A spotlight on Design and Technology study in England

Trends in subject take up and the teacher workforce

Sam Tuckett

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This work was produced using statistical data from ONS. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.

Contents

Executive summary

- The number of young people entering Design and Technology qualifications in England has declined in recent years: 136,150 (21.8%) students at the end of key stage 4 entered a Design and Technology GCSE in 2020, compared to 280,670 (44.2%) in 2009.

- Of those at the end of 16-19 study in 2020, 1.7 per cent had entered a Design and Technology A level and 1.9 per cent had entered a level 3 vocational engineering qualification. This represents a steep decline in student numbers since 2009 (from 22,160 to 10,430) amongst A level entrants, but an increase in vocational engineering students (from 3,880 to 11,240). It should, however, be noted that this period coincides with an increase in the number of 16-19 students overall, most notably those taking non-academic qualifications.

- Sponsored academies and free schools were less likely to enter pupils for Design and Technology GCSEs than the other main provider types, both in the state sector and independent schools.

- Students at the end of 16-19 study in independent schools were most likely to enter Design and Technology A levels (4.2%). In contrast, students in general further education (FE) colleges were least likely to enter Design and Technology A levels (0.07%), but more likely than average to enter level 3 vocational engineering qualifications (2.8%).

- Entries to Design and Technology GCSEs amongst pupils at the end of key stage 4 were particularly low in London, the North East, and Yorkshire and the Humber (all around 18%). In contrast, rates were higher in the South West (25.5%), the East Midlands, the East of England and the South East (all around 24%).

- Students at the end of 16-19 study were most likely to enter level 3 vocational engineering qualifications in the North East (3.8%) and least likely in London (1.3%). Those in the East Midlands were most likely to enter a Design and Technology A level (2.6%).

- Pupils who did not enter any Design and Technology GCSEs at age 16 were very unlikely to continue studying Design and Technology subjects in the 16-19 phase (1.6%). This compares to 16.6 per cent of those that entered an Electronic Products GCSE and 15.7 per cent of those that had entered a systems and control GCSE, for example.

- The number of Design and Technology teachers in secondary schools has been declining since 2011, such that in 2020, they only accounted for 3 per cent of all teachers nationally. Post graduate initial teacher training recruitment has continually fallen short of targets for Design and Technology subjects, with actual recruitment accounting for just 23 per cent of the target in 2021/22. It is unclear to what extent the decline in teachers and GCSE entries are drivers of each other.

- The interaction of teacher numbers, accountability, curriculum and qualification reforms, alongside potential capital restraints some schools may face, make for an unclear picture as to why entries

have declined so persistently. However, what is clear is that without specific changes to encourage take up, the long-term declining trend is showing no sign of reversing.

Introduction

There is momentum within government to boost the status and take-up of vocational education - via the introduction of T levels, apprenticeship reforms, and Institutes of Technology amongst other initiatives. However, at present, entries to Design and Technology qualifications are declining in number. This is true both for GCSE entries at age 16, and those entering A level qualifications aged 16-19.

Throughout this report, figures refer to England only, and we have focused on trends since 2009. This is to provide an overview of changes in entry patterns by key student characteristics over recent years. However, it should be noted that there has been a long-term declining trend in Design and Technology entries since the turn of the millennium. There have been significant policy changes and reforms over the more recent period examined. For example: the academisation programme, school accountability reforms such as the introduction of the English Baccalaureate (EBacc) in 2010 and Progress 8 in 2016, and qualification reform meaning that the subjects available to students have not been consistent through time. Entries to Design and Technology subjects have continued to decline against the backdrop of these policy changes. However, although initiatives such as allowing non-EBacc subjects to count towards part of the Progress 8 measure (the headline school performance measure) have not reversed this decline, nor is there any evidence to suggest that they have accelerated the long-term declining trend.

We go on to investigate how these changes varied regionally, within different institution types and by a suite of individual student characteristics.

By examining the data in this way, we are able to identify the factors most strongly associated with entering Design and Technology qualifications; how school and pupil incentives may have changed in response to government policy; and if there are areas of the country where entry rates have remained stronger than others.

We then examine the qualifications entered at GCSE level which are most strongly associated with going on to take Design and Technology Qualifications in the 16-19 education phase.

Historically, England has had a strong reputation in engineering and product design. The courses available, and incentive to study Design and Technology subjects at a young age are therefore of the utmost importance if young people are to continue moving into career pathways in these areas. Even prior to the workplace, examining how subject choices at school inform the qualifications students go on to study at college or sixth form demonstrate the importance of developing an interest in Design and Technology at a young age.

Finally, we consider the changes in the number of qualified teachers in these subjects in recent years, and examine correspondingly the recent trends in teacher vacancies.

1 – GCSE entries to Design and Technology qualifications

In this section we look at the trends in entries to Design and Technology GCSE and equivalent qualifications by pupils at the end of key stage 4.

Recent reforms mean that the qualifications on offer have not been consistent through time.

Specifically, the reformed Design and Technology GCSE graded on a 9-1 scale was introduced in 2017, with first results awarded in 2019. The content of this qualification was the subject of a Department for Education consultation in 2015.[i]

Over the same time period, the teaching of legacy Design and Technology GCSEs was phased out. Previously, pupils had the option of entering separate Design and Technology qualifications such as D&T: Product Design, or D&T: Graphic products.

Up to and including 2016, pupils could enter a range of Design and Technology GCSEs which were tailored towards a specific area. From 2017 onwards (first awards in 2019) these syllabuses were discontinued and replaced with an overall Design and Technology GCSE, graded on the reformed, 9-1 scale.

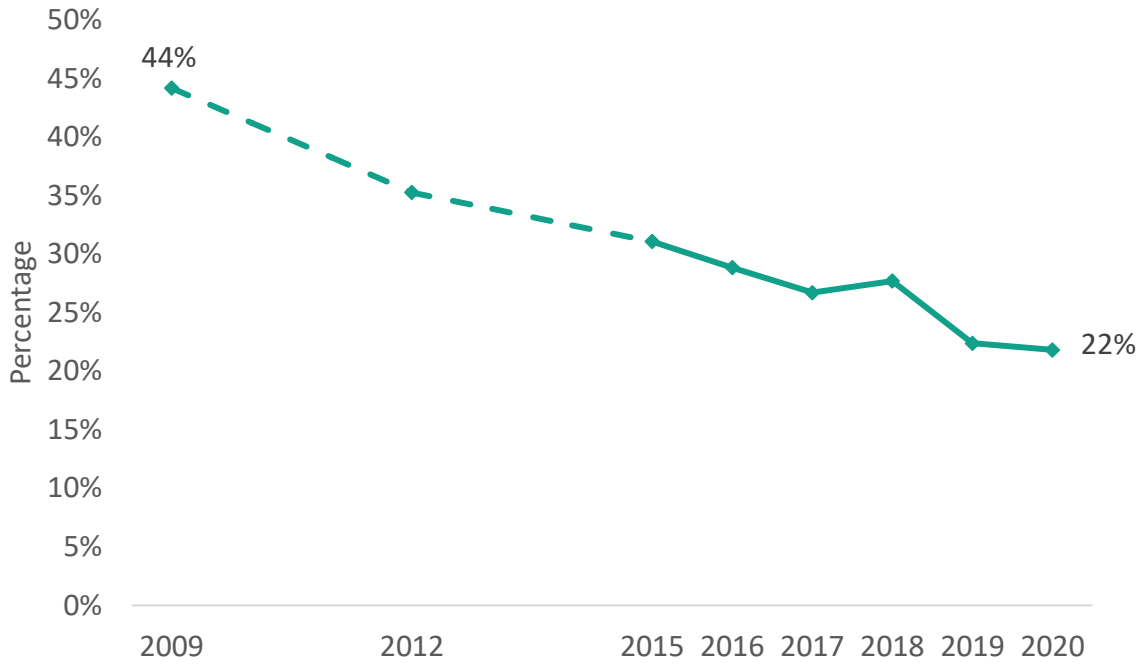
To compare trends through time as consistently as possible, as well as looking at the uptake of the individual Design and Technology qualifications historically, we have also created an 'Any Design and Technology' measure. This flags if pupils had entered at least one of the relevant qualifications that were available in the given year that they finished key stage 4.

D&T: Food Technology has historically been included as a Design and Technology qualification by the Department for Education in their statistical releases. However, a separate Food Preparation and Nutrition GCSE was introduced alongside the reformed Design and Technology qualification. For consistency of comparisons through time, we have therefore included entries to Food Preparation and Nutrition within our 'Any Design and Technology' metric.

We have also included Electronics and Engineering (including applied engineering where applicable) GCSEs within this measure because of their clear relevance, despite not being explicitly categorised as Design and Technology qualifications in the Department for Education statistical release.

For the purpose of this report, we have included full course GCSEs (9-1 or A*-G) as well as short course, vocational and double award GCSE as an entry, where they were available in certain subjects in given years.

Figure 1: Percentage of pupils at the end of key stage 4 entered for at least one Design and Technology GCSE 2009, 2012, 2015-2020



Figures have been produced for 2015-2020 to examine the latest trends. In addition, we have included figures for 2009 and 2012 in order to compare entry rates to points in time prior to recent accountability reforms.

Figure 1 shows that there has been a substantial and persistent decline in GCSE entries to Design and Technology qualifications, from 280,670 (44.2%) in 2009 to 136,150 (21.8%) in 2020. However, the long term declining trend predates this and recent reforms such as the introduction of the EBacc (English Baccalaureate) in 2010, which put an increased school accountability focus on ensuring pupils were entered for science, a humanities subject, and foreign language qualifications. Statistics from the Department for Education show that in 2001, almost 70 per cent of pupils were entered for a Design and Technology GCSE.[ii]

The decline in entries was steeper between 2009 and 2012 than it was between 2012 and 2015, before accelerating again slightly between 2015 and 2017. This latter period coincided with the introduction of the accountability measures Attainment 8 and Progress 8. However, we cannot infer from this that Progress 8 was driving these behavioural changes, although it did create an added emphasis on EBacc subjects, it also features an open element which any subject (such as D&T) can count towards. Progress 8 was the headline measure of school performance introduced in 2015, it was given prominence in school performance tables and given focus in Ofsted inspections.

The trends that we see in the most recent three years, coincide with the introduction of reformed 9-1 grade GCSEs and are examined more closely in Figure 2 which follows.

Figure 2: Number of pupils at the end of key stage 4 entered for GCSE Design and Technology qualifications split by subject area, 2009, 2012, 2015-2020

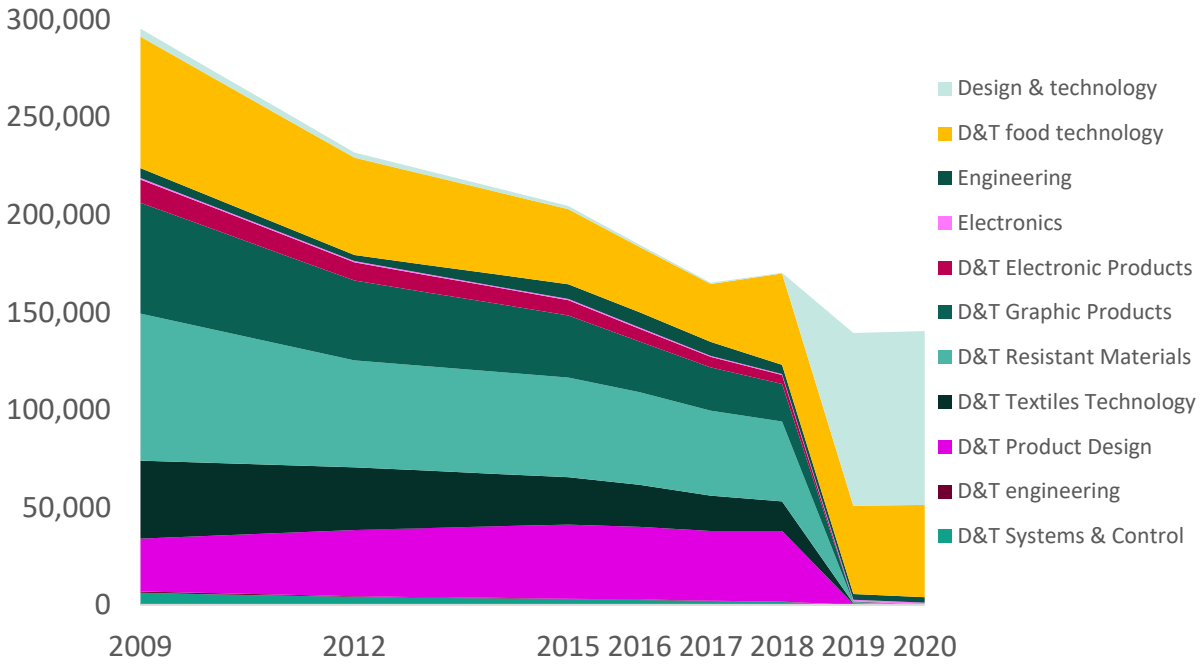


Figure 2 shows how the total number of Design and Technology entries has declined between 2009 and 2020. In addition, it shows how the legacy specifications focused on a specific element of Design & Technology have been replaced with the reformed Design & Technology GCSE, and new Food Preparation and Nutrition GCSE.

Note that the total number of entries displayed in Figure 2 will not correspond precisely to the percentages displayed in Figure 1. This is because Figure 2 looks at all entries, whereas Figure 1 counts the number of pupils with at least one entry.

The first Food Preparation and Nutrition GCSEs were awarded in 2018. From 2018 onwards, the D&T Food Technology series on this chart includes Food Preparation and Nutrition, as well as early entries to the legacy D&T: Food Technology qualification, taken by students who finished key stage 4 in 2018 or later.

The Food Preparation and Nutrition GCSE replaced the legacy D&T: Food Technology qualification. This new syllabus also replaced the GCSE in Home Economics: Food and Nutrition (not previously grouped as a Design and Technology GCSE). This may explain partly why we see an increase in entries to food qualifications compared to previous years, and the increase in entries to any Design and Technology GCSE observed between 2017 and 2018 in Figure 1.

The first reformed Design and Technology GCSEs were awarded in 2019. Although we see entries of close to 90,000, the number that entered this new syllabus is substantially below the number that entered at least one of the previously existing separate specifications in earlier years.

It can also be seen that prior to being phased out, some of the separate Design and Technology specifications still had a notable number of entries. Both D&T: Resistant Materials and D&T: Product

Design had around 40,000 entries each. Furthermore, product design was the only syllabus to have followed a general upward trend since 2009.

For the purpose of this report, we have focused exclusively on GCSEs and equivalents while examining trends in entry at key stage 4, as these are by far the most common qualification type entered. There is also however, a small but growing cohort of pupils at the end of key stage 4 entered for level 2 vocational engineering qualifications, and entries have increased from 12,000 in 2016 to 21,000 in 2020.[iii]

Figure 3: Proportion of pupils at the end of key stage 4 entered for at least one Design and Technology GCSE split by gender, 2009, 2012, 2015-2020

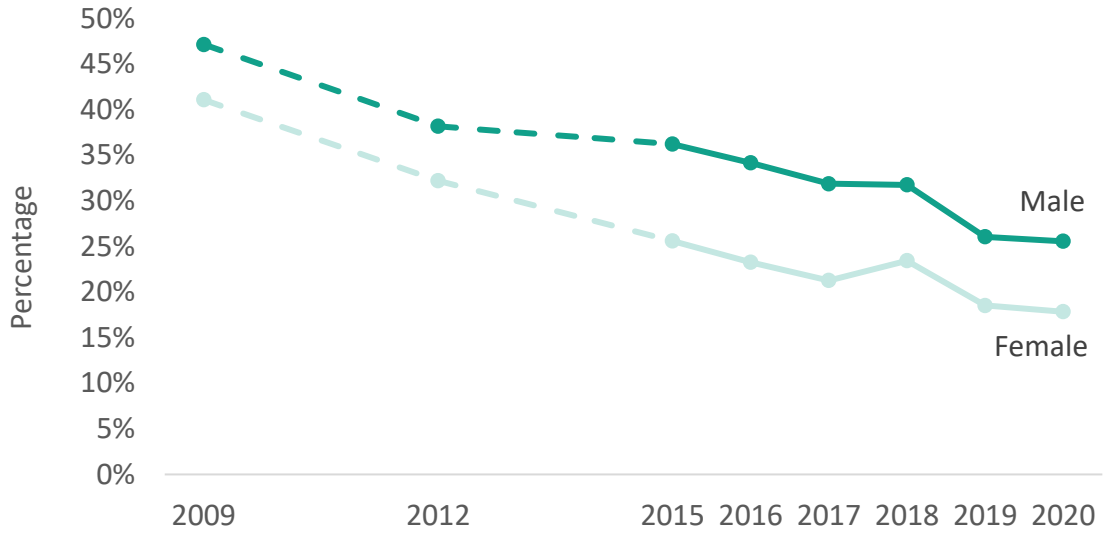


Figure 3 shows that entries to Design and Technology qualifications have been consistently higher amongst male pupils compared with female pupils. Although the trend in entries for both has broadly followed the national trend, the decline amongst males was less sharp between 2012 and 2015.

Figure 4: Proportion of pupils at the end of key stage 4 entered for at least one Design and Technology GCSE split by free school meal status in the last 6 years, 2009, 2012, 2015-2020

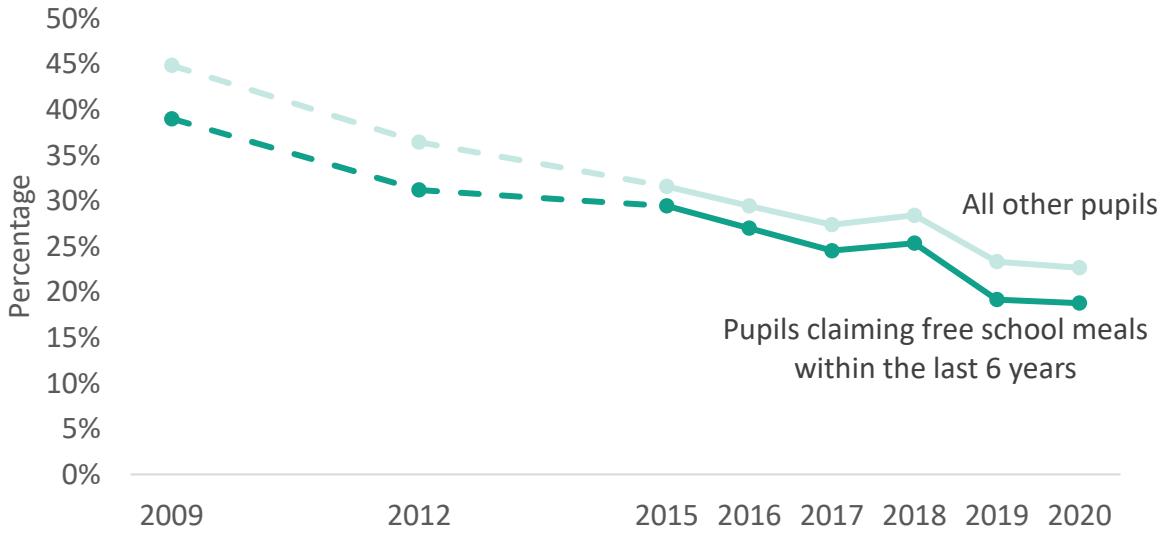


Figure 4 shows the proportion of total entries to Design and Technology GCSEs in each year split by pupils' free school meal (FSM) status – a proxy for disadvantage. If the pupil had claimed a free school meal in the previous six years as recorded on the school census, they are categorised as FSM Ever 6. Note that for this key stage 4 chart, the 'All other pupils' category includes those in the state sector who did not claim a free meal, or those that attended an independent school, or otherwise could not be matched to a valid school census record.

We can again see that the decline in entries for both groups broadly mirrors that of the overall trend, but that those who had not claimed free school meals were more likely to have entered a Design and Technology subject in any year.

Figure 5: Total number of pupils at the end of key stage 4, and proportion of which entered at least one Design and Technology GCSE split by school type[1], 2020

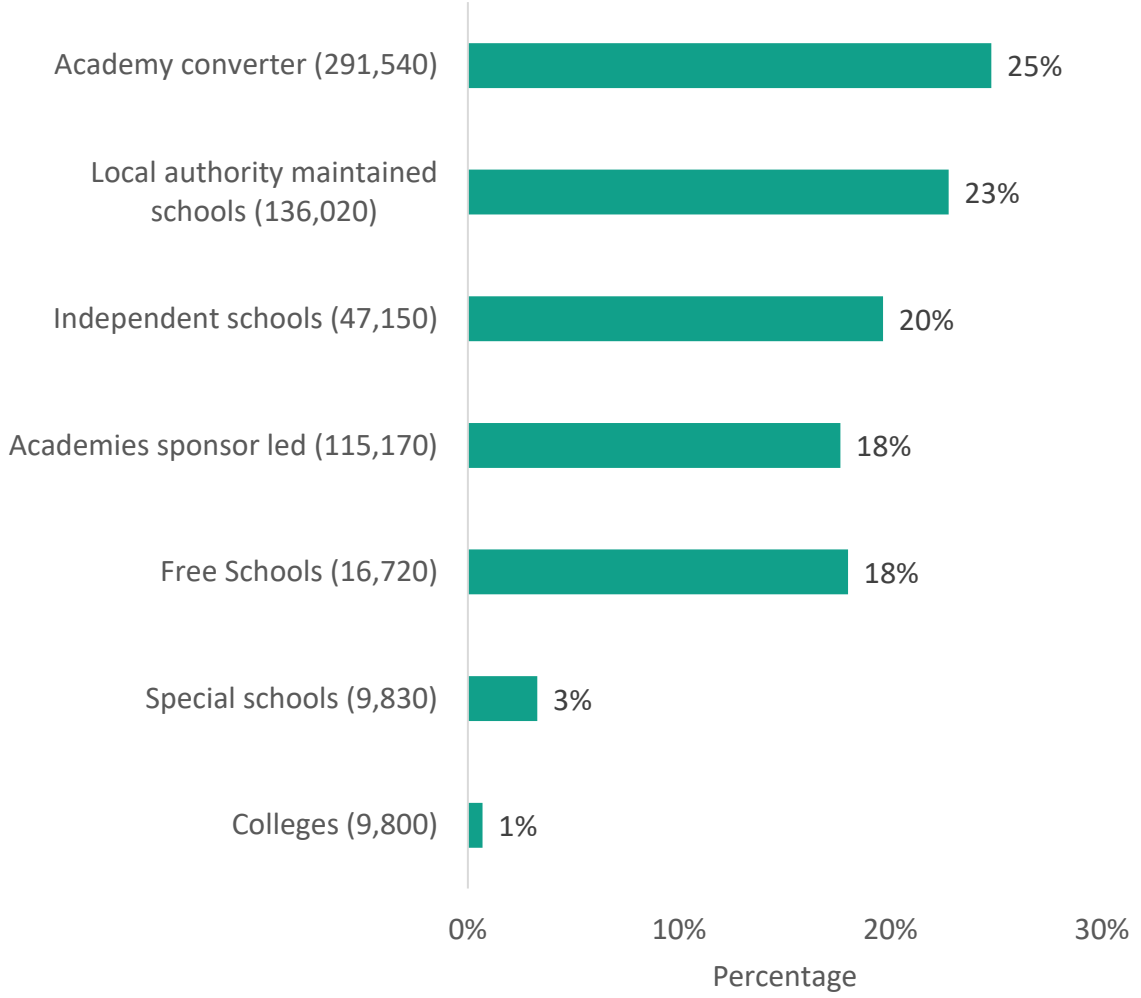


Figure 5 shows the total number of pupils at each institution type and the proportion entered for Design and Technology GCSEs. Academy Converters and local authority-maintained schools all have a higher proportion of pupils entered for Design and Technology GCSEs in 2020 than the national average of 22 per cent.

Notably, Sponsor Led Academies are amongst the most common institution type attended to have below average entry rates to Design and Technology GCSEs.

Although entries are a little below the national average in independent schools, Design and Technology GCSEs remain more popular in independent schools that many of the other types of state-maintained institutions. We cannot infer anything directly from these figures about the incentives to enter certain qualifications. However, as independent schools are not typically

[1] School type displayed on this chart is as recorded on GIAS (Get Information About Schools) for the URN (Unique Reference Number of a school) the pupil is allocated to by the Department for Education. School types with 10 or fewer entries to Design and Technology GCSEs have not been included in these breakdowns. These mainly consist of certain types of special schools and alternative provision. An additional 2,800 pupils attended an institution which did not appear in GIAS so have been omitted from this chart

responsive to policy changes or curriculum incentives in the same way as those in the state sector, the fact that 20 per cent of their pupils are entered still for a Design and Technology GCSE, implies that these qualifications are not held in low esteem.

Figure 6: Total number of pupils at the end of key stage 4, and proportion of which entered at least one Design and Technology GCSE, split by region, 2020

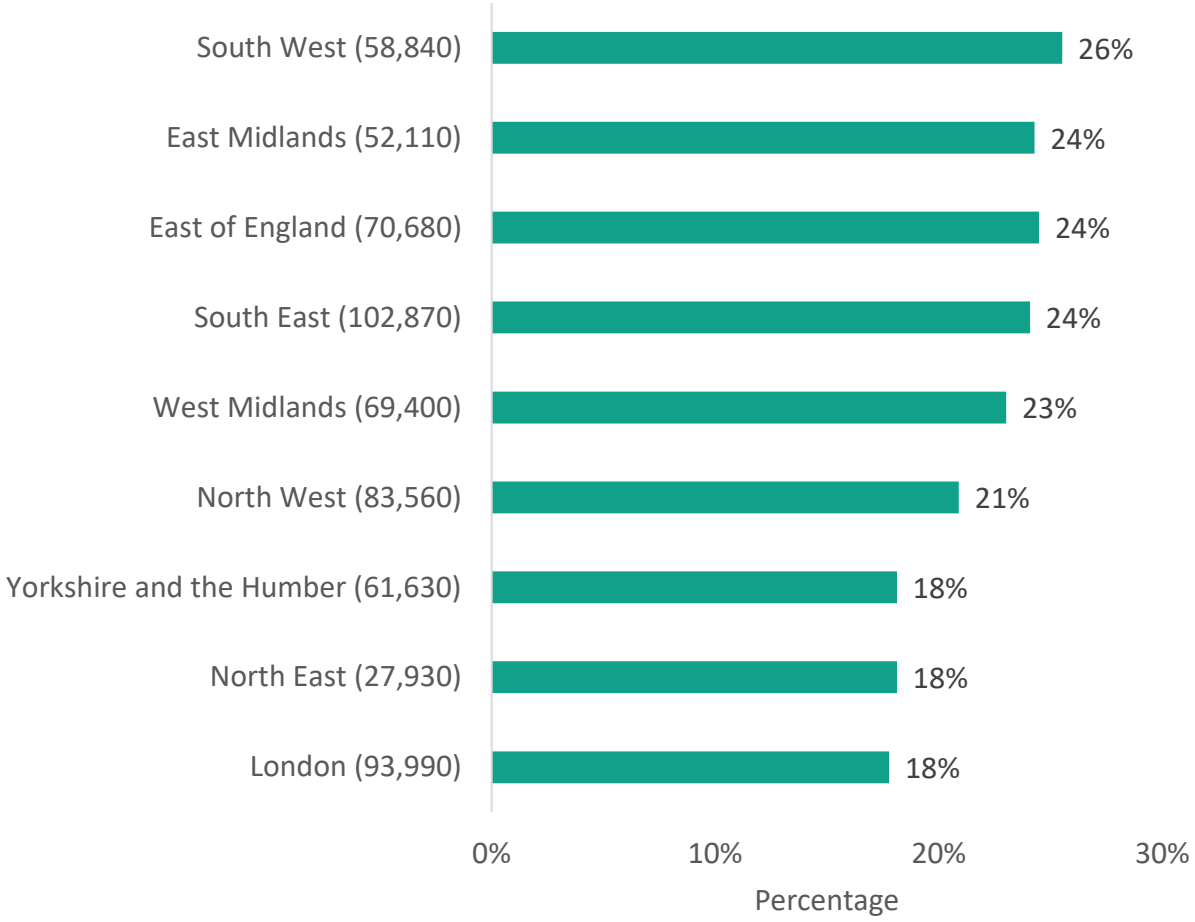


Figure 6 shows that London is the region of England with the lowest rate of entry to Design and Technology GCSEs. The North West, Yorkshire and the Humber, North East and London all have entry rates below the national average, whereas rates in the South West, East Midlands, East of England, South East and the West Midlands are all above average.

Figure 7: Total number of pupils at the end of key stage 4, and proportion of which entered at least one Design and Technology GCSE, split by ethnicity, 2020

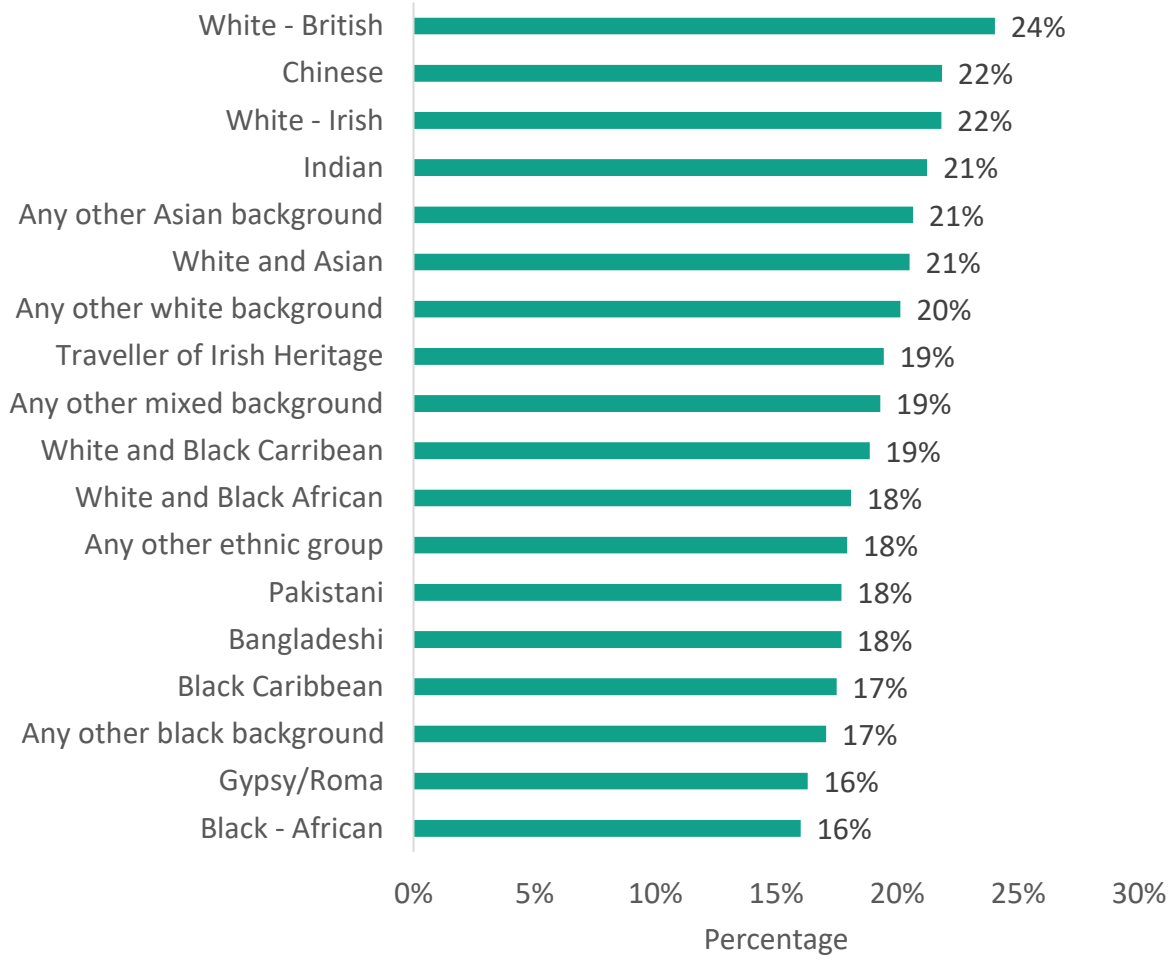


Figure 7 shows entry rates to Design and Technology GCSEs by ethnicity, as recorded in the school census. Those without a valid census record, or for whom ethnicity information was not recorded, have been omitted from this chart.

Figure 7 demonstrates that for most ethnicities, the rate of entry to Design and Technology GCSEs is below the national average. However, White British pupils account for the vast majority of the school population, for which the entry rate is slightly above the national average.

Figure 8: Proportion of pupils at the end of key stage 4 entered for at least one Design and Technology GCSE split by pupils' first language status, 2009, 2012, 2015-2020

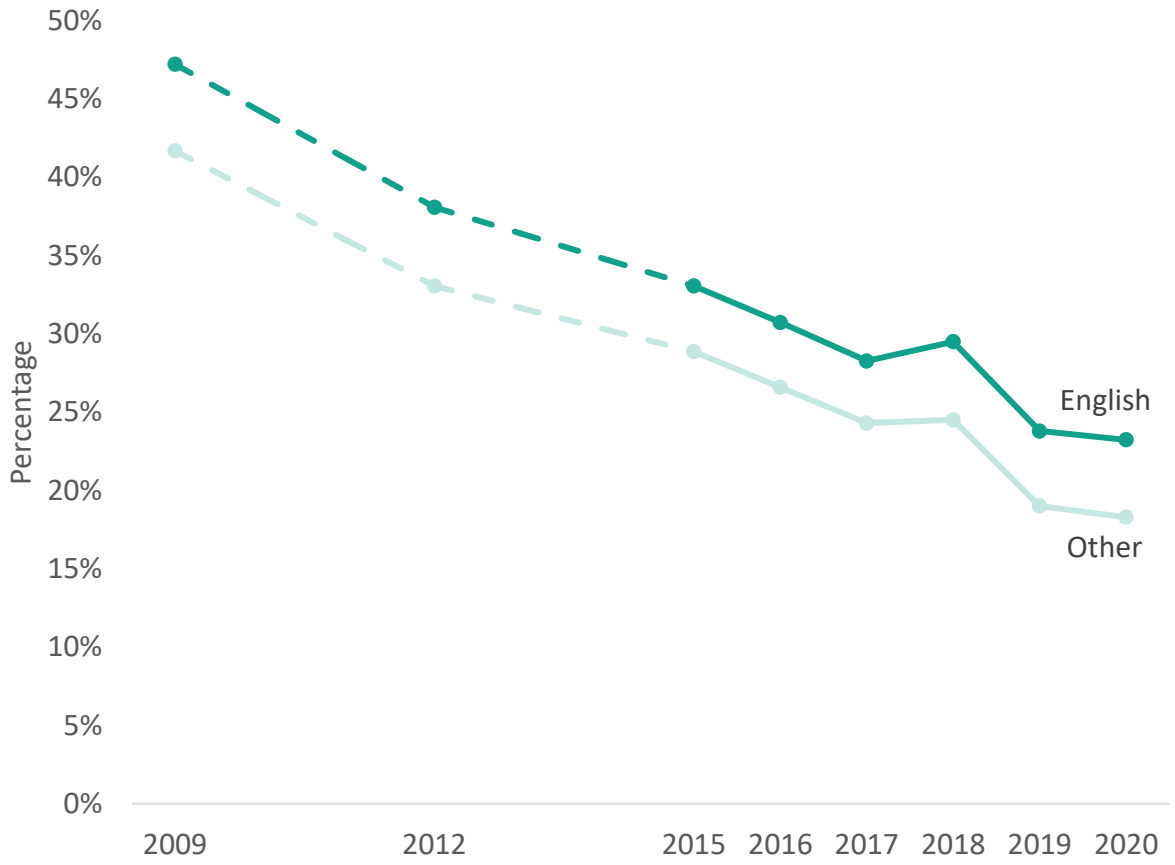


Figure 8 shows the rate of entry to Design and Technology GCSEs by whether English was recorded as their first language in the school census. Those without a valid census record or for whom this information was not obtained have been omitted from this chart.

Figure 8 shows that there are no discernible trends when the data is split in this way. Those for whom English was their first language are more likely to have entered a Design and Technology GCSE, but both groups have seen a steady decline since 2009, in line with the national average.

Figure 9: Proportion of pupils at the end of key stage 4 entered for at least one Design and Technology GCSE split by pupils' special educational needs status, 2009, 2012, 2015-2020

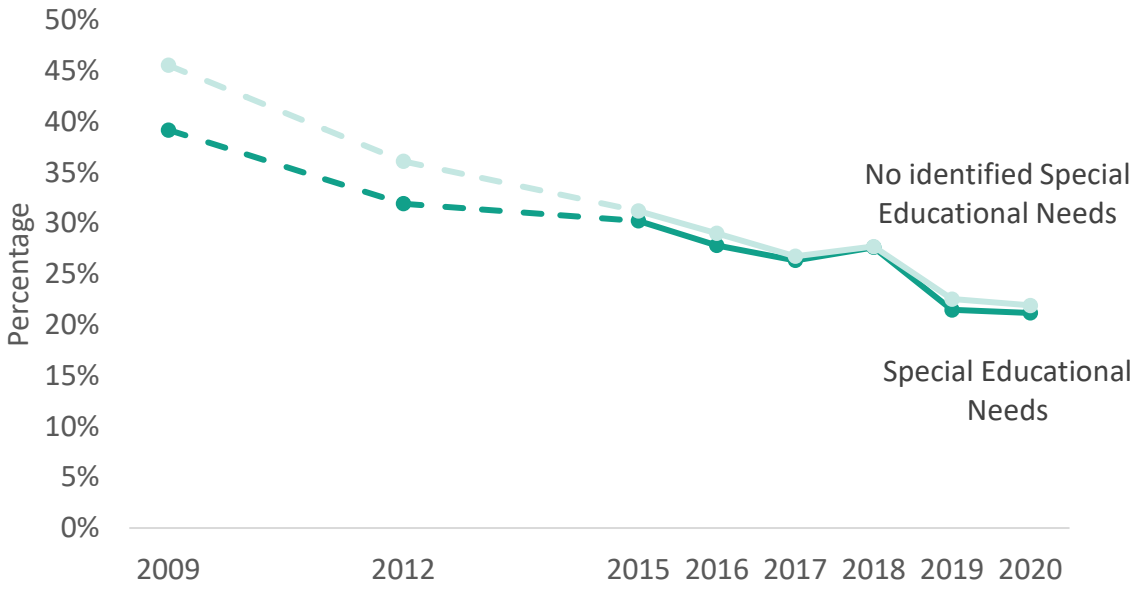


Figure 9 shows that the proportion of entries for Design and Technology GCSEs used to be lower for pupils with special educational needs. However, the decline in entries was steeper for those with no identified special educational needs prior to 2015, so that in recent years entry rates have been similar between the two groups.

Table 1: The 10 local authorities with the highest rate of entries to Design and Technology GCSEs, pupils at the end of key stage 4, 2020

Local authority	Number of pupils	Proportion entered for any Design and Technology GCSE
Herefordshire, County of	1,920	39.0%
Dorset	4,210	33.8%
South Gloucestershire	2,600	32.9%
Somerset	6,010	32.1%
Suffolk	8,340	31.8%
Milton Keynes	3,170	31.2%
Shropshire	3,520	31.2%
Dudley	3,410	30.2%
Waltham Forest	2,970	29.9%
Havering	2,940	29.8%

The average proportion of students who entered a Design and Technology GCSE nationally was 22 per cent. Table 1 shows that around the country there are still areas where rates of entry are far greater than this, although these is no clear geographic pattern to this trend.

Table 2: The 10 local authorities with the lowest rate of entries to Design and Technology GCSEs, pupils at the end of key stage 4, 2020

Local authority	Number of pupils	Proportion entered for any Design and Technology GCSE
Lambeth	2,400	11.0%
Hammersmith and Fulham	1,970	10.7%
Thurrock	1,900	10.2%
Doncaster	3,160	9.5%
Blackpool	1,360	9.3%
Brent	3,240	8.7%
South Tyneside	1,660	8.1%
Kingston upon Hull, City of	3,010	7.6%
Barnsley	2,350	7.5%
Middlesbrough	1,580	4.4%

As with Table 1, Table 2 shows no clear geographic trends, with London boroughs, and local authorities in the North and South being amongst those with the lowest entry rates.

2 – A level, equivalent and vocational entries to Design and Technology qualifications

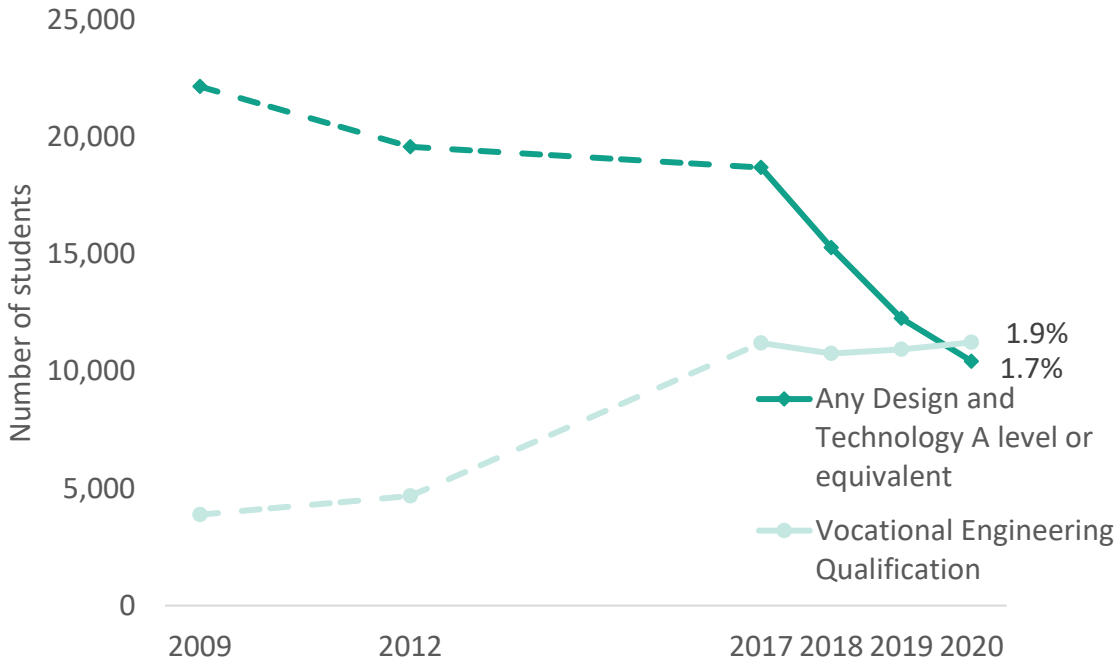
In this section we look at the trends in entries to Design and Technology A level and equivalent qualifications, by students at the end of 16-19 study. Separately, we examine the trends in relevant level 3 vocational qualifications.

Similarly to key stage 4, recent reforms mean that the qualifications on offer have not been consistent through time. Specifically, Design and Technology A levels have been reformed, with students sitting exams in the new qualifications for the first time in 2019. There are reformed A level qualifications in D&T Product Design and D&T Textiles Technology (commonly referred to as fashion and textiles). The reformed Design and Technology A level offered by the OCR examination board has 3 strands to choose from: Design Engineering, Fashion and Textiles and Product Design.

For the purpose of this report, we have categorised these new A levels in the most appropriate legacy categories in order to demonstrate the trend through time most clearly. We have also created an 'Any Design and Technology A level or equivalent' category in order to compare the number of students who had entered at least one Design and Technology subject through time. For the purpose of this report, Design and Technology A levels and equivalents consist of: A levels, AS levels, Applied A levels and relevant International Baccalaureate components. We have also included Electronics and Engineering (including applied engineering) A levels within this measure because of their clear relevance, despite not being formally categorised as Design and Technology qualifications by the Department for Education. There is no standard definition of what constitutes a vocational Design and Technology qualification.

The figures we present in this report are based on Ofqual Subject Sector Area (SSA) groupings. We have selected all level 3 qualifications with size equivalent to at least half an A level and that are grouped under the 'Engineering' SSA code. We then remove any of the qualification types included in our A level and equivalent groupings to create our level 3 vocational engineering qualification definition. This is not a comprehensive list of all vocational qualifications with a Design and Technology element, as such a grouping would necessarily be a broad and subjective definition. However, a wide range of vocational qualification types will come under our definition, which can be calculated consistently through time, and provide a high-level overview of trends in this area. Note that although we use vocational qualifications as a broad term, this definition also includes the applied general and tech level engineering qualifications which are included in the Department for Education performance tables.

Figure 10: Number of students at the end of 16-19 study entered for at least one Design and Technology A level/equivalent or vocational Engineering qualification 2009, 2012, 2017-2020



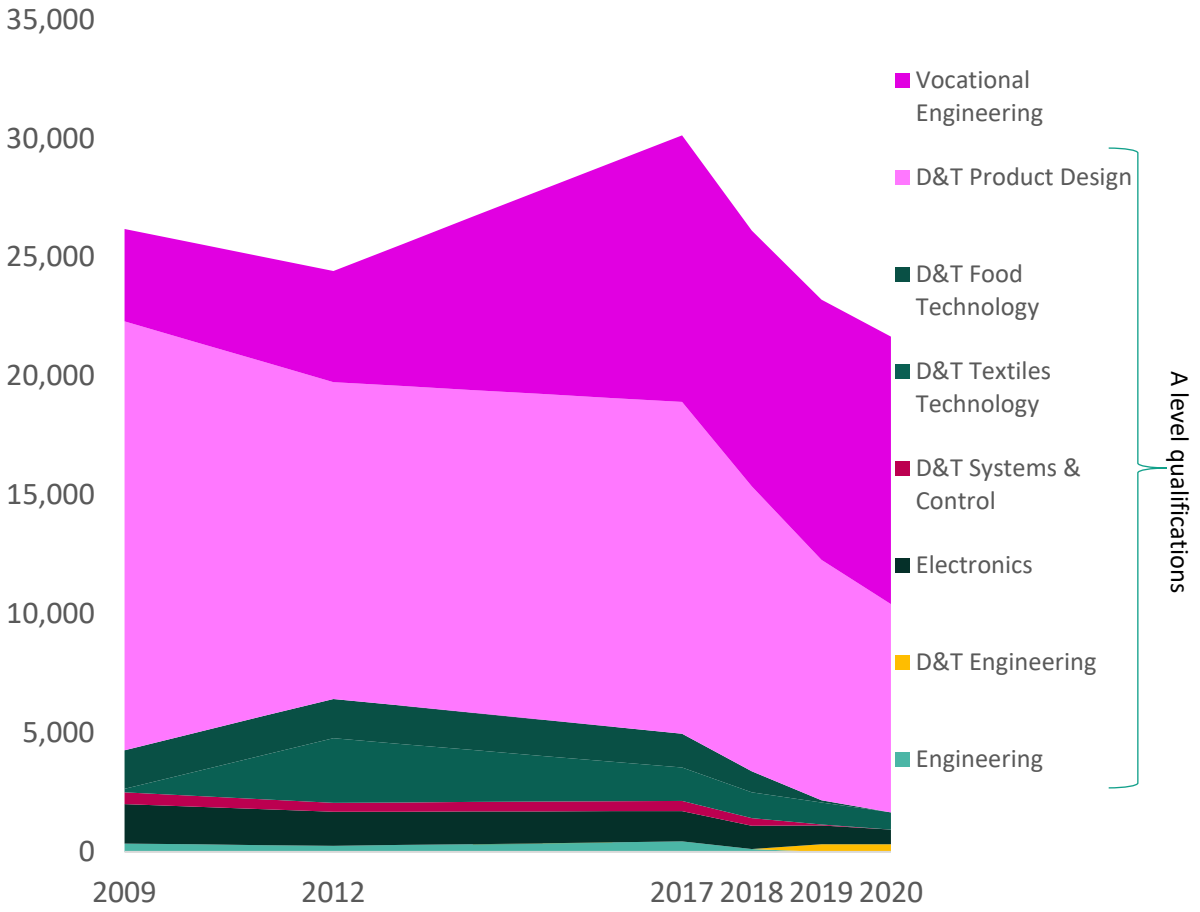
In Figure 10, we have reported the number rather than proportion of entries to these qualifications except for the most recent year.

This is because the compulsory education participation age was increased to 18 over the period in question. As such, the overall cohort size of students at the end of 16-19 study has increased substantially over time, meaning percentages for earlier years would be misleading. Percentages have been provided for 2020 to put these figures in context and demonstrate that only a very small proportion of the current 16-19 cohort enter Design and Technology subjects.

Figure 10 shows that there has been an increase in entries to vocational engineering qualifications since 2010, but that numbers have remained broadly stable in recent years. The increase in vocational engineering students goes a long way to compensating the decline in A level entrants over this period. However, as there has been also an increase in the absolute number of vocational students over this time frame, we cannot conclude that the additional vocational students are those that might previously have entered Design and Technology A levels.

Conversely entries to A levels have declined since 2009, and this decrease in entries has accelerated in recent years as reformed qualifications became available, despite the overall number of A level students remaining broadly stable over this period.

Figure 11: Number of students at the end of 16-19 study entered for Design and Technology qualifications split by subject area. 2009, 2012, 2017-2020



Note that the total number of entries displayed in Figure 11 will not correspond precisely to the percentages displayed in Figure 10. This is because Figure 11 looks at all entries, whereas Figure 10 counts the number of students with at least one entry.

Figure 11 shows that product design has been consistently the most popular Design and Technology A level and is therefore the strongest driver of the 'Any Design and Technology' A level grouping shown in Figure 10. However, entries have declined sharply in recent years, such that in 2019, more students entered a vocational engineering qualification than a product design A level.

Textiles technology and the design engineering specification of the OCR Design and Technology qualification have also been reformed (first results in 2019), but entries have remained low in number.

Trends broken down by student characteristics for students at the end of 16-19 study have been produced back to 2017. Cohort sizes have been broadly consistent over this period, so we are able to meaningfully compare the proportion of entries within characteristic groups. Throughout, students who could not be linked back to a census record at the end of key stage 4 have been excluded from characteristic analysis (Not including school type and geographic breakdowns which are based on their 16-19 institution location).

Figure 12 mirrors the GCSE situation at key stage 4, that is that although entries to Design and Technology A levels have been decreasing overall, the entry rates have been consistently higher amongst males than females.

Figure 12: Proportion of students at the end of 16-19 study entered for at least one Design and Technology A level split by gender, 2017-2020

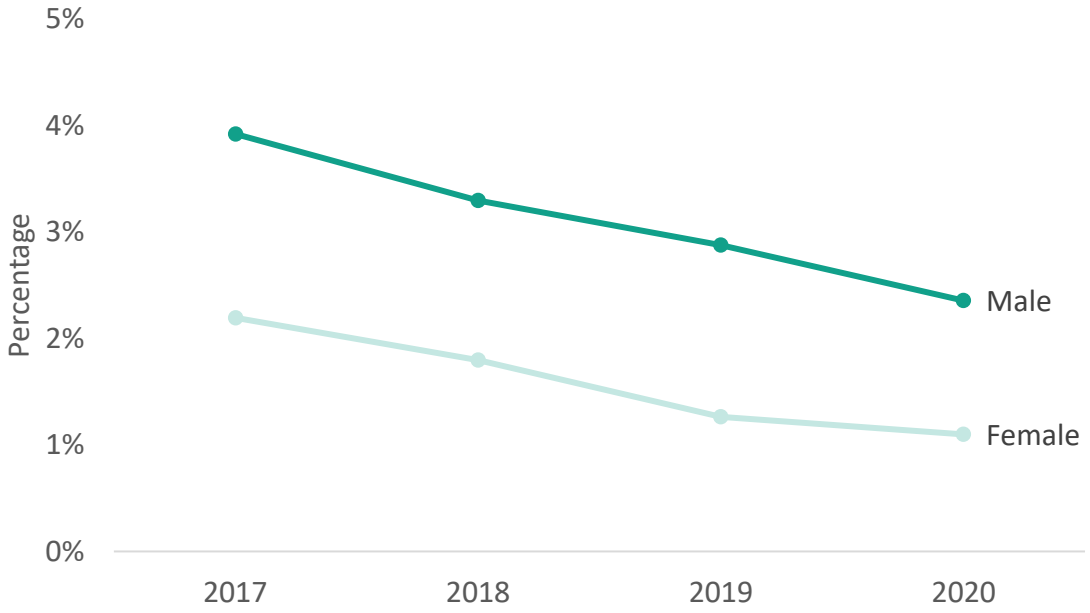
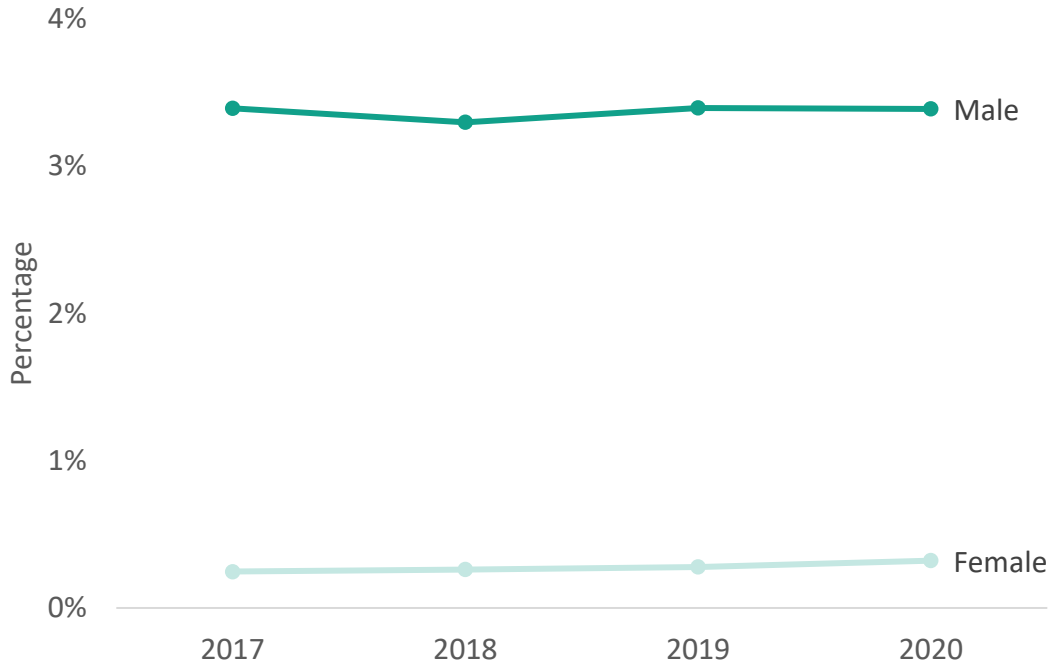


Figure 13: Proportion of students at the end of 16-19 study entered for at least one vocational engineering qualification split by gender, 2017-2020



It is also true that males were more likely to enter vocational engineering qualifications than females, and although the trend for both groups broadly mirror the overall time series, the gap between the proportion of males and the proportion of females entering a vocational engineering qualification is far greater than the corresponding gap for A levels, with female students outnumbering male students at a rate of more than 10 to 1. However, as a proportion of the entire cohort, the overall rate of students entered for such qualifications is low.

Figure 14: Proportion of students at the end of 16-19 study entered for at least one Design and Technology A level split by free school meal status in the last 6 years, 2017-2020

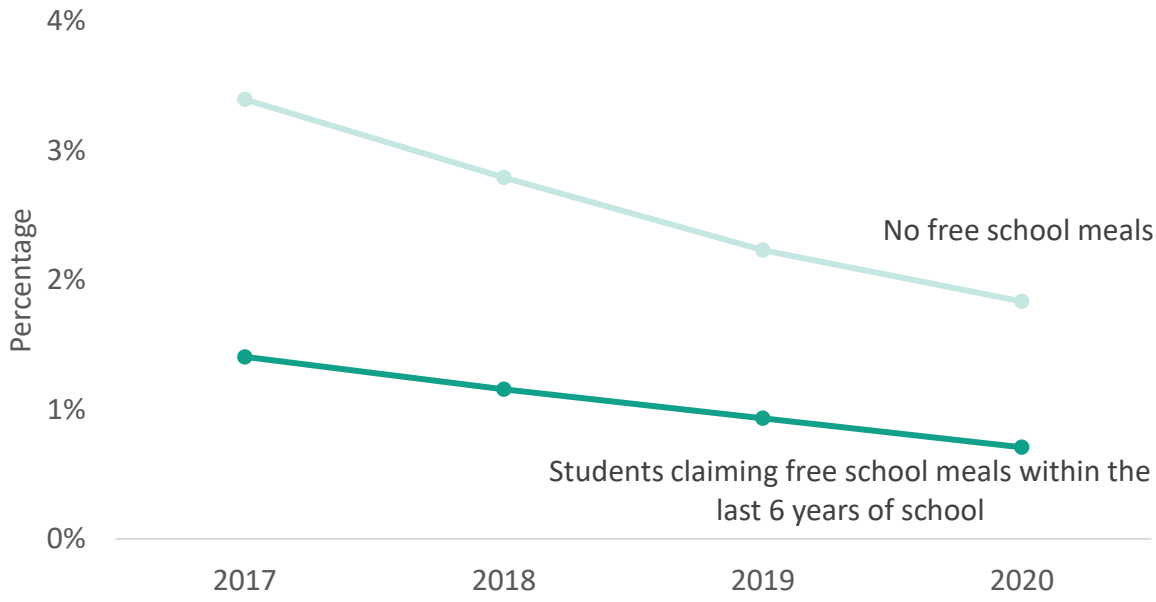
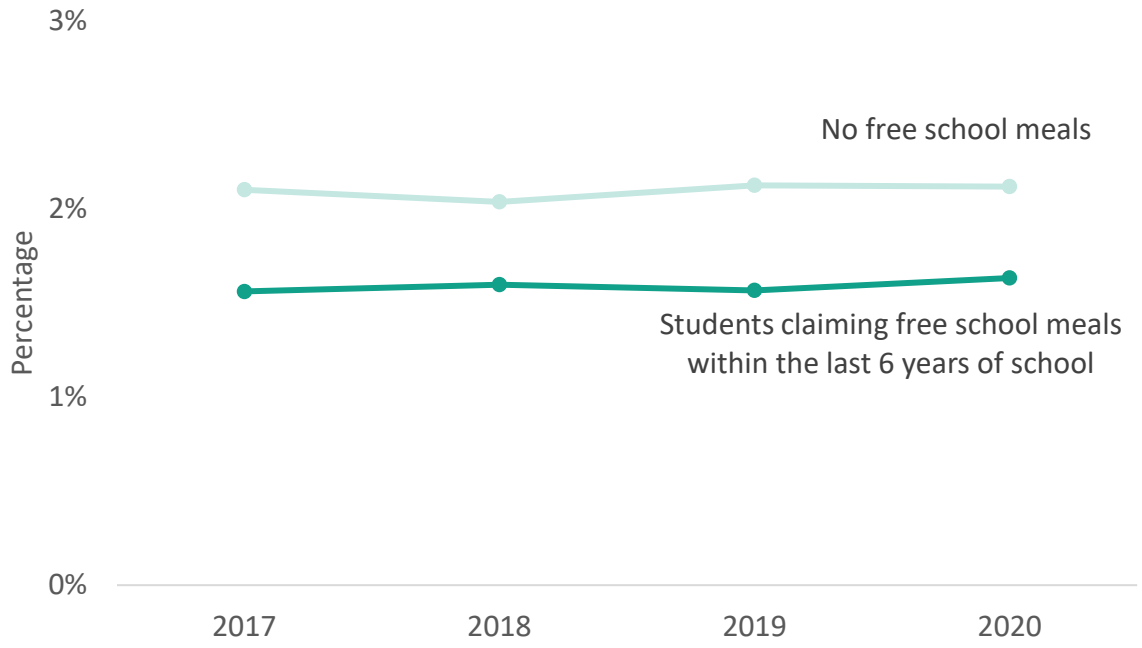


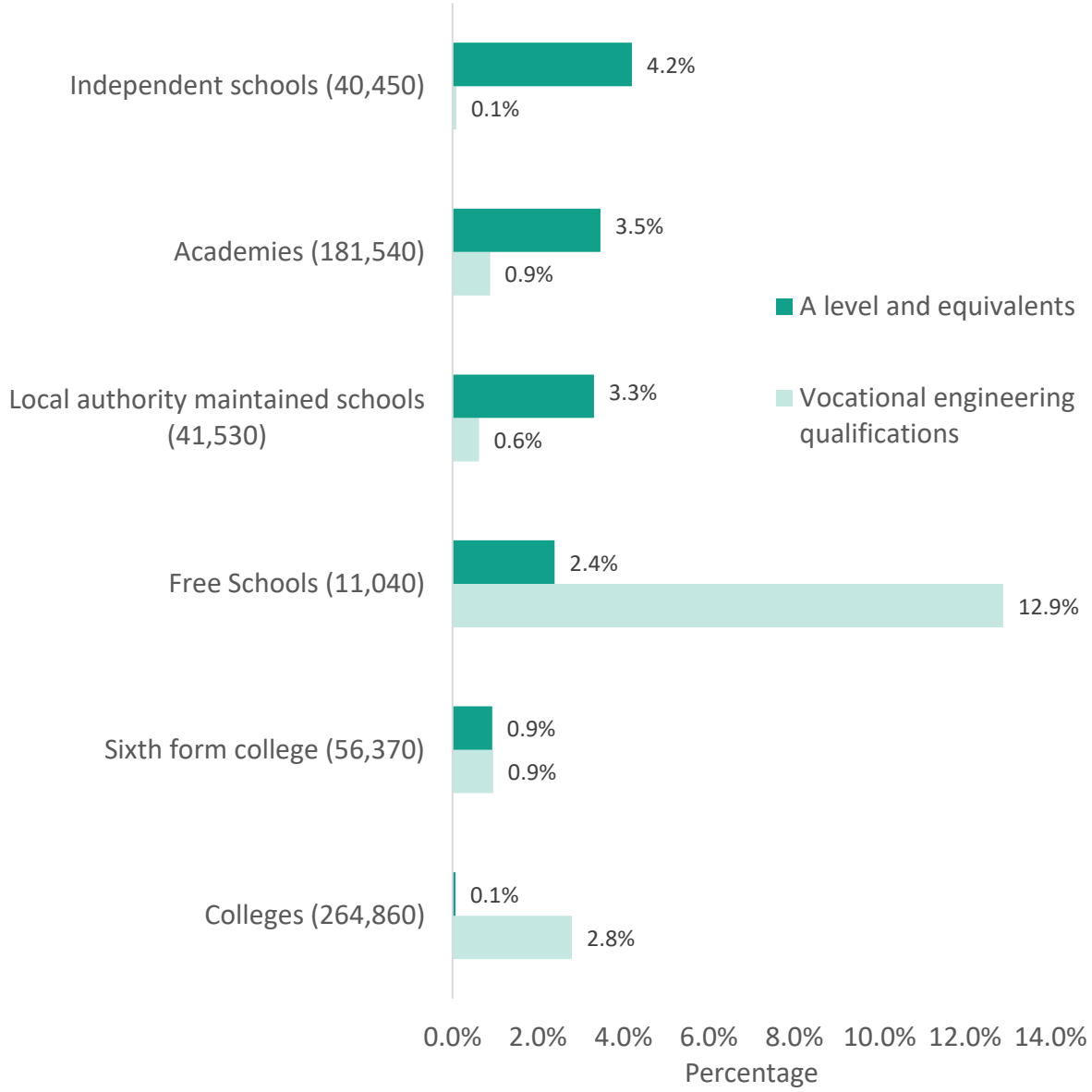
Figure 14 demonstrates that the decline in entries to Design and Technology A levels has been slightly steeper for those that had not been in receipt of free school meals in secondary school. Although entry rates have been consistently higher for those not in receipt of free school meals, the trend for both groups broadly mirror the national averages. Those in 16-19 study that could not be linked back to free school meal information while they were at school have been excluded from this chart.

Figure 15: Proportion of students at the end of 16-19 study entered for at least one vocational engineering qualification split by free school meal status at the end of key stage 4, 2017-2020



Similarly, Figure 15 shows that those who had not been in receipt of a free school meal at secondary school were marginally more likely to enter a vocational engineering qualification in the 16-19 phase. The rate of entries for both groups has remained broadly stable in recent years.

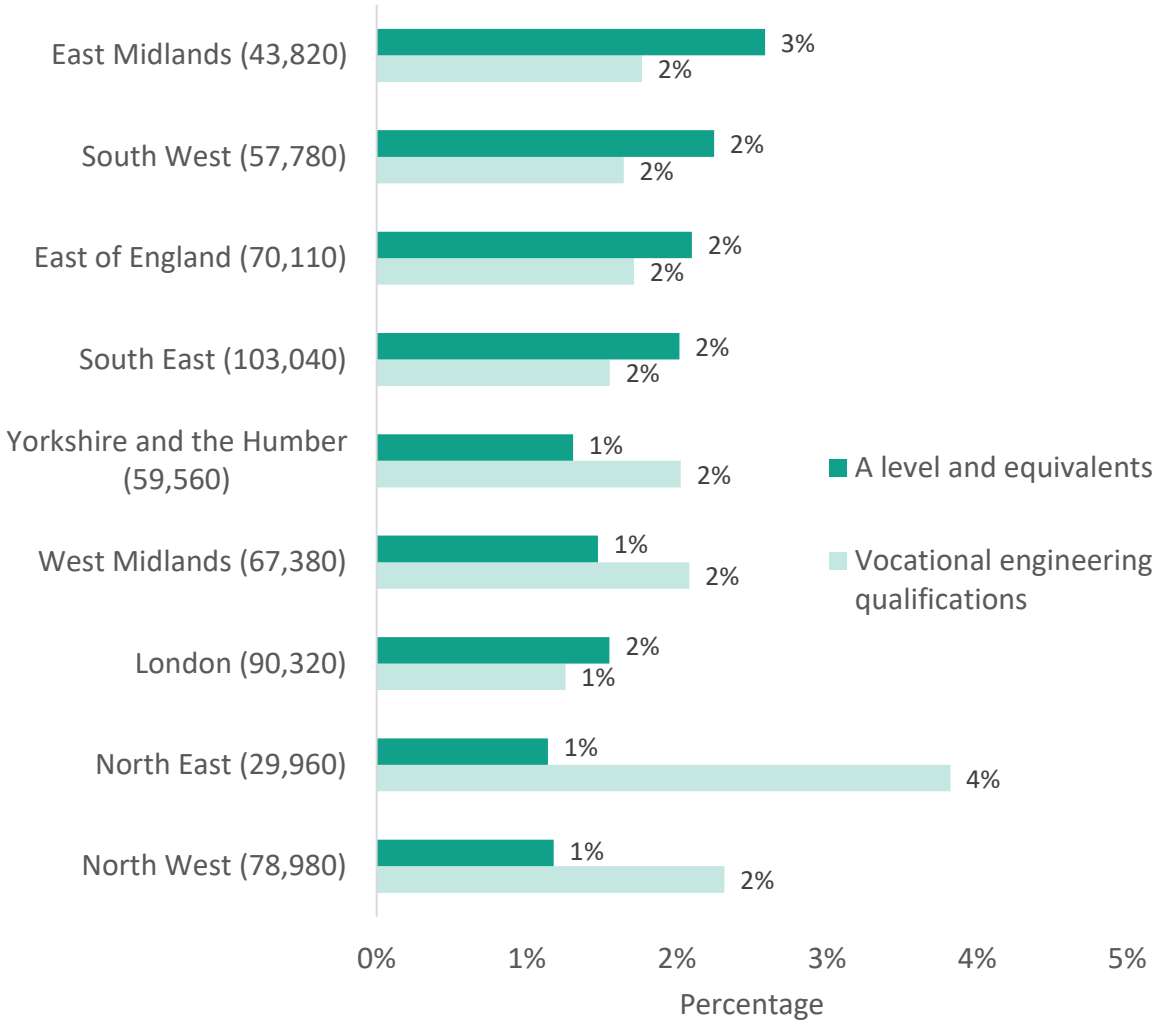
Figure 16: Total number of students at the end of 16-19 study, and the proportion of which entered at least one Design and Technology qualification, by school type[2], 2020



Entries to Design and Technology A levels were above the national average in independent schools, academies, local authority-maintained schools and free schools, however entry rates within sixth form colleges, and in particular other general FE colleges, were very low. Conversely, vocational engineering qualifications are more popular than average amongst those attending general FE colleges, which account for a significant proportion of the overall 16-19 population. The high entry rates to vocational engineering qualifications amongst free schools is driven by the popularity of these qualifications at University Technical Colleges.

[2] Institution type displayed on this chart is as recorded on GIAS (Get Information About Schools) for the URN (Unique Reference Number of a school) the student has most qualifications recorded at. School types with 10 or fewer entries to Design and Technology/vocational engineering qualifications have not been included in these breakdowns.

Figure 17: Proportion of students at the end of 16-19 study entered for at least one Design and Technology qualification split by region, 2020



Most regions had similar Design and Technology A level entry rates to the national average. The East Midlands had entry rates of around three per cent, marginally above the national average.

There is a little more variation when looking at the spread of entries to vocational engineering qualifications between the regions. In the North East, around four per cent of students were entered, compared to the national average of two per cent. London had an entry rate of one per cent, slightly below the national average.

Figure 18: Proportion of students at the end of 16-19 study entered for at least one Design and Technology qualification split by ethnicity, 2020

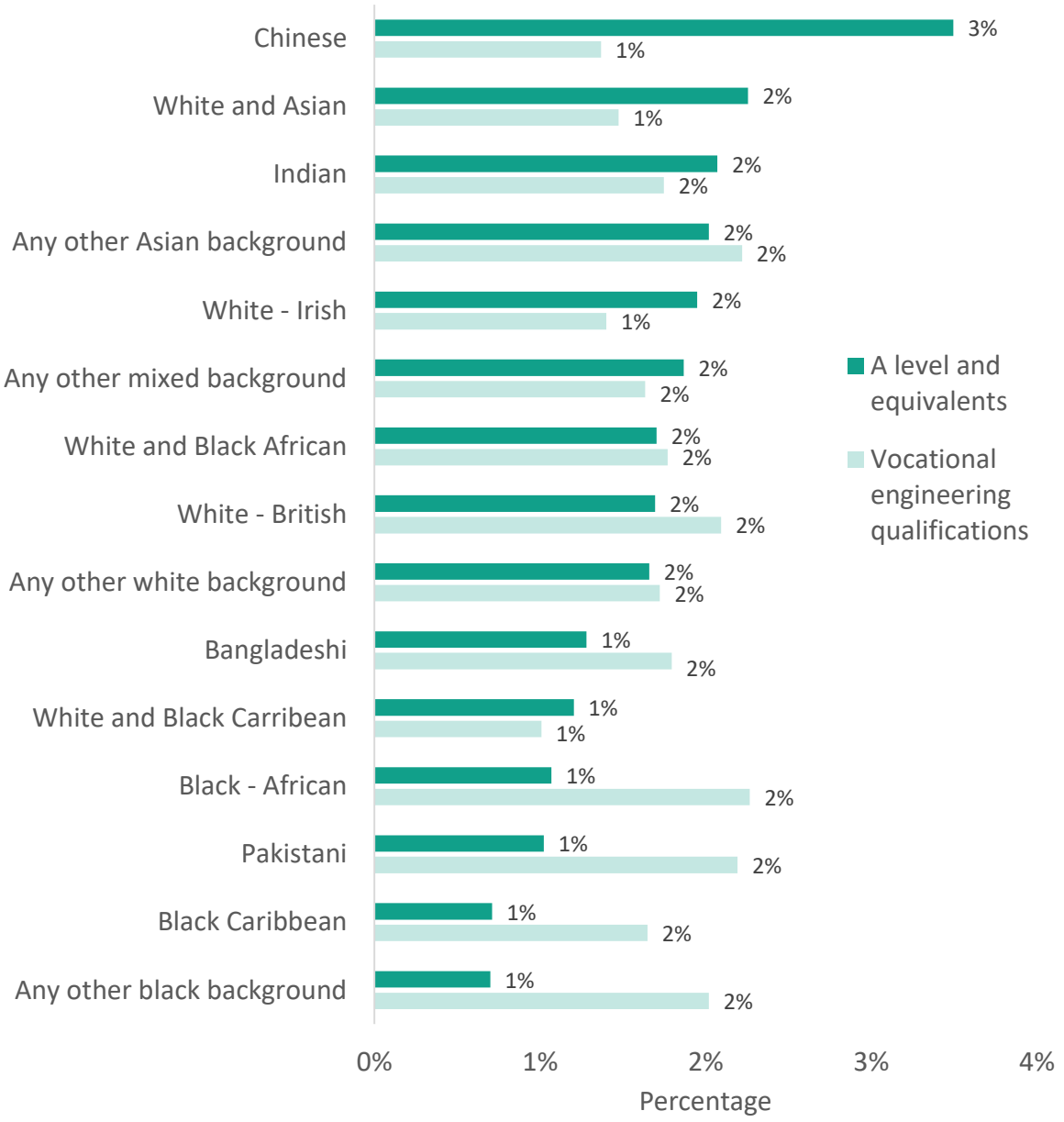


Figure 18 demonstrates that there were not substantial differences in entry rates among students of different ethnicities. Chinese students were marginally more likely to enter a Design and Technology A level compared to the national average (three per cent compared to two per cent), but amongst all other groups, entry rates were similar to, or around one percentage point below the national average.

Figure 19: Proportion of students at the end of 16-19 study entered for at least one Design and Technology A level split by students' first language status, 2017-2020

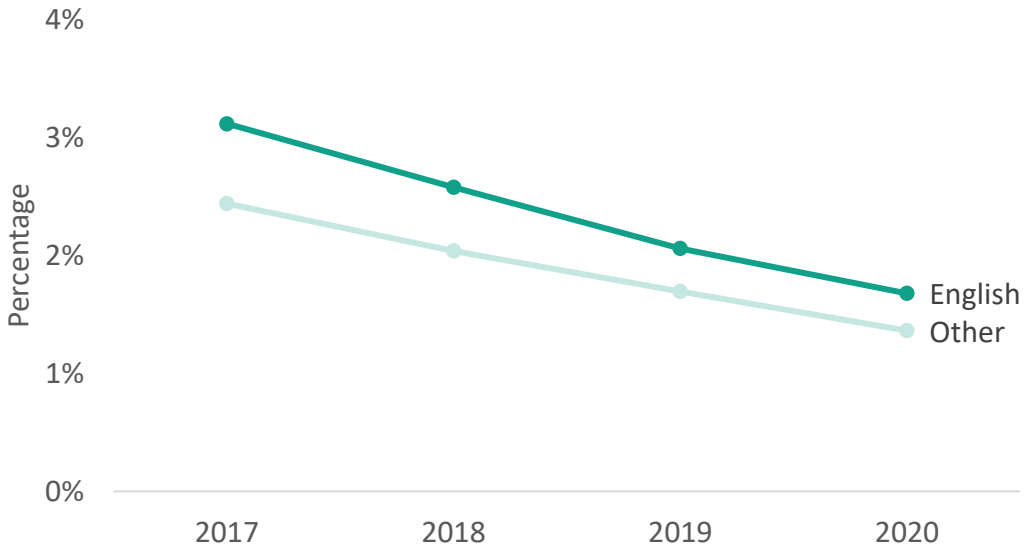
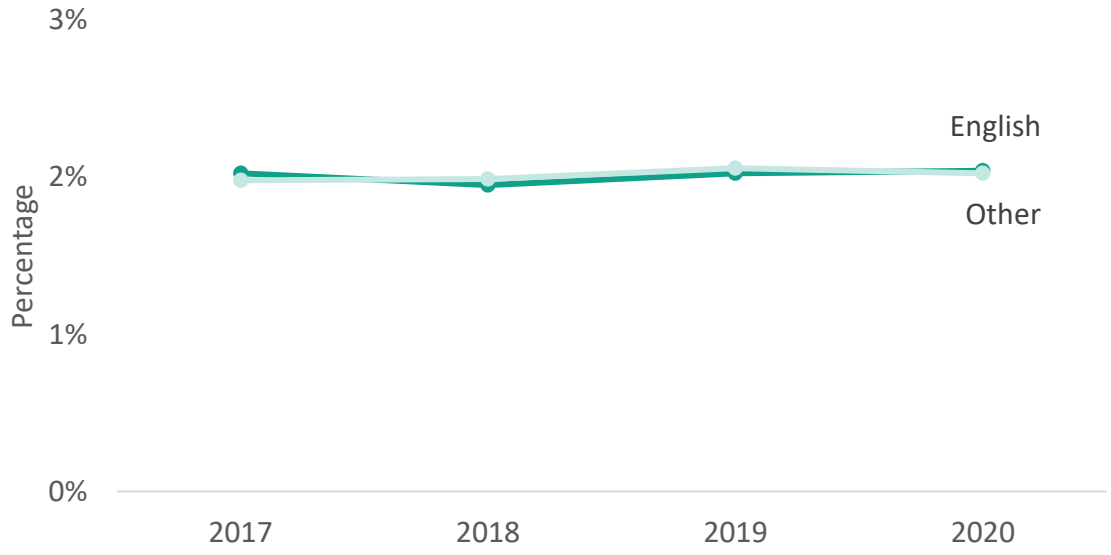


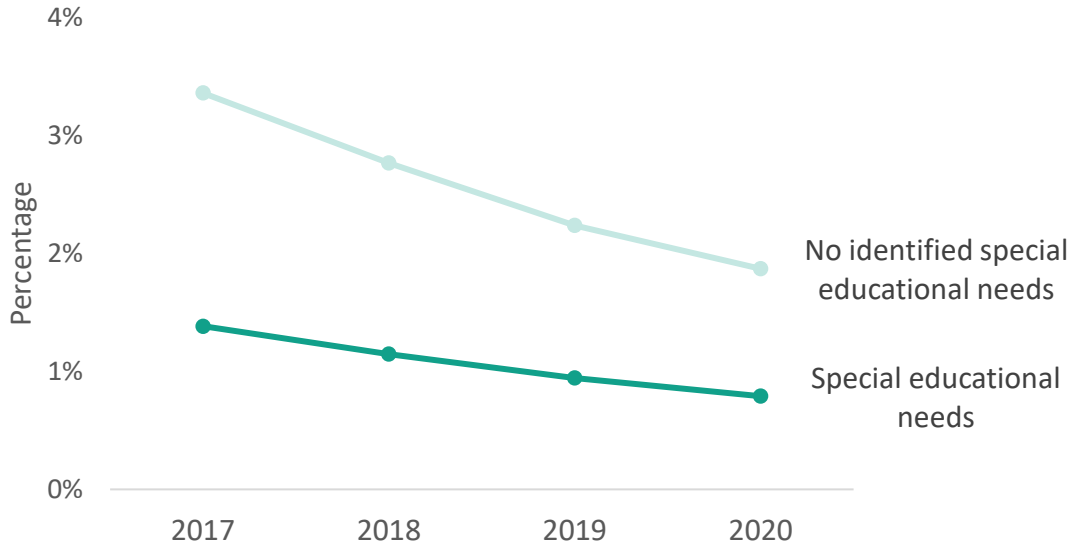
Figure 19 shows that students whose first language was English were consistently more likely to have entered a Design and Technology A level, but entry rates amongst both groups were low and have declined since 2017.

Figure 20: Proportion of students at the end of 16-19 study entered for at least one vocational engineering qualification split by students' first language status, 2017-2020



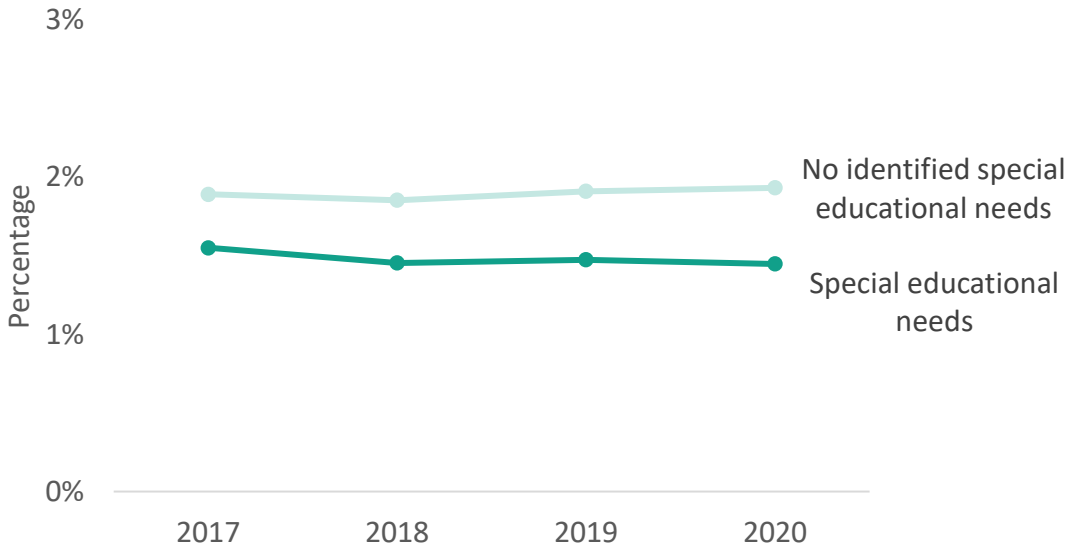
Conversely, when looking at vocational engineering qualifications, students are equally likely to have entered regardless of whether their first language was English.

Figure 21: Proportion of students at the end of 16-19 study entered for at least one Design and Technology A level split by pupils' special educational needs status, 2017-2020



Entry rates to Design and Technology A levels were greater for students without any identified special educational needs, though entries have declined amongst both groups as demonstrated in Figure 21.

Figure 22: Proportion of students at the end of 16-19 study entered for at least one vocational engineering qualification, split by students' special educational needs status, 2017-2020



Although it is still true that students with identified special educational needs were less likely to enter vocational engineering qualifications compared to those with no identified needs, the gap in entry rates between the two groups was narrower than it was for A level qualifications.

Table 3: The 10 local authorities with the highest rate of entries to Design and Technology A levels, students at the end of 16-19 study, 2020

Local authority	Number of students	Proportion entered for any Design and Technology A level
Dorset	3,520	5.7%
Northumberland	2,230	4.7%
Cumbria	4,010	4.4%
Leicestershire	6,360	4.1%
Bracknell Forest	1,110	4.0%
City of London	280	3.9%
Wirral	3,320	3.9%
Cheshire West and Chester	2,400	3.9%
Redbridge	3,130	3.6%
Bath and North East Somerset	2,730	3.4%

Table 4: The 10 local authorities with the highest rate of entries to level 3 vocational engineering qualifications, students at the end of 16-19 study, 2020

Local authority	Number of students	Proportion entered for any level 3 vocational engineering qualification
Hartlepool	730	16.7%
Middlesbrough	2,430	7.2%
Stockton-on-Tees	1,630	6.8%
South Tyneside	1,880	5.5%
Halton	1,770	5.3%
Cumbria	4,010	4.7%
Reading	970	4.6%
North East Lincolnshire	2,380	4.1%
Kingston upon Hull, City of	3,630	4.1%
North Lincolnshire	3,080	4.0%

Tables 3 and 4 show the 10 local authorities with the highest proportion of entries to Design and Technology A levels, and level 3 vocational engineering qualifications respectively.

Interestingly, it is only Cumbria that appears in the top 10 local authorities in both lists. Furthermore, it is only Dorset that appears in the top 10 local authorities based on A level entries that was also in the top 10 based on GCSE entries.

Hartlepool has the highest entry rate for level 3 vocational engineering qualifications. The higher entry rates for these qualifications in the North East more generally was driven by a small number of colleges in the region with particularly high entry rates.

3 – The interaction between entries to Design and Technology qualifications at key stage 4, and 16-19 study

In this section, we examine the subject entries at GCSE level most commonly associated with studying Design and Technology qualifications in the 16-19 education phase.

To facilitate this, exam records for students at the end of 16-19 study have been linked back to key stage 4 datasets from two and three years previously (allowing for the fact that some students complete 16-19 study in three rather than two years). As those finishing 16-19 study in 2020 would have completed key stage 4 in either 2017 or 2018, the table overleaf includes both legacy (core and additional) and reformed (combined science) GCSE entries, as the period examined straddled this reform.

For each GCSE qualification commonly entered, we examine the proportion that went onto study either a Design and Technology A level, or a vocational engineering qualification.

The most commonly entered GCSEs are English and mathematics, however as these are a compulsory part of the key stage 4 curriculum which all pupils study, the proportion which go on to study Design and Technology qualifications post 16 are in line with the national average of around 3.5 per cent.

Table 5: Proportion of students at the end of 16-19 study in 2020 that entered a Design and Technology A level or vocational engineering qualification, split by qualification entered at GCSE

GCSE qualification entered	Progression rate to Design and Technology A level or vocational engineering qualification for those at the end of 16-19 study in 2020
Design and Technology: Electronic Products	17%
Design and Technology: Systems & Control	16%
Design and Technology: Resistant Materials Technology	12%
Design and Technology: Graphic Products	10%
Any Design and Technology subject	9%
Biology (except Human Biology)	5%
Physics	5%
Chemistry	5%
Biological Science	5%
German	4%
Design and Technology: Textiles Technology	4%
Geography	4%
Information Technology	4%
Combined Science	4%
Statistics	4%
Business Studies	4%
English Literature	4%
English	4%
Maths	4%
French	3%
Physical Education	3%
Spanish	3%
Religious Studies	3%
Art and Design	3%
History	3%
Other languages	3%
Music	3%
Additional Science	2%
Media, Film and Television Studies	2%
Core Science	2%
Drama	2%
Design and Technology: Food Technology	1%

As might be expected, entering a Design and Technology qualification in the 16-19 phase, was most common amongst those that had entered Design and Technology GCSEs. This was particularly the case for Electronic Products, Systems and Control, Resistant Materials and Graphic Products. However, it was not so clearly the case for Textiles Technology. For Food Technology the opposite was true, with very few students studying Food Technology at school continuing to enter a Design and Technology qualification in the 16-19 phase. Most other GCSEs see a similar proportion to the

national average go on to take a Design and Technology qualification in the 16-19 phase, although this is less true for certain subjects such as Music and Drama.

As discussed, the subjects most strongly associated with entering Design and Technology subjects in the 16-19 phase, are Design and Technology GCSEs.

Most significantly, those that had not entered any Design and Technology qualifications at GCSE level were very unlikely to study in these areas post-16 (1.6%). This indicates that without the option or incentive to begin studying in these areas at an early stage, young people are unlikely to develop sufficient interest or be inclined to pursue Design and Technology subjects at a higher level.

Furthermore, this suggests that the declining entries in Design and Technology GCSEs we have seen in recent years may signal a further decline in entries by 16-19 students in the near future. Conversely this suggests that we are unlikely to be able to improve take up in the 16-19 phase, without first widening participation at age 16.

Also of note, is that those opting for a separate science pathway (Chemistry, Physics and Biology) were marginally more likely (1 percentage point) to go on to study a Design and Technology qualification in the 16-19 phase compared to those entering the combined science GCSE.

Figure 23: Number of schools by proportion of pupils at the end of key stage 4 entered for GCSE Design and Technology qualifications, 2020

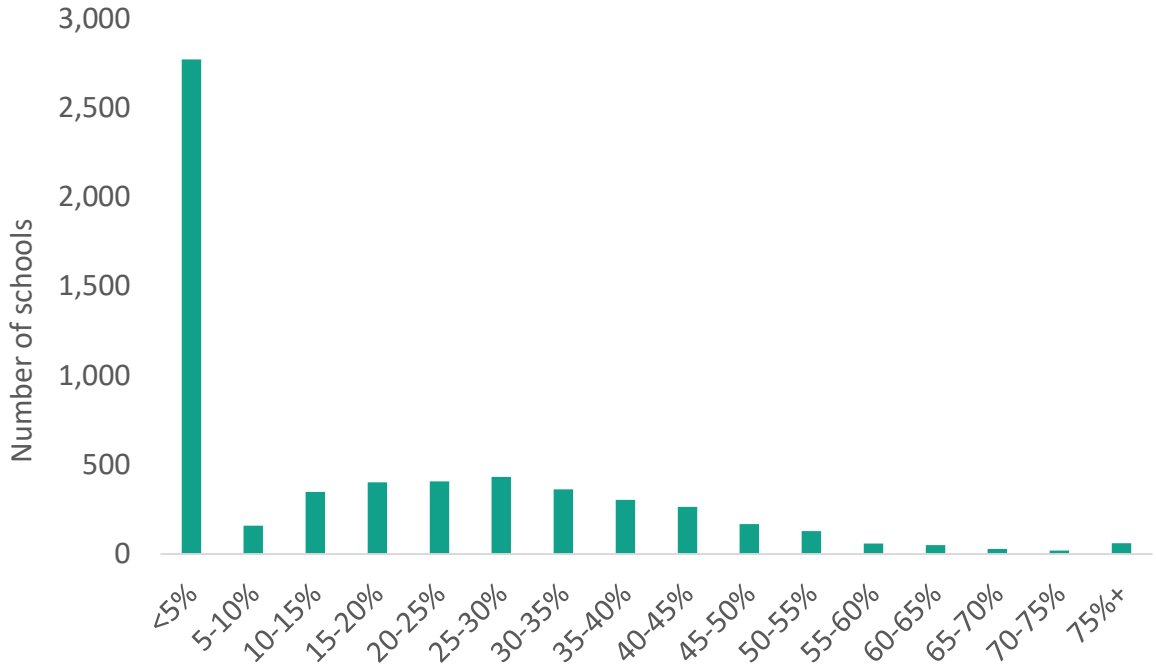
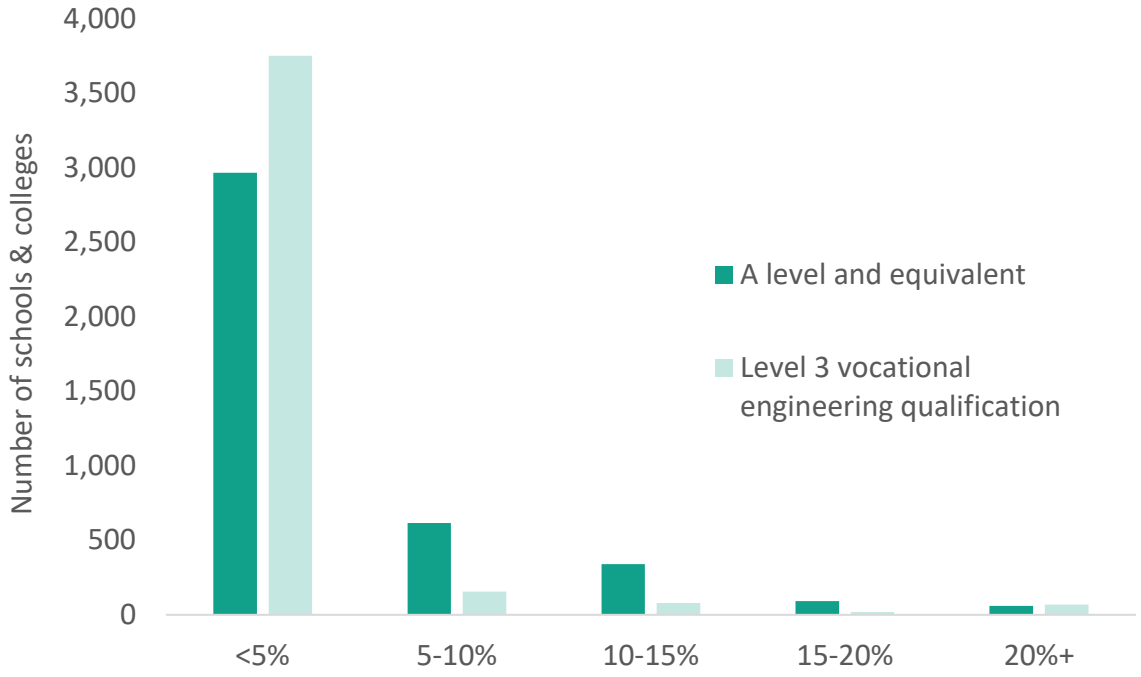


Figure 24: Number of schools and colleges by proportion of students at the end of 16-19 study entered for Design and Technology qualifications, 2020



Figures 23 and 24 go onto show that although there are certain schools or colleges that enter a large proportion of their students for Design and Technology, by far the most common pattern at key stage 4 and 16-19 study is for less than 5 per cent of the cohort to be entered.

4 – Design and Technology teacher numbers and vacancies

In this section of the report, we examine the number of Design and Technology teachers working in state funded schools since 2011.

Figure 23: Estimated number and proportion of Design and Technology teachers in state funded schools, 2011-2020

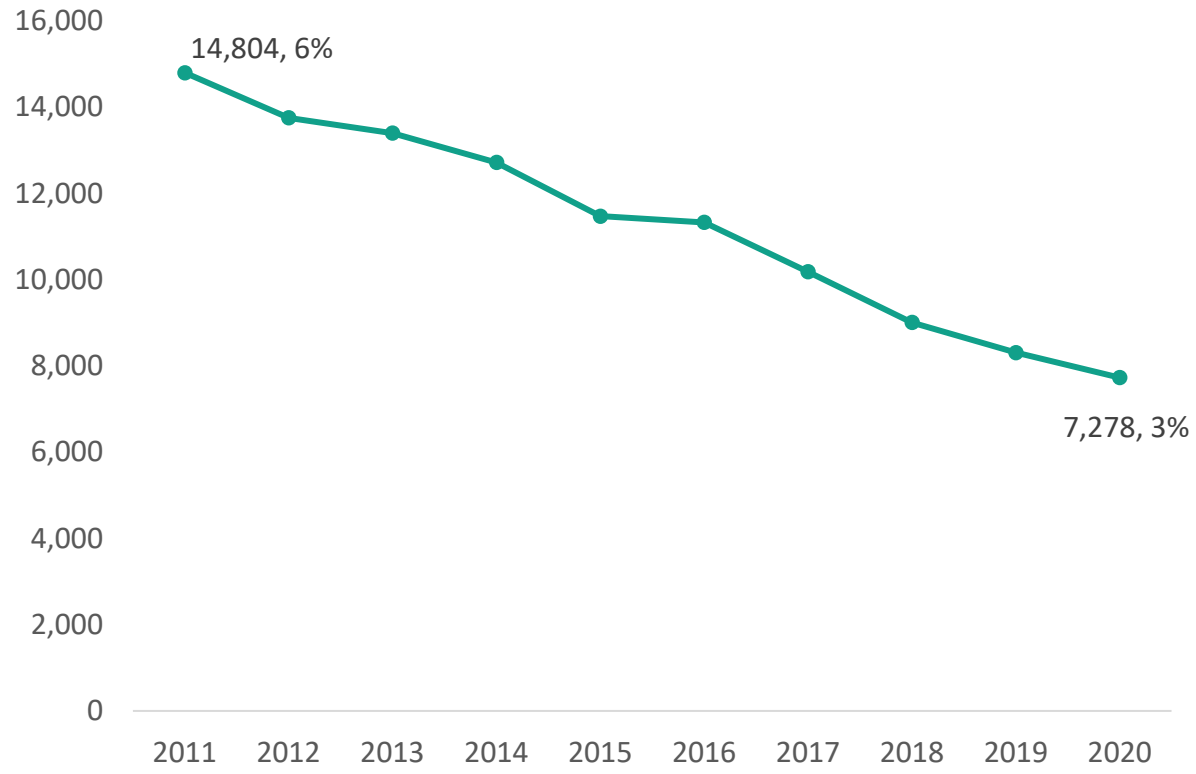


Figure 23 (Source: Department for Education)[iv] shows that the absolute number of Design & Technology teachers in England has fallen by over 6,000. Although overall teacher numbers have also declined over this period, the decline in Design and Technology teachers has been relatively steeper. In 2011, Design and Technology teachers accounted for 6 per cent of all year 7-13 teachers, compared to just 3 per cent in 2020.

Figure 24: Estimated rate of Design and Technology, and all teacher vacancies in state funded schools, 2011-2019

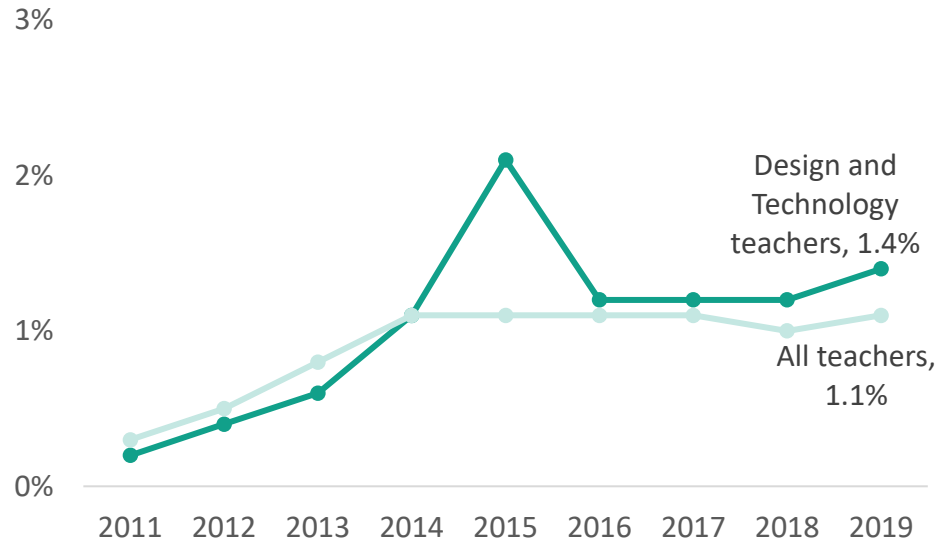


Figure 24 (Source: Department for Education)[v] shows the estimated proportion of vacancies for all teachers, and Design and Technology teachers since 2011 as calculated from the school workforce census.

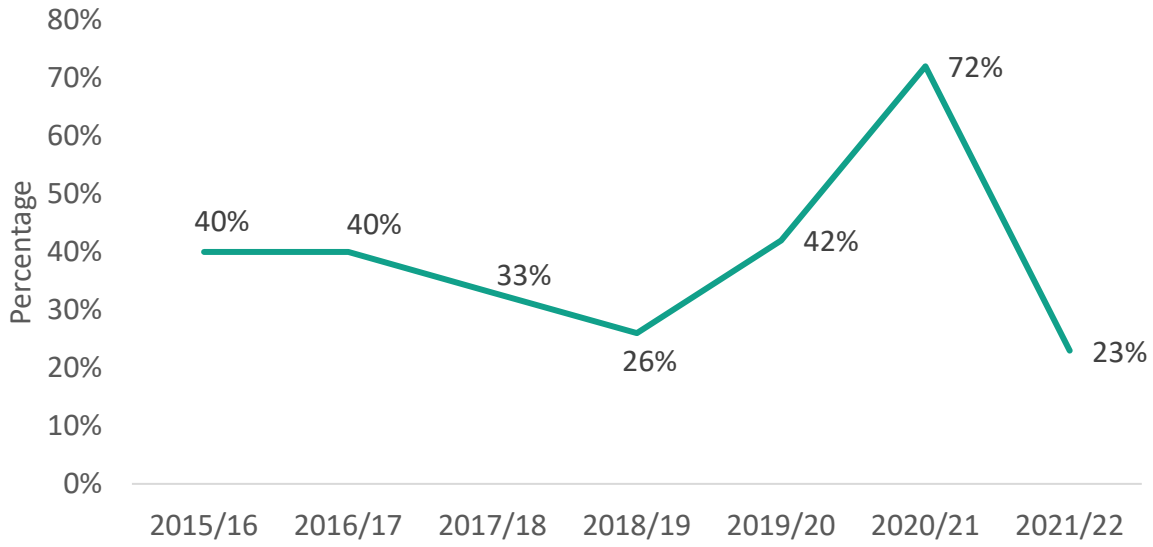
The overall rate of teacher vacancies has increased since 2011 and stood at 1.1 per cent in 2019.

However, the vacancy rate for Design and Technology teachers has risen more sharply over this period and has been greater than the rate for all teachers since 2014.

Initial teacher training recruitment targets and bursaries

Targets are set for post-graduate ITT (Initial Teacher Training) recruitment to each subject, of which Design and Technology (alongside physics and modern foreign languages) has one of the poorest recruitment records.

Figure 25: Post graduate ITT recruitment against targets for Design and Technology, 2015/16 – 2021/22



In 2020/21 postgraduate ITT recruitment for Design and Technology was at 72 per cent of its target, which dropped to 23 per cent in 2021/22. (Source: Department for Education).[vi] However this apparent decrease reflects a substantial increase of the target as well as a decrease in recruitment numbers, which were inflated in 2020/21, likely to be as a result of the COVID-19 pandemic. Excluding this exceptional year, post-graduate ITT recruitment for Design and Technology has been substantially below 50 per cent of the target the Department for Education has set since 2015/16.

To encourage applicants and help meet targets in shortage subjects, the Department for Education offers ITT bursaries, subject to eligibility criteria based on academic qualifications amongst other things. The bursaries offered have varied through time. Over the period where ITT recruitment increased during the COVID-19 pandemic, the bursary for Design and Technology was removed completely (though recruitment rates were still below target). It now stands at £15,000, compared to £24,000 offered for Chemistry, Computing, Mathematics and Physics[vii].

It is unclear whether, or to what extent, the decline in GCSE entries and teacher numbers are drivers of each other. Sustained teacher vacancies and continual missed targets will mean that schools without the required staff may be unable to offer Design and Technology qualifications, which in turn could lead to reduced pupil entry numbers. Conversely, if pupils have less incentive to enter Design and Technology qualifications, this may lead to schools gradually cutting back on the number of teachers trained in this area.

Both of these trends are likely to have interacted with curriculum and accountability reforms, school governance changes and capital constraints associated with teaching Design and Technology. The decline in entries is not a simple picture to understand, but it is clear that without specific and targeted policies, the decline in students qualified in Design and Technology subjects is unlikely to reverse in the near future.

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[ii] Department for Education, 'GCSE/GNVQ and GCE A/AS/VCE/Advanced GNVQ Examination Results 2000/2001 - England', 2002, https://webarchive.nationalarchives.gov.uk/ukgwa/20130322120848/https://www.education.gov.uk/researchandstatistics/statistics/allstatistics/a00193811/gcse-gnvq-and-gce-a-as-vce-advanced-gnvq-examinati.

[iii] Department for Education, 'Key Stage 4 Performance, Academic Year 2019/20', 2020, https://explore-education-statistics.service.gov.uk/find-statistics/key-stage-4-performance-revised/2019-20.

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