

Educational pathways

Further education,
apprenticeships and engineering

Introduction

For more than 20 years, we've undertaken comprehensive research into the state of engineering in the UK, including the extent to which the supply through education and training pathways is likely to meet future needs and demand for engineering skills. This flagship research, once produced as a single report, is now available in a range of formats, providing the most up-to-date analysis. This briefing is part of our educational pathways series and is accompanied by a suite of data tables.

This briefing looks at the qualifications available in further education (FE), with 2 main categories: technical/vocational qualifications and apprenticeships. We cover both, with more emphasis on apprenticeships (due to the data available).

The main difference between the 2 types of qualification is that pupils pursuing technical qualifications tend to spend more time in educational institutions (for example, FE colleges), compared to apprentices who spend more time in the workplace. Both offer routes into engineering, and it is important that the engineering sector continues to offer a variety of options for young people to enable more diversity for the future workforce.

Here we will focus on 'engineering-related qualifications', which - in line with previous EngineeringUK research - covers the 'construction, planning and the built environment', 'engineering and manufacturing technologies', and 'information and communication technology' sector subject areas.

Context

In recent years, the government have led a large-scale overhaul of the English further education system, in an attempt to streamline the range of options for young people. This included revising the apprenticeship system from 2015 onwards, and creating a new vocational qualification called a 'T level'. The T level was intended to provide the vocational equivalent of an A level, with one clear qualification available per subject area, instead of the variety of qualifications from different awarding bodies that existed previously.

FE and apprenticeships were hit hard by the Covid-19 pandemic, with FE colleges shutting their doors during the pandemic, and apprentices who had already started their qualifications told to put their work on hold. Due to the nature of apprenticeships (often practical work involving manufacturing, construction, healthcare, and generally more 'hands-on' experiences), working from home was not an option for many.

In a similar manner to the wider UK economy, the pandemic did not impact all apprenticeships equally. The data shows the largest decline in apprentices in those sectors that faltered most heavily due to the pandemic (travel, retail and so on). The data, then, is reflective of a particular period where the entire country witnessed a stagnation and economic shocks. Provisional apprenticeships data from 2021/22 shows that there is reason to be optimistic, however, although it is too early to say whether the recovery in vocational education will be sustained. Trends that were in place before the pandemic (a shift towards higher-level apprenticeships and qualifications) have been accelerated, perhaps due to the increasing understanding and knowledge of them.

The further education data is more expansive in England than that of the other UK nations, so consequentially, there are more tables available. At the time of this publication, for England, full-year data for 2020/21 and some provisional data for 2021/22 was available, but only up to April 2022. The Scottish academic year is different, so full

year data for 2021/22 was available. For Wales and Northern Ireland, the report uses data from 2020/21. Throughout this briefing, where comparing data between nations, we use years where we have data for all groups.

T levels and vocational qualifications

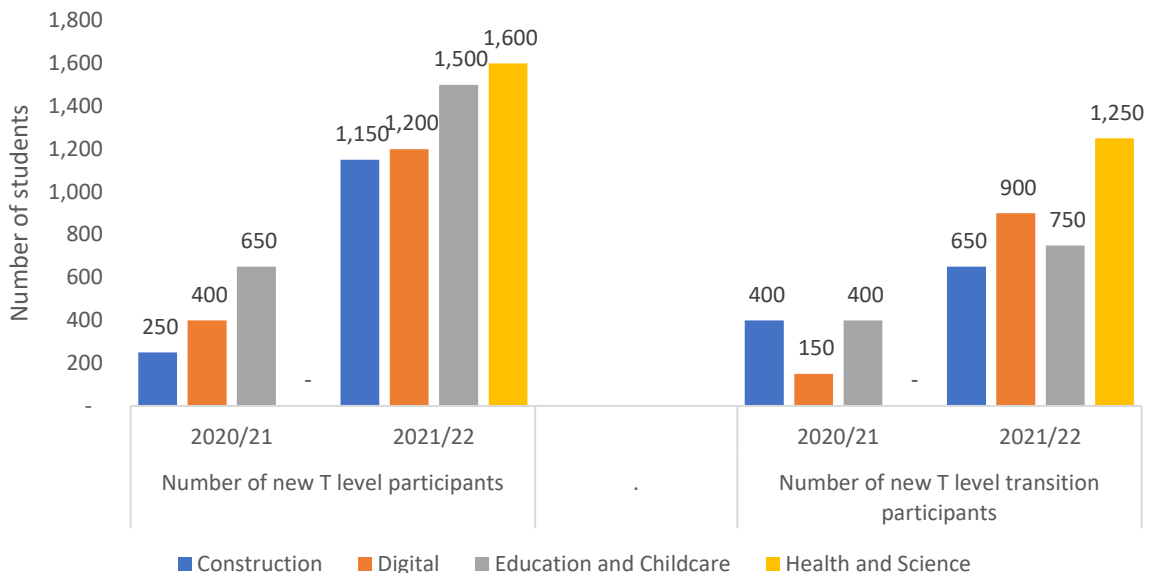
With the introduction of T levels (which follow on from GCSEs and are equivalent to 3 A levels) the hope is that there will be clearer vocational pathways into engineering, whilst also allowing the flexibility to move across different educational routes. Construction was one of the first T levels to be introduced in 2020/21, with engineering and manufacturing to follow from 2022/23.

We have grouped T levels and vocational qualifications together in this publication, as the intention by the government is for T levels to gradually replace the latter. However, because they are still very much in their infancy, there is little information available about T levels. That which we draw on, is still ‘provisional’, as the Department for Education (DfE) has not finalised data collection from T level providers. Tables 3.1 to 3.5 in the accompanying excel resource explore various aspects of enrolments and achievements for T levels and vocational qualifications, which are summarised below.

Enrolments

In 2021/22 there were 5,450 enrolments on T levels, up from 1,300 in their first year (2020/21). The health and science T level, despite being in its first year in 2021/22 saw the greatest intake, with 1,600 participants. The construction T level more than quadrupled its intake from 250 in 2020/21 to 1,150 in 2021/22. Construction made up 21.1% of the total T level cohort in 2021/22, with 45 providers offering that year.

Figure 1: T level enrolments by subject, 2020/21 to 2021/22, UK



Source: DfE, 'T Level Action plan 2021', 2022.¹

¹ The T level Transition Programme provides a route onto T levels for students who would benefit from additional study

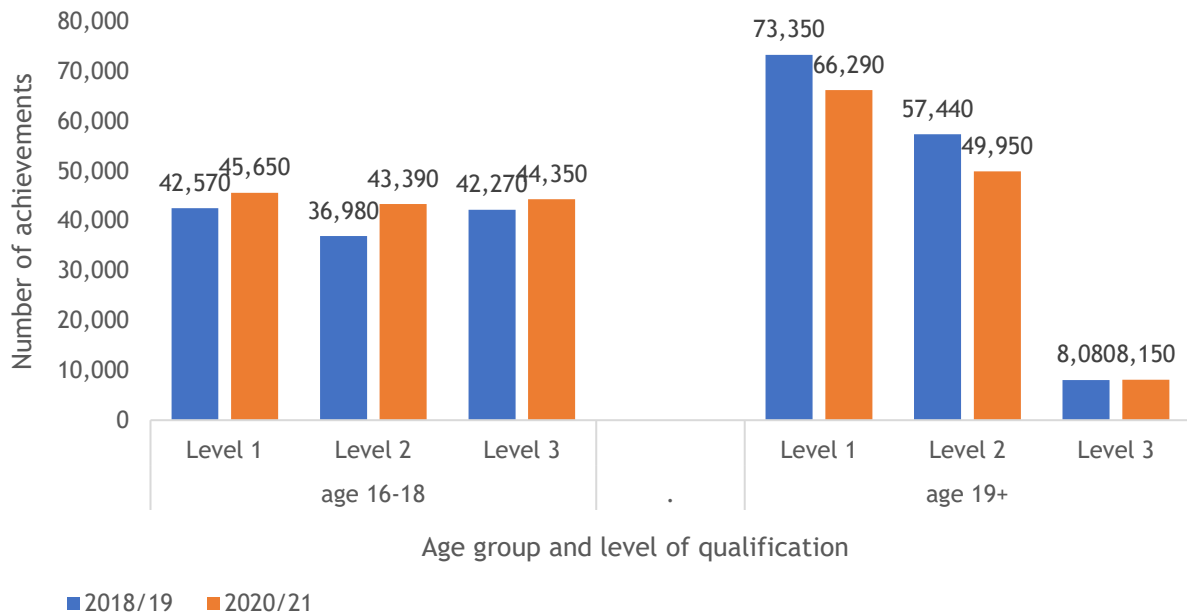
Regarding other vocational qualifications, such as NVQs or BTECs, it is necessary to split different age groups and qualification types, due to the way the data is collected.

- There were 33,852 entries in engineering-related vocational qualifications by students aged 16 to 18 in 2021.² This represented an increase of 8% from 2018/19, but a 10% decrease from 2019/20. Across all sector subject areas, there was a 21% increase across the two-year period. Engineering-related qualifications made up 31% of all entries in 2020/21.
- For adults (aged 19+), there were a total of 182,130 enrolments in engineering-related vocational qualifications in the 2020/21 academic year. This represented a 23% increase on 2019/20, but a 14% decrease from 2018/19, and a 22% decrease since 2016/17. This was comparable to the trend across all sector subject areas, with a 20% decrease overall in enrolments in further education.
- The number of enrolments to engineering-related qualifications differed by level, with the largest decreases coming from entry and level 1 qualifications (26% decrease since 2016/17), and level 4 and 5 qualifications (37% decrease since 2016/17).

Achievements

We do not see the same level of decline when looking at vocational achievements,³ especially looking at 16 to 18-year-olds. Because those qualifying in 2020/21 would have been likely to start their courses in previous years, numbers were not as heavily affected by the pandemic.

Figure 2: Number of achievements in engineering-related vocational qualifications, by age group and year, 2018/19 and 2020/21, UK



Source: DfE, 'Further education and skills 2021/22 - achievement rates ET detailed series', 2022⁴

time and preparation ahead of starting their T level. www.gov.uk/government/publications/t-level-transition-programme-framework-for-delivery-2022-to-2023

² Qualifications referred to here are those that count in DfE's 16-18 performance tables for educational institutions. These qualifications are the vocational equivalent of A levels, and allow students to apply for university or other higher-level vocational courses. For more information, see: www.ucas.com/file/142366/download?token=R2fL4jzO

³ Achievements here means anyone who has both completed and passed their vocational qualification.

⁴ Level 4+ numbers excluded from chart due to very low levels.

- Overall, there were 262,470 achievements in engineering-related vocational qualifications in 2020/21. This represented an increase of 21.3% from 2019/20 - most likely because many students were not able to complete their qualifications in the summer of 2020 - and a 0.7% increase on 2018/19 figures.
- Across all engineering-related sector subject areas, 85.1% of participants successfully completed their qualification. This compares to 84.8% across all sector subject areas.

Gender

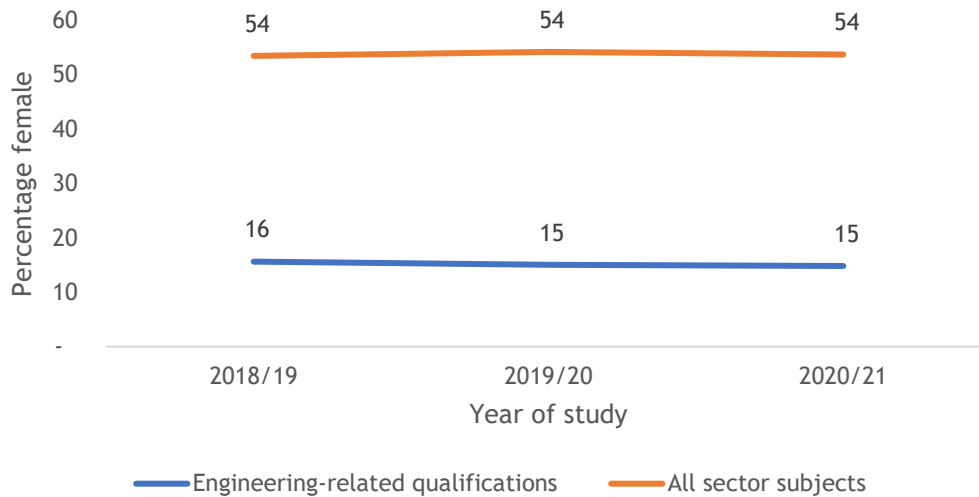
Gender is an important aspect when it comes to pathways into engineering. Our recent report on women in engineering showed that just 16.5% of the engineering workforce were women in 2021⁵. In order to meet the need for the number of engineers in the future, the workforce needs to diversify and attracting more women into engineering would contribute to this. Therefore, it's important to monitor how many women are taking the relevant qualifications to enable them to follow routes into a future career in engineering.

For engineering-related vocational qualifications, men continued to make up the overwhelming majority of entries (16 to 18-year-olds) and achievements (all ages). There was, however, a large difference between the different sector subject areas.

- For 16 to 18-year-olds, women comprised 14.8% of engineering-related entries - a decrease of 0.9 percentage points (%p) since 2018/19. There is variation by sector subject area, however, with just 9.5% of engineering and manufacturing entries by women, and 17.7% of ICT entries.
- The proportion of 16 to 18-year-old women entering 'construction, planning and the build environment' vocational qualifications in 2020/21 was 10.2% - representing a 4.5%p increase since 2018/19.
- In 2020/21, women comprised 21.0% of all engineering-related vocational qualification achievements - a decrease of 0.4%p since 2018/19.
- 42.8% of ICT achievements were by women in 2020/21. This compared to just 4.9% of 'construction' achievements, and 13.7% of 'engineering and manufacturing' achievements
- As seen in secondary education, we see higher attainment rates in women, with 87.4% achieving their engineering-related qualification in 2020/21, compared to 84.4% of men.

⁵ Trends in the engineering workforce between 2010 and 2021, EngineeringUK 2022

Figure 3: Trend in percentage of entries to 16 to 18 vocational qualification courses that were female, 2018/19 to 2020/21, UK



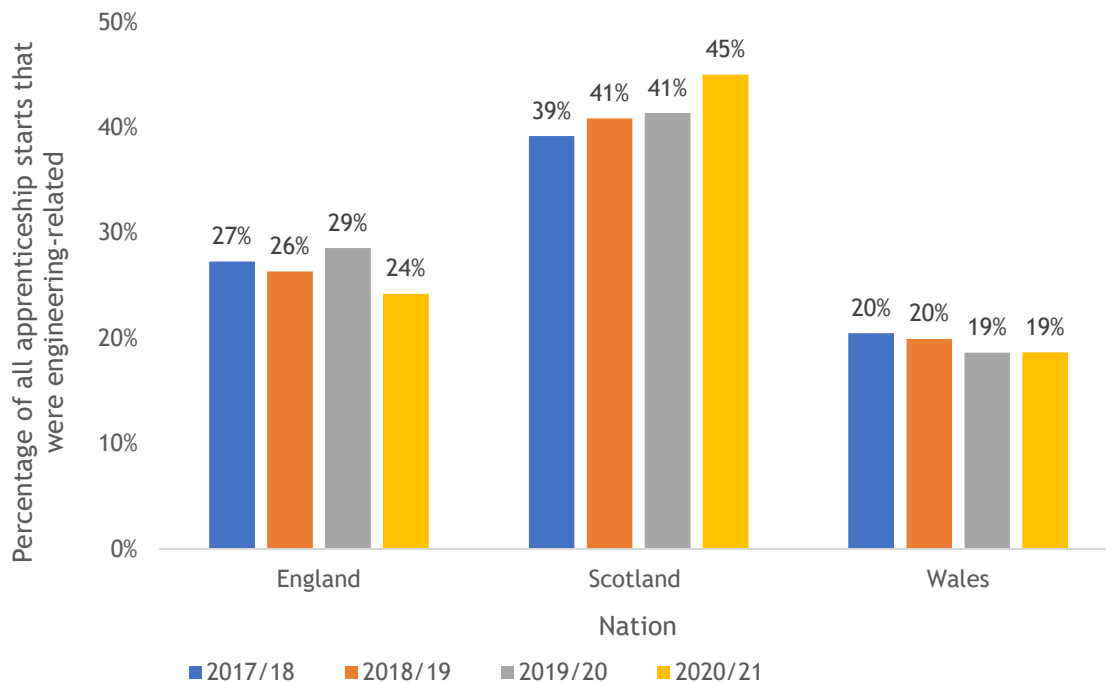
Source: DfE, 'Further education and skills 2021/22 - achievement rates ET detailed series', 2022

Apprenticeships

Apprenticeships are an important route into engineering careers, but reforms in recent years have impacted the numbers of apprenticeship starts. In this section, we refer to 'engineering-related apprenticeships', which are apprenticeships in the 'construction, planning and built environment', 'engineering and manufacturing technologies', and 'information, communication and technology' (ICT) sector subject areas.

If we compare engineering-related apprenticeships as a percentage of all apprenticeship starts in England, Scotland and Wales (Figure 4), we see that Scotland has the highest percentage of engineering-related starts, and that engineering has increased its share of all apprenticeships from 39% in 2017/18 to 45% in 2020/21. This compared to just one in five (20%) apprenticeship starts being engineering-related in Wales, and close to a quarter (24%) of all apprenticeship starts in England. Further detail for each nation can be found in the section below and in the excel resource. Note, however, that there are some differences between UK nations.

Figure 4: Percentage of all apprenticeship starts that were in engineering-related sectors, by GB nation, 2017/18 and 2020/21



Source: England - DfE, 'Apprenticeships subject and levels - learner demographics 2021/22', 2022.
 Scotland - Skills Development Scotland, 'Modern apprenticeship statistics Q4 2021/22' 2022. Note that figures for 2021/22 are available but have not been included here for comparison purposes.
 Wales - Stats Wales. 'Learning programmes for foundation apprenticeships, apprenticeships and higher apprenticeships 2014/15 to 2020/21' data, 2022.⁶

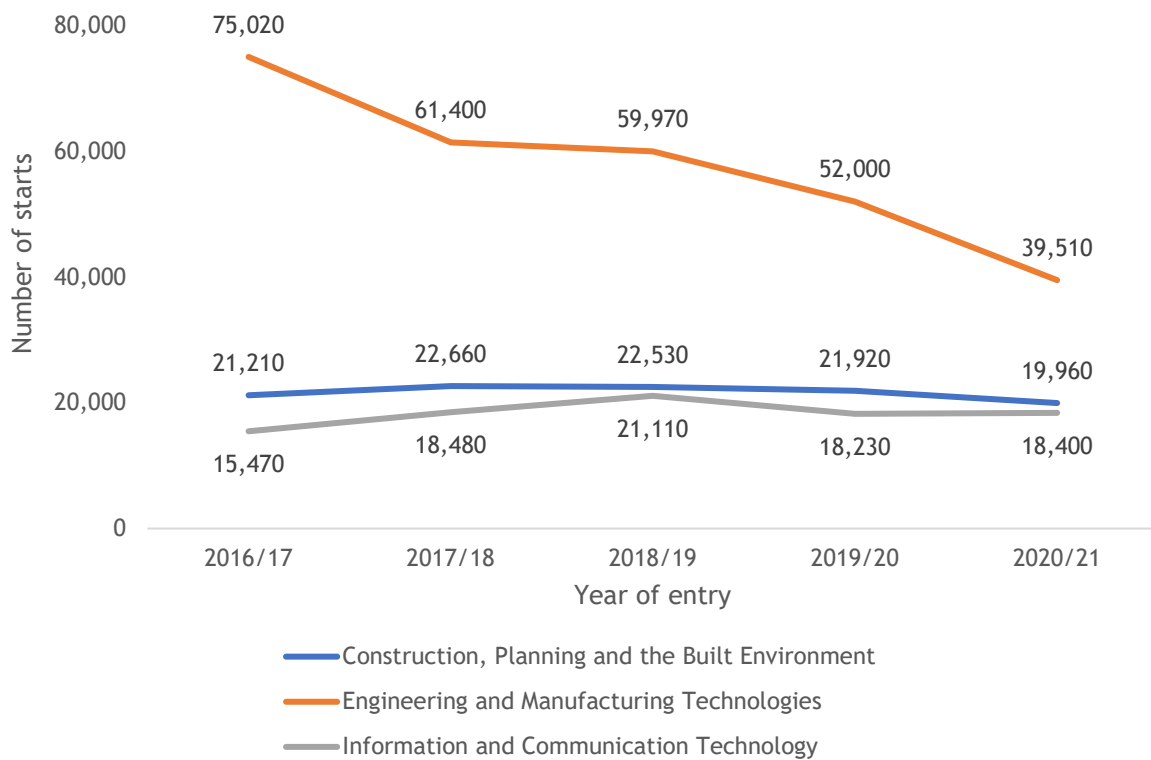
Overall, the number of apprenticeship starts decreased from 2018/19 in each nation - across all sector subjects areas and in engineering-related subjects. Scottish data shows this picking up again in 2021/22, but it is too early to tell if this is the case for England and Wales.

- There were 77,870 starts in engineering-related apprenticeships in 2020/21, which represented a 15.5% decrease since 2019/20, a 24.8% decrease since 2018/19, and a 30.3% decrease since 2016/17. However, most of this decrease came from lower-level apprenticeships,⁷ with a 61.1% decrease in 'intermediate' apprenticeships between 2016/17 and 2020/21. The number of higher-level engineering-related apprenticeship starts increased by 22.5% since 2018/19, from 5,110 to 6,260.
- Figure 5 shows the difference in apprenticeship starts between 2016/17 and 2020/21 in England. There was an overall decrease of 35% in starts across all sector subject areas, and a decline in all engineering-related apprenticeships of 30.3%. 'Engineering and manufacturing' saw the biggest decrease (47.3%), 'construction' the smallest decrease (5.9%) and 'ICT' an increase of 18.9%.

⁶ Northern Ireland data not shown due to differences in data.

⁷ Details on the levels for apprenticeships can be found here: www.gov.uk/become-apprentice

Figure 5: Trend in the number of engineering-related apprenticeship starts by sector, 2016/17 to 2020/21, England



Source: DfE, 'Apprenticeships subject and levels - learner demographics 2021/22', 2022.

In Scotland, total numbers of apprenticeship starts in all occupational groupings have decreased slightly compared to before the pandemic, but 2021/22 figures were higher than 2020/21.

- Across all occupational groupings, there was a decrease of 6.4% in the number of apprenticeship starts between 2017/18 and 2021/22. Defying the trend, engineering-related apprenticeship starts saw an increase of 10.2% over the same period.
- Engineering-related occupational groupings made up nearly half of all apprenticeship starts in Scotland (46.2%) in 2021/22. The proportion of apprenticeship starts being in engineering-related occupational groupings has steadily increased, from 39.2% in 2017/18.
- In 2021/22, engineering-related apprenticeships saw a 72.7% success rate: 7,643 out of a total of 10,518 leavers.

In Wales, there has been a similar decline in the total number of apprenticeship starts since before the pandemic.

- In 2020/21, there were 4,170 engineering-related apprenticeship starts in Wales. This represented a 5.7% decrease from 2019/20, and a 19.4% decrease from 2018/19.
- The largest decrease in numbers was seen in engineering with a 23.6% decrease since 2018/19, compared to a 12.7% decrease in construction.

- In contrast to England, there was a larger reduction in higher level apprenticeships than lower-level apprenticeships in Wales. While the number of engineering-related foundation apprenticeships increased by 5.6% in 2020/21 compared to 2019/20, the number of higher apprenticeships decreased by 21.9%.

In Northern Ireland 'participation on apprenticeships' is measured, rather than starts and achievements as in the rest of the UK, so the impact of the pandemic may not be reflected as much due to the delay.

- Engineering-related apprenticeship frameworks comprised 69.8% of all frameworks in Northern Ireland in 2021.
- There were 7,102 apprentices participating on engineering-related apprenticeships in Northern Ireland in 2021. This represented an increase of 31.2% compared to numbers in 2019.
- The most popular engineering-related apprenticeship in 2021 in Northern Ireland was 'electrotechnical', with 1,796 starts in 2021.

Gender

We see low female representation in STEM subjects and particularly engineering throughout the entire educational pipeline, however, apprenticeships attract even lower female participation than other stages and routes - GCSEs/National 5s and A levels/Highers in secondary school (see chapter 2) and higher education such as degrees (see chapter 4).

Across all the UK nations, women made up a very low proportion of apprenticeship starters and achievers, although broadly the female share has increased over the past few years - reflecting the increase in female share of engineering employment.

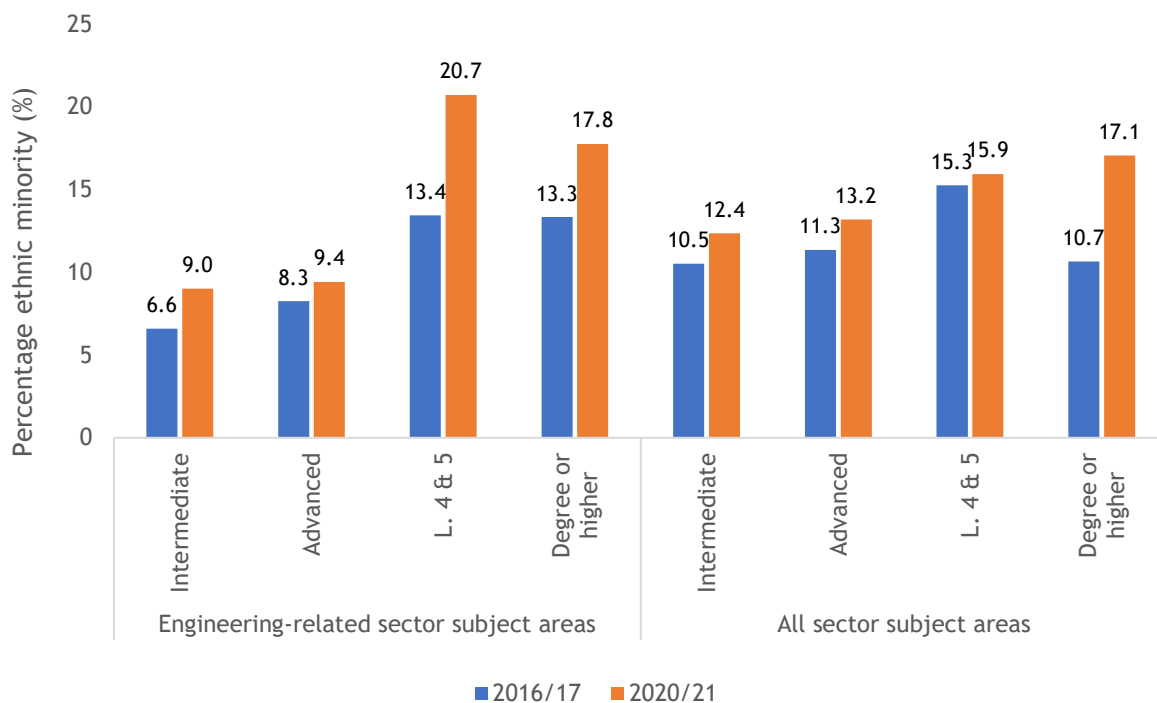
- In England in 2020/21, women made up 14.5% of engineering-related apprenticeship starts in 2020/21, up from 8.1% in 2016/17. There was variation between subjects in the percentage of women starting apprenticeships, ranging from 7.5% in 'construction' to 30.8% in 'ICT', with 'engineering and manufacturing' on the lower end of the scale at 10.6%.
- In Scotland, between 2017/18 and 2021/22, the share of women starting engineering-related apprenticeships increased from 8.8% to 11.3%. Much like England, the higher percentages of women were seen in 'IT and other services' at 37.8% of all starts in 2021/22, whereas in 'construction and related', women comprised just 2.7%. The proportion for engineering was 6.2%.
- There were 285 engineering-related apprenticeship starts by women in Wales in 2020/21 - 7.4% of the total, representing an increase of 3.4% compared to the female share in 2014/15.
- In Northern Ireland, however, there has not been an increase in female share in the years of data available (2019-2021). In 2021 women comprised 6.5% of all engineering-related apprenticeships participants, compared to 6.8% in 2019.
- In England, women made up a larger proportion of higher-level apprenticeship starts, compared to lower-level apprenticeships. For Level 4 and 5 engineering-related apprenticeships, women comprised 29.5% of starts, and for degree apprenticeships they made up 24.8%. This compared to 7.8% and 13.1% of intermediate and advanced apprenticeships respectively.

Ethnicity

People from minority ethnic backgrounds remain underrepresented in the engineering workforce at 11.4% compared with 13.4% in the entire workforce⁸. It is important that all routes into engineering attract and engage with a diverse range of individuals to ensure that the future workforce continues to diversify and meet the UK's future engineering needs.

Data for ethnicity combined with sector subject area is only available for England. The proportion of starters and participants from ethnic minority backgrounds in engineering-related apprenticeships⁹ is lower than the average across all sector subject areas.

Figure 6: Percentage of all apprenticeship starts from ethnic minority backgrounds, by level, England 2017/18 and 2020/21



Source: DfE, 'Apprenticeships subject and levels - learner demographics 2021/22', 2022.

- In 2020/21, students from ethnic minority backgrounds made up 11.4% of all engineering-related apprenticeship starts across all levels. This compared to 14.0% across all sector subject areas, but a 3.9%p increase since 2016/17.
- Higher numbers of ethnic minority students were also seen in higher level apprenticeships. Level 4/5 engineering-related apprenticeship starts consisted of 20.7% minority ethnic students, and degree level consisted of 17.8%. This compares to 9.0% and 9.4% for intermediate and advanced apprenticeships respectively.
- Students from an ethnic minority background were more likely to be represented in 'ICT', compared to 'construction' or 'engineering'. In ICT, 21.4% of all starts in 2020/21 were by students from ethnic minority backgrounds, compared to just 6.0% and 9.5% in construction and engineering respectively.

⁸ Trends in the engineering workforce between 2010 and 2021, EngineeringUK 2022

⁹ EngineeringUK is aware of the vast limitations of using 'ethnic minority' as one homogenous grouping. DfE have revised their publication so that detailed ethnicity combined with sector subject area is no longer available for apprenticeship starts so we are restricted to this measure.

Region and deprivation

The government's levelling up agenda has highlighted the disparity between regions and the need to minimise differences between access to education and jobs across the UK both in terms of region and deprivation.

Engineering-related apprenticeships were not distributed equally across the different regions of England. However, the regional distribution was mostly similar to that observed for all sector subject areas, with a few differences.

- The region with the highest share of engineering-related apprenticeship starts in 2020/21 was the South East (excluding London), with 15.7% of starts. This was followed by the North West, with 14.7% of all starts. This geographical spread was consistent across all sector subject areas, with 15.2% of all apprenticeship starts in the South East, and 14.3% in the North West.
- The share of engineering-related apprenticeship starts in the South East has increased since 2016/17, from 13.3% to 15.7%, whereas the share in the North East has declined from 7.8% to 6.0%

Data combining deprivation and sector subject area is only available in England. We look at the most deprived quintile, which means that if apprenticeship starts were distributed equally across each IMD quintile¹⁰ and level of study, we would expect to see 20% of starts by those in the most deprived areas. However, we saw that students from the most disadvantaged backgrounds were underrepresented in engineering-related sector subject areas in 2020/21.

- Overall, 17.3% of apprenticeship starts in engineering-related areas in 2020/21 came from students classed as most deprived, which is a decrease from 21.2% in 2016/17. This compares to 19.8% of apprentices across all sector subject areas in 2020/21, which is also down from 25.8% in 2016/17.
- Students classed as the most deprived are more likely to enrol in lower-level apprenticeships, both within engineering and across all sector subject areas. In 2020/21, 22.7% of intermediate engineering-related apprenticeship starts were by the most deprived students, compared to just 13.5% of level 4/5 starts, and only 12.1% of degree or higher-level starts.
- The most deprived students made up 19.4% of construction apprenticeships, compared to 17.5% in engineering, and 14.7% in ICT.

Further information

For further information about the FE and apprenticeship landscape in relation to engineering, please see Chapter 3 of the 'Educational pathways into engineering' report (2020) on the EngineeringUK website.

¹⁰ The Index of Multiple Deprivation (IMD) is a measure of relative deprivation for small geographic areas of the UK. It classifies areas into five quintiles based on relative disadvantage, with 1 being the most deprived, and 5 being the least.