare capacity (smaller classes) which they have used up. It may also be that low recruitment and retention rates have limited schools' ability to expand science teaching hours.

History/ geography and languages are EBacc subjects, but Progress 8 incentivises schools to fill EBacc slots for one of these subject groups more strongly than it incentivises them to fill both. History and geography curriculum hours have risen by 17 per cent since 2011, while languages hours have fallen slightly. This suggests that lower recruitment and retention rates in language subjects have constrained schools' ability to offer more language teaching in response to an incentive to do so. This also constrains the Government's ability to achieve its aim for 90 per cent of pupils to be entered for the EBacc.

Non-EBacc subjects have all seen reductions in teaching hours since 2011. Progress 8 gives schools very little incentive to expand teaching of these subjects. Technology subjects have seen the largest falls in curriculum time, compared to arts subjects and PE. As noted above, high leaving rates among experienced technology teachers suggests that budget pressures may have played a part in this trend as well.

Percentage change in total curriculum hours compared to 2011



Note: Percentage change in teaching hours has been estimated from a regression model of the log of total hours taught in a subject in each school and year for which there is data. Dummy variables for each year 2012-2015 measures growth relative to the 2011 level. The model is estimated with school fixed-effects, so results measure changes compared to the school's overall average level. The model also takes account of growth in teaching hours that is driven by growth in pupil numbers, by including the log of the total number of pupils as a covariate.

Source: NFER analysis of School Workforce Census data.

What next for this research?

Diagnostic analysis of teacher retention and turnover patterns on the workforce

This research project aims to gain a deeper understanding of the dynamics within the teacher workforce in England. The study will inform policy makers and system leaders to help formulate effective responses to this complex issue and meet the challenge of increasing demand for teachers. The research project will be in two stages, which will each explore different aspects of the teacher labour market.

Teacher workforce dynamics in the school sector

In the first stage of the project we will use data from the School Workforce Census to determine the key factors associated with a teacher leaving the profession, moving within the sector and returning to the profession in England. Another Research Update will be published in June 2017 and an interim report in summer 2017.

Teacher labour market behaviour and comparisons with other professions

In the second stage of the project we will undertake new statistical analysis using data from the Understanding Society survey to understand the external and personal factors that are associated with teacher labour market behaviour. Using data analysis and stakeholder interviews, we will draw comparisons between teaching and other public sector professions, particularly nursing and policing. We will disseminate our findings from the second stage through further Research Updates in autumn 2017 and a final report will be published in early 2018.

Find out more about this project and sign up to receive reports when they are available at:
www.nfer.ac.uk/research/teaching-workforce-dynamics/

This project is being funded by the Nuffield Foundation, but the views expressed are those of the authors and not necessarily those of the Foundation.

Appendix

Definition of subject groups

Subject group	Subjects included (School Workforce Census categories)
English	English language & literature
Maths	Mathematics, statistics
Science	Biology, physics, chemistry, combined/general science, applied science.
Humanities	History, geography, social studies (see below)
Social studies	Accountancy, business studies, economics, humanities, religious education, politics, law, philosophy, psychology, sociology, classics, Latin, Greek
Modern languages	Arabic, Bengali, Chinese, Danish, Dutch, Finnish, French, German, Greek (modern), Gujarati, Hindi, Italian, Japanese, modern foreign language, Panjabi, Portuguese, Russian, Spanish, Swedish, Turkish, Urdu.
PE	Physical education
Arts subjects	Art, communication studies, drama, media studies, music, performing arts, dance
Technology	Applied ICT, ICT, computer science, design and technology, electronics, food technology, graphics, graphics, resistant materials, systems and control, textiles, craft, engineering, technical drawing.
Other subjects	PSHE, careers education, citizenship N.B. Social studies (see above) is included in 'other subjects' for the analysis of changes in curriculum time.

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