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# WHO WILL BE THE ENGINEERS OF THE FUTURE?

FOR MANY YEARS, **ENGINEERINGUK** HAS PUBLISHED DATA AND ANALYSIS OF EDUCATIONAL ROUTES INTO ENGINEERING. ITS RECENT BRIEFING FOCUSES ON THE UPTAKE OF STEM SUBJECTS IN SECONDARY SCHOOLS AND COLLEGES. SENIOR RESEARCH ANALYST **MARIE HORTON** EXPLAINS WHAT THESE DATA CAN TELL US ABOUT THE FUTURE OF ENGINEERING

## WHAT IS THE PURPOSE OF THESE DATA AND ANALYSES AND WHO ARE THEY FOR?

Previously, *The State of Engineering* report was hundreds of pages long and included a detailed spreadsheet showing all the data. We understand that the way people consume this kind of information has changed and that publishing the data online is the best way to communicate these findings. We wanted to make it more user-friendly and timelier, so will be publishing a series of briefings analysing the data as they become available.

In our latest briefing, we are looking at secondary education (GCSEs and A-levels for England, Wales and Northern Ireland, and National 5s, Highers and Advanced Highers for Scotland). The data show trends in entries and pass rates and are designed for a range of audiences including educators, employers, the media and policymakers.

## WHAT ARE THE DATA AND ANALYSES TELLING US?

Firstly, there are some positives for STEM subjects. Entries into GCSE single science subjects continue to rise, and maths, biology, chemistry and physics remain within the top 10 most popular A-level subjects to study, with maths being the most taken A-level subject.

However, there are far fewer girls than boys taking GCSE subjects like computing (20.7% female) and design and technology (29.2% female), and girls remain in the minority of entrants across all A-level STEM

subjects, except for biology and chemistry. At A-level, there are very low numbers of girls studying some subjects such as computing, where less than 15% of the students are girls.

The number of teachers of STEM subjects in state schools in England has decreased by nearly 5% since the start of the COVID-19 pandemic. The highest teacher vacancy rates are seen in Information Technology, with 1.7 vacancies for every 100 filled roles compared to 1.1 for all subjects.

## WHY IS SECONDARY EDUCATION AN IMPORTANT PIPELINE INTO ENGINEERING CAREERS?

Secondary school is a really important stage of education for future careers – if young people don't study and achieve good results in the right subjects at this stage, their subject choices going forward will be more limited and they may be less likely to consider a role in engineering.

## WHICH STEM SUBJECTS FACILITATE A CAREER IN ENGINEERING?

There is a range of engineering careers that have different requirements but, in general, the major STEM subjects include biology, chemistry, physics, as well as maths, computer science, and design and technology. Most schools in the UK don't offer engineering as a subject at GCSE, so it's important that employers consider a range of relevant subjects.

## WHY IS THERE A PERSISTENT UNDER-REPRESENTATION OF GIRLS IN KEY STEM SUBJECTS?

This is something we don't fully understand yet. Girls' pass rates are better than, or similar to, that of boys in all the STEM subjects at GCSE and A-level. This is, of course, not unique to STEM, so in order to increase female representation, it's important that careers in STEM and engineering become more attractive to girls.

## WHAT CAN WE DO TO MAKE STEM CAREERS MORE ATTRACTIVE TO GIRLS?

Employers in STEM, and engineering in particular, need to work together to publicise the range of careers available within the sector and the range of skills that can be applied in these roles.

There are inspiring women doing important and exciting things in STEM jobs. Employers need to be showcasing female role models so that girls can see themselves in a STEM or engineering career and study the required subjects to do so. Campaigns like **Tomorrow's Engineers Week** (November), International Women in Engineering Day (June) and International Day of Women and Girls in Science (Feb) are great opportunities to do this, but this can happen all year round across a range of platforms. Neon has a wide range of case studies, which you can filter by sector or route into the industry (see next page), and This is Engineering ([www.thisisengineering.org.uk](http://www.thisisengineering.org.uk)) features engineers in surprising roles.

## HOW CAN WE ATTRACT MORE TEACHERS OF STEM SUBJECTS?

There are various initiatives in place to attract teachers of STEM subjects, such as bursaries. These are working for some subjects – for example, biology has exceeded targets for recruitment – but not for others. Some of these financial incentives have been increased for the next academic year with the hope that this will attract more teachers into schools.



## WHY DO WE NEED ENGINEERS?

Engineering is a very diverse field that touches our lives daily. Far from what many perceive it to be (the hard hat stereotype), engineering plays a pivotal role in driving forward products: for example, faster broadband and new digital technologies. It also plays an increasingly significant role in providing solutions to global issues such as climate change and achieving net zero. The skills needed for engineering are evolving as the needs for products and solutions change, and there is significant demand for more engineers in the future, making it an exciting career prospect.

## WHAT RESOURCES DOES ENGINEERINGUK OFFER TEACHERS AND STUDENTS?

Access to clear, up-to-date and engaging careers information is important to help young people understand the breadth and relevance of a career in modern engineering, as well as navigate the various educational and vocational routes into the sector. It can also help to dispel myths and inspire students who may be thinking that engineering is not for them. One of the ways EngineeringUK does this is through its Neon platform, which helps primary and secondary school teachers introduce their students to future STEM careers, raise their aspirations and explore the excitement of engineering. The platform includes bookable experiences, video case studies and careers resources.

For more than 20 years, EngineeringUK has undertaken comprehensive research into the state of engineering in the UK – providing a detailed examination of engineering's economic contribution and the composition of its workforce, as well as 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:

[www.engineeringuk.com/research](http://www.engineeringuk.com/research)

## MEET MARIE

Senior Research Analyst,  
EngineeringUK



Marie studied mathematics with Spanish at the University of Greenwich in London, UK. She went on to study for an MSc in Applied Statistics at Birkbeck University.

### WHO OR WHAT INSPIRED YOU TO STUDY MATHS?

I always enjoyed maths as a subject at school. I like the fact that it has processes to follow, and you get a clear answer at the end of your calculations, rather than responses being open to interpretation, as in other subjects.

### WHY DID YOU DECIDE TO STUDY SPANISH, TOO?

I studied Spanish at A-level because I knew that I wanted to travel to Central America after finishing my degree. By including a language as part of my degree, it gave some variation to what I was studying but also enabled me to develop some additional skills.

### WHAT WAS YOUR AIM IN STUDYING FOR AN MSc IN APPLIED STATISTICS?

My degree in maths covered a broad range of topics and through this I realised that I wanted statistics to be my speciality. I was lucky enough to be able to study for my master's at Birkbeck University in the evenings whilst also working as an analyst, and once I received my qualification, I was then able to further my career in statistics.

### WHAT DOES YOUR ROLE AS SENIOR RESEARCH ANALYST ENTAIL?

I work mostly with survey data, analysing datasets and producing reports and briefings showing the latest results and trends. At EngineeringUK, we run our own surveys, such as the **Engineering Brand Monitor**, where we ask young people, parents and teachers about their knowledge of, and interest in, engineering as a career. We also use some larger datasets from the Office for National Statistics to look at who is working in engineering, the types of jobs they're working in, and how this is changing over time. As Senior Research Analyst, I'm looking to provide insights for the engineering sector, answering questions and advising policy colleagues on questions such as: are there particular engineering careers that attract women?, how popular are different routes into an engineering career?, how much do people know about what engineers do?

### WHAT DO YOU LOVE MOST ABOUT YOUR JOB?

I enjoy digging into the data and exploring what people are telling us through the survey responses. I also like being able to present





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**LOOK AT ALL THE ROUTES INTO DIFFERENT CAREER PATHS. UNIVERSITY IS NOT THE ONLY WAY TO GET INTO ENGINEERING; THERE ARE MANY VOCATIONAL ROUTES SUCH AS T-LEVELS AND APPRENTICESHIPS THAT WILL ALSO ALLOW YOU TO PROGRESS TO A SUCCESSFUL CAREER.**  
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## NEON RESOURCES

[neonfutures.org.uk](https://neonfutures.org.uk)

**Bookable STEM and engineering experiences** – searchable by postcode, STEM and engineering experiences range from activities that teachers can deliver in the classroom, and take under an hour to do, to whole-day, off-site experiences.

**Engineer case studies** – a growing collection of case studies showcasing the different types of, and routes into, engineering.

**Careers resources** – leaflets, posters, postcards, guides, presentations and quizzes about careers in engineering. Popular resources include ‘Meet the future you’ – a fun online quiz that helps students connect their passions and skills with different careers in engineering. There is a set of four classroom display posters showing how engineers are at the forefront of helping the UK reach its net zero target. There is also a useful PowerPoint presentation – ‘Engineer your future’ – designed for teachers and careers advisers to help students understand more about the opportunities presented by a career in engineering.

These resources are available to download or order in print from Neon free of charge. The resources are developed by EngineeringUK’s Careers Working Group, a collaborative group drawn from across the engineering community, and are created in consultation with teachers and students.

these findings to a variety of audiences so that they can use them as an evidence base to make changes in the way things happen in the workplace. It shows the power that data can have to facilitate improvements and reduce inequalities.

### WHAT ARE YOUR TOP TIPS FOR YOUNG PEOPLE CHOOSING SUBJECTS AT COLLEGE AND/OR UNIVERSITY LEVEL?

Look at all the routes into different career paths. University is not the only way to get into engineering; there are many vocational routes such as T-levels and apprenticeships that will also allow you to progress to a successful career.

If you’re interested in a particular career, make sure you do your research about the requirements for entry, so that you study the correct subjects to allow you to progress.

If you’re not sure what you want to do, study something that you enjoy and that will allow you to have a range of options as you achieve your A-levels and further education qualifications.