EDGE FOUNDATION

Bulletin 16

Skills shortages in the UK economy

May 2025

Skills Shortages in Formula 1 – An Edge special supplement

SEE INSIDE

Key Highlights from the Bulletin

Addressing geographic and demographic inequalities in access to skills and education is a crucial aspect of tackling skills shortages. In Edge's 16th Skills Shortage Bulletin, we investigate the scale of these inequalities and take inspiration from the world of Formula 1 as to how they might be tackled.

Inequalities are ubiquitous. The Learning and Work Institute has identified significant disparities in qualification levels, with the proportion of highly qualified individuals ranging from nearly two-thirds (64%) in London to just 34% in Greater Lincolnshire. Additionally, people in the West Midlands are twice as likely to have no qualifications as those in the West of England. To address this, as the OECD in this bulletin argue in their comparison of the UK and England with the rest of the OECD, is 'to unlock the potential of the labour force, particularly of lower-qualified groups, higher investment and a proactive approach to lifelong learning'.

A key agent in coordinating this investment, as the Lifelong Education Institute and City & Guilds argue, will be Skills England. The decades of policy churn and oscillation between state-led, business-led, and market-led strategies has led to 'an overly complex and fractured system unable to address rising skill shortages and widening skill gaps'. Foresighting projects such as the Innovate UK Catapult Network convenes key stakeholders including providers and employers to identify changing workforce requirements. There are, however, not altogether positive signs that things are moving in the right direction. The withdrawal of the Scottish Flexible Workforce Development Fund has resulted in 39% of previously reliant employers stating they will reduce workforce training, while only 19% plan to increase their own investment, according to Edinburgh College's research into employer attitudes in their region.

In the largest study of its kind, the Careers & Enterprise Company's 'Student career readiness in 2023/24' found positive signs that careers education is having a positive impact, helping young people to align their aspirations with real-world opportunities. By Year 11, young people's interests shift towards labour-market aligned sectors. However, significant barriers remain, including pronounced regional variations in industry interests and persistent disparities in career readiness and confidence, particularly among disadvantaged groups. In their survey of STEM provision, EngineeringUK found that 36% of respondents reported a lack of funding prevented them from offering STEM work experience in schools, while 33% cited insufficient capacity to engage with STEM employers. Both factors undermine young people's career readiness.

How can specific sectors tackle such inequalities while also addressing skills shortages? This bulletin includes a special supplement exploring how motorsport and Formula 1 have launched targeted campaigns and initiatives to achieve these goals. We explore how partners of world champion Lewis Hamilton's charity Mission 44 have sought to address barriers to opportunity amongst disadvantaged groups, and talk to Red Bull Technology Group on their role as a place-based employer in Milton Keynes. Exploring how one prominent sector has addressed these challenges may yield transferable or adaptable insights to support other industries in tackling similar issues.

The world is changing fast and education needs to keep up. Edge is an independent, politically impartial education foundation. We want education to be relevant to the twenty-first century. We gather evidence through research and real world projects and partnerships and use this to lead the debate and influence policy and practice.

Edge believes all young people need to be equipped with the skills that today's global, digital economy demands, through a broad and balanced curriculum, high quality training, engaging real world learning and rich relationships between education and employers.

Visit www.edge.co.uk to find out more.

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Worlds apart: skills and learning inequalities in the UK

Learning and Work Institute

Learning and skills are crucial for life, work and society: helping our economy to grow; living standards to rise; people to be fulfilled; health and wellbeing to improve; and community engagement to increase. The first publication from our Ambition Skills programme, highlighted in edition 15 of this bulletin, showed that the UK compares poorly to other countries, particularly when it comes to low and intermediate skills.

Looking to the future, we projected that the UK's qualification profile is improving overall, but with no real increase in qualifications at an intermediate level; by 2035, one third of working-age adults will still only be qualified at or below GCSE or equivalent level. Building on this work, our recent report, 'Worlds apart' digs deeper into the variation and inequalities between areas within the UK, both now and in the future. It finds that there is a risk of a growing skills divide across the country, with inequalities already higher than many EU countries.

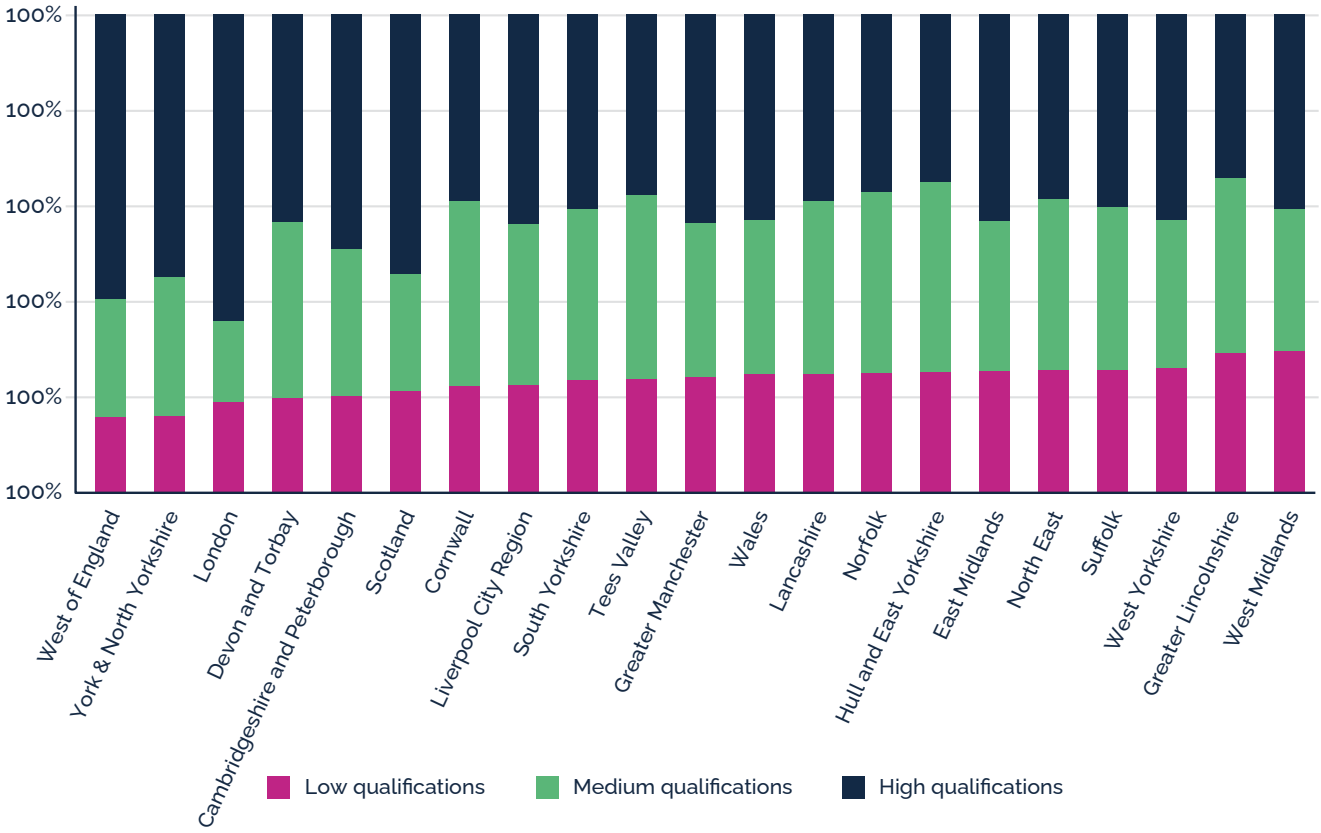
Skills across the UK

There are high levels of variation in skills in the UK. We looked at the proportion of residents in different areas with high (level 4+), medium (levels 2 and 3) and low (below level 2) qualifications (see Figure 1). We found big disparities in how many people are highly qualified, ranging from almost two thirds (64%) of people in London to 34% in Greater Lincolnshire. There are similar disparities for people with low qualifications. People in the West Midlands are twice as likely to have no qualifications than those in the West of England.

Ambition Skills Programme

This work formed part of our Ambition Skills programme, supported by City and Guilds and NOCN. On current trends, the UK risks falling short by 2035: not improving our international skills position when the skills of our people are a core economic asset; not meeting the needs of a changing economy; not fully utilising the skills we have; and not ensuring everyone has sufficient opportunities to learn for life and work. The remainder of the Ambition Skills programme will focus on exploring how we can change this, setting and delivering a higher skills ambition for the UK.

Figure 1: Qualification profile, 25–64-year-olds, 2022



Source: Office for National Statistics

Looking at the qualification split at a more granular level adds to the picture. The proportion of people with level 3 qualifications ranges from 10% in London (in part because of more people having higher education qualifications) to 23% in Tees Valley (where fewer people have higher education qualifications than the UK average and more people have low qualifications). This matters because an increasing proportion of jobs require at least level 3 qualifications and because these qualifications generally bring higher pay, more employment options, and productivity benefits.

International comparisons

The uneven distribution of skills in the UK becomes more concerning when placed in the international context. Qualifications in the UK are more unequally distributed than in many European countries, particularly for low qualifications. In the UK, the average resident in the least qualified area is three times as likely to have low qualifications than in the best qualified areas. In Ireland, Norway and Finland there would be very little difference in that likelihood. For higher qualification levels, things look a bit more positive. The UK is still more unequal in its distribution of high skills than many European countries, but this results from a starker skew toward London and the South East, rather than any parts of the UK having a lower proportion of people with high qualifications by most European standards.

The impact of migration within the UK

The mix of qualifications people have in each part of the UK is made up of the qualifications of local people starting work after finishing education and those who move into the area. However, some areas attract and retain people with high qualifications better than others. Our findings show that a small number of cities, such as Brighton, Bristol, Leeds and London, both retain graduates and attract large numbers of graduates from other parts of the country. Meanwhile some areas, like Cromer and Sheringham, struggle both to retain local graduates and to attract graduates from elsewhere.

It is not just the case that cities do well and smaller towns struggle. Some cities, including Liverpool, Leicester, and Birmingham all have a net loss of graduates. This shows that the kinds of jobs available matter - graduates (in particular) are moving to cities with higher average pay and more opportunities, so these opportunities need to be spread more evenly across the country.

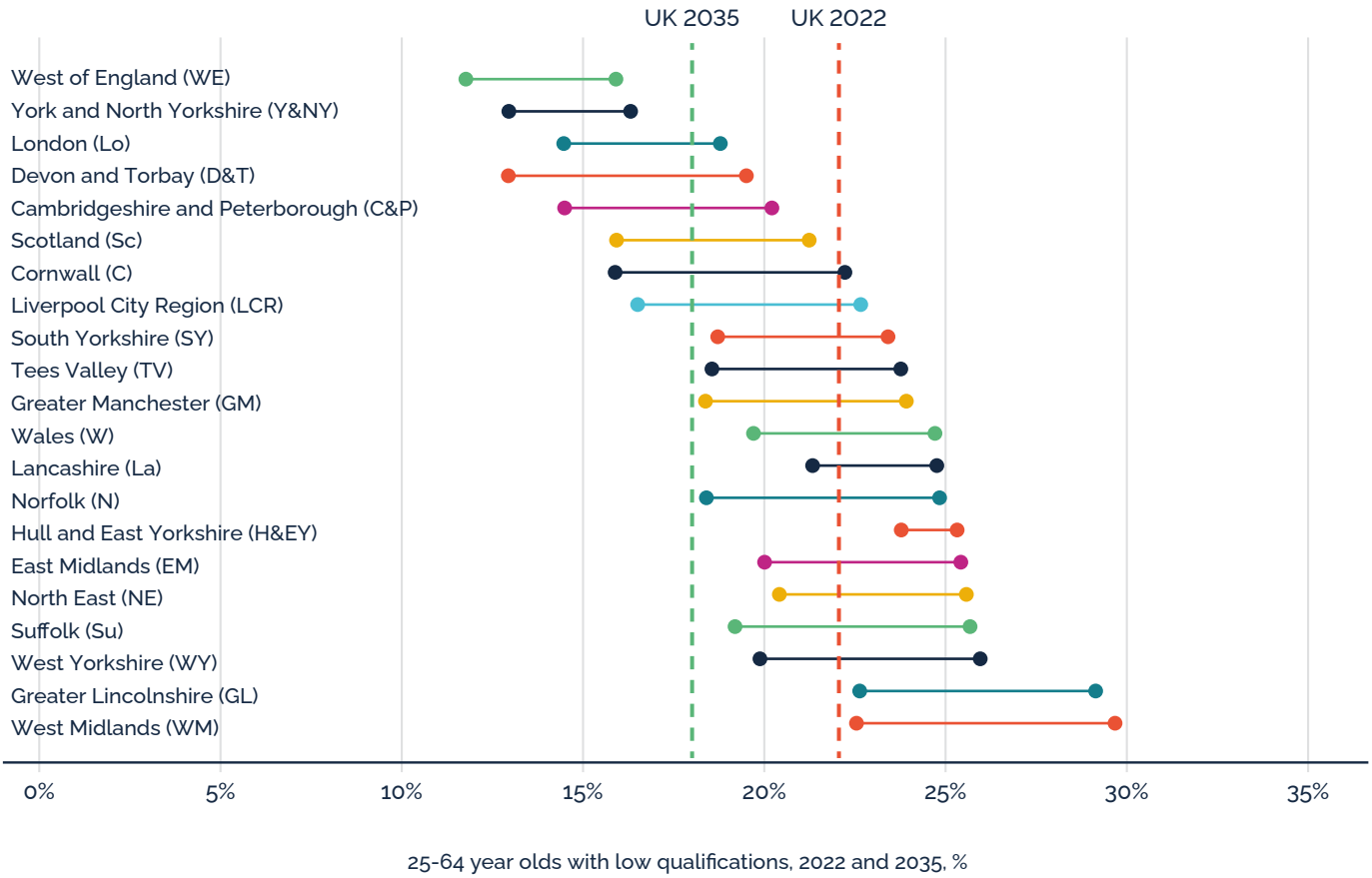
Looking to the future

If current trends continue, we project that the qualifications profile of every part of the UK included in the analysis will improve by 2035. Across the board, people are expected to be better qualified than they are today. This is a product largely of better qualified young people entering the labour force and less qualified older people leaving it, as well as people in the workforce improving their skills. However, existing inequalities in degree level qualifications are set to remain as they are, with some areas of the country having a more skilled population than others.

What is particularly concerning are the projections for those with low or no qualifications. The proportion of people with low qualifications is on track to fall everywhere, but with wide variations remaining. Three regions – the West Midlands, Greater Lincolnshire and Hull and East Yorkshire – would still have a higher proportion of people with low qualifications in 2035 than the UK average in 2022.

Figure 2 shows the projected proportion of people with low skills in different parts of the UK, and how they compare to the UK average. When comparing these projections with other countries, more than half the areas analysed are on track to have a higher proportion of people with low qualifications in 2035 (15% or higher) than countries including Canada, Hungary and Ireland did in 2022.

Figure 2: Proportion of 25–64-year-olds with low qualifications, 2035 projection



Source: Office for National Statistics

The risk is a tale of two countries: highly skilled London and the South East which compares well to leading international comparators; and a higher concentration of lower qualifications elsewhere, with those areas dropping further down the international league tables.

This risks holding back the Government's ambitions to grow the economy and ensure every part of the country has rising prosperity. We need to set a path for a higher ambition for learning and skills, and make sure people in every part of the country can benefit from this.

Our analysis highlights the high levels of variation in skills within the UK and how these are set to remain distinct in years to come. Despite projecting that people are expected to be better qualified in 2035 than they are today, some areas will still have high levels of people with low or no qualifications, and areas that already have many high-skilled residents maintaining their lead. This emphasises the need for central and devolved governments to work together to reduce regional skills inequality. Divides across the country hold us all back and we need a higher ambition and broad-based skills improvements.

Sara Treneman
Researcher at Learning and Work Institute

Lifelong learning in an evolving UK labour market

Magdalena Burtscher, OECD

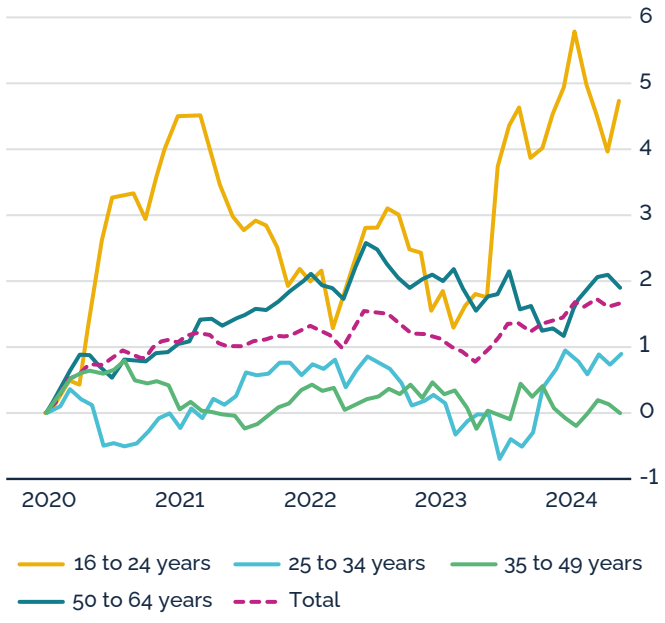
Lifelong learning is essential for individuals, businesses, and policymakers to respond to changing skill needs and high economic inactivity in the UK labour market.

What is going on in the UK labour market?

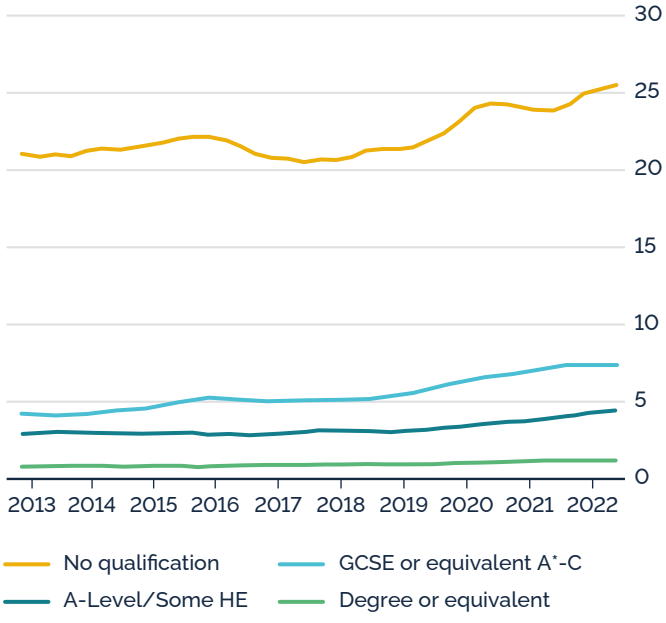
Employment has been rather stable in the UK in the past years, with a high share of people in employment and a low share of people in unemployment. A key indicator that looks less rosy, however, is the share of inactive people. Office for National Statistics (ONS) data shows in the third quarter of 2024, 21.5% - a fifth of the working-age population – were not in paid work and not looking for a job. The UK is an outlier compared to most OECD countries, where inactivity is now typically below its pre-pandemic level. The rise in inactivity in the UK during the pandemic, particularly among young people, is worrisome. While the indicator partially captures increased participation rates in higher education among young people, there is good evidence that cohorts who transition from education to work in times of crisis experience enduring negative consequences on their labour market outcomes even years later.

A recent OECD analysis shows that long-term sickness is a key driver of economic inactivity in the UK, disproportionately affecting young individuals (age 16-24) and those without qualifications.

Inactivity trend by age group, cumulative change (since 2020) in %



Long-term sick inactivity rate in %, by qualification (2013-2022)



Source: OECD (2024), OECD Economic Surveys: United Kingdom 2024, OECD Publishing, Paris

The reasons for high rates of long-term sickness among those with less education may well be linked to poor job quality at the bottom of the income distribution. This and other potential drivers of inactivity should be closely monitored and understood to determine effective policy responses.

Next to inactivity and other employment indicators, we often talk about longer term drivers of labour market change at the OECD that affect almost all advanced economies: the adoption of digital technology, the green transition, and population ageing.

The adoption of digital technology, including AI, is driven by companies that aim to increase their productivity, with SMEs still falling behind in adoption compared to larger firms. On the labour market, digital innovation creates new job opportunities for those with specialist skills, while at the same time leading to a widespread demand for basic digital competences for most workers – a requirement which in the UK (and elsewhere) many cannot fulfil.

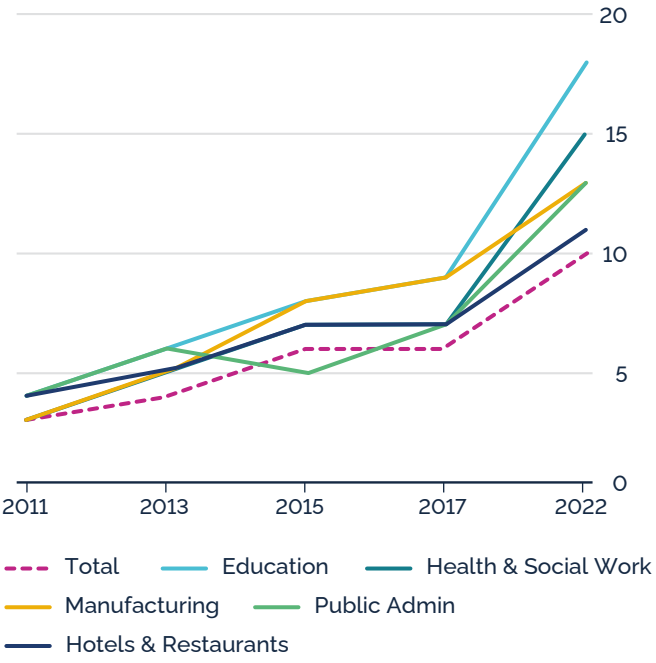
The UK's commitment to reaching net-zero carbon emissions implies changes in skills demand and job transitions away from greenhouse-gas intensive industries towards other sectors of the economy. The good news is that in the UK, according to the 2024 OECD Employment Outlook, only around 4% of jobs in the UK are CO2-intensive, compared to 7% on average in the OECD. This means that only a very small share of individuals could be affected, while more people are set to benefit from job growth in greener, low-emission sectors.

Population ageing likely intensifies existing skills and labour shortages as experienced workers retire. If unaddressed, skills shortages will constrain economic growth, particularly in sectors such as education, or health and social work.

While there is not one solution to the labour market challenges that the UK is facing, one thing is clear: to unlock the potential of the labour force, particularly of lower-qualified groups, higher investment and a proactive approach to lifelong learning is now critical for individuals, businesses, and policy makers alike. Continuous learning opportunities and targeted investments in skills development will help empower the workforce to face new demands and opportunities in a changing labour market. The post 16 education and skills system plays a critical role in providing learning and training opportunities for individuals of all ages wherever they live and work.

Working-age population (aged 15-64) in % pf adult population

Skills shortages in selected sectors, in % of employers



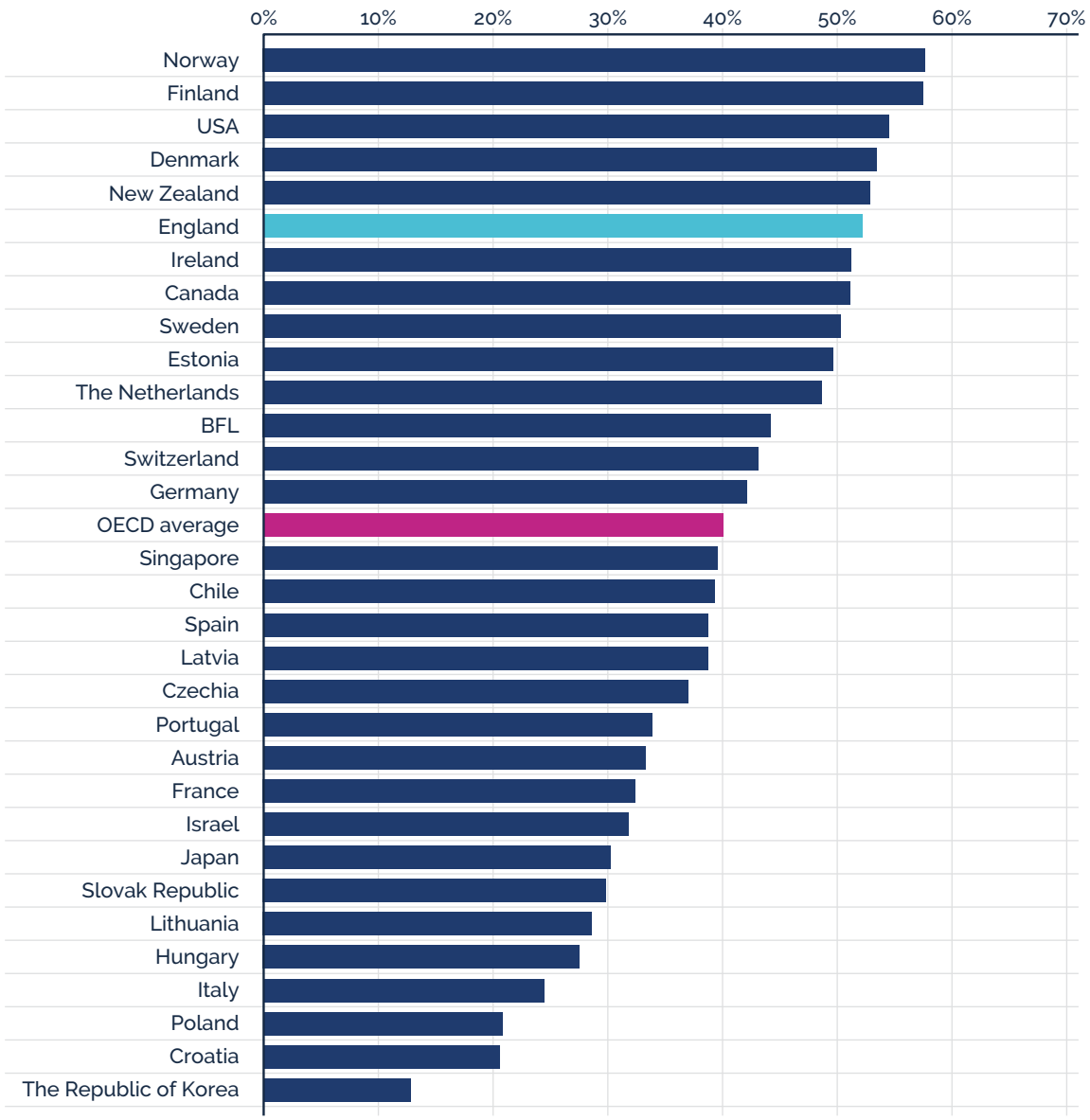
Source: OECD (2024), OECD Economic Surveys: United Kingdom 2024, OECD Publishing, Paris

Adults' skills and lifelong learning in the UK

Novel OECD data from the Programme for the International Assessment of Adult Competencies survey indicates that adults (aged 16-65) in England perform above the OECD average in literacy, numeracy and adaptive problem-solving. Compared to a decade earlier, adults' skills have remained stable, with a small improvement in numeracy. In 2023, more than half of adults in England participated in some type of adult education and training in 2023, compared to 40% in the OECD. While data is unavailable for other UK nations, the picture is relatively encouraging.

The data, however, also confirms a recurring trend of unequal participation in adult learning: the higher the level of education of an individual, the more likely they are to participate in learning and training activities. This phenomenon may well drive a widening of educational and income gaps over time. The most common barriers for adults to participate in training are a lack of time due to family or work, financial constraints, and limited employer support.

Participation in adult education and training, in % of adults aged 25-65



Source: OECD (forthcoming), Trends in Adult Learning: New data from the 2023 Survey of Adult Skills, OECD Publishing, Paris.

Policies for changing skill demand

With inactivity at high levels, changing skills demand in the green and digital transition, and skills shortages that may worsen with an ageing workforce, what should policy makers focus on? Lifelong learning should be a strategic priority for an inclusive and resilient economy.

- Boost training participation of individuals: there are many ways to incentivise skills development, for example, through training leave entitlements, or targeted public funding, especially for those with lower or no qualifications. Many successful funding schemes in OECD countries mobilise co-investment by employers and target priority skills or industries.
- Innovate the delivery of education and training: education and training providers need a flexible and innovative offer in terms of mode (virtual, hybrid), timing (part-time, evening classes), and format (modular, industry-specific) of training to address adults' time constraints. Close cooperation with local employers helps making sure that the training is relevant to them and improves individuals' labour market opportunities.
- Enhance the post 16 skills system: strong partnerships between governments, education providers, and businesses are necessary to ensure that training targets in-demand skills and is accessible. In the UK, a clear strategic direction with an appropriate budgetary backing could fulfil the promise of an effective post 16 skills system.

Changing skills demand, and high inactivity rates mean that lifelong education and training should become a strategic priority. Equipping individuals - particularly those with lower qualifications - with in-demand skills is crucial for the UK's economic future.

Magdalena Burtscher
OECD Directorate for Employment, Labour and Social Affairs

Can Skills England solve the productivity puzzle?

Mark Morrin for Lifelong Education Institute and City & Guilds

In September 2024 the Lifelong Education Institute launched a report with City & Guilds at Labour Party Conference. This focussed on the newly elected governments proposals for Skills England and how this could help address the country's long standing productivity crisis by making the skills system work.

Skills England is still in the early stages of its policy and organisational formation and there is continued speculation and some disagreement about what this new entity should do or whether it is needed. However, it is clear that the purpose of Skills England is to integrate a fragmented system, to correct the current mismatch between the supply and demand for skills, to help drive productive growth in a flatlining economy.

The challenge is not a new one. Arguably no other area of public policy has remained so stubbornly dysfunctional for so long. In 1882, the Royal Commission on Technical Instruction (the Samuelson Report) identified poor technical skills, compared to Germany and the US, as the cause of the nation's ailing competitiveness. One might argue that nothing has changed.

Our current skills system has suffered from decades of policy churn, alternating between state-led (Manpower Services) and quasi business-led approaches (think Training and Enterprise Councils, Local Enterprise Partnerships); between centralised and decentralised forces; and between the shifting priorities of sector-specific and place-based strategies. The result is an overly complex and fractured system unable to address rising skill shortages and widening skill gaps.

Yet, since the mid-2000s, the proportion of young people obtaining higher education qualifications has risen significantly. The UK has seen the highest increase among G7 nations in the percentage of 25-to-34-year-olds with tertiary education. However, this has not translated into productivity gains, partly because a significant proportion of graduates (around one-third) are in non-graduate jobs. The economy has not created enough high-skilled roles to match the rising number of highly qualified workers, leading to a misalignment between education and industry needs.

As university degrees have become more common, vocational and technical education has suffered. The focus on higher education has led to a decline in mid-level qualifications (Level 3 and 4) that are critical for industries such as manufacturing, engineering, and construction. Many skilled trades, such as welding, stonemasonry, and carpentry, now face severe worker shortages, partly due to an aging workforce and declining interest among younger generations.

The situation has worsened since Brexit, particularly in sectors that had relied on workers from the European Union, reducing the available talent pool in industries like healthcare, construction, agriculture, food processing and hospitality. The position has been further exacerbated by skill shortages following the Covid-19 pandemic with many workers leaving the labour market due to long-term illness, mental health challenges, or early retirement. These trends have contributed to gaps in critical sectors such as healthcare, logistics, and IT.

Additionally, skill gaps and shortages have become more unevenly distributed across the UK. As the employer survey for the City & Guilds paper identified, certain regions such as the West Midlands and Wales, report lower confidence in workforce skills compared to London and the South East. These variations are due

to differences in local economic structures, investment in education, and access to training opportunities. Some regions have struggled to develop higher value industries that attract skilled workers, further widening the productivity gap between different parts of the UK.

This is the task facing Skills England. To balance post-16 education across an integrated tertiary education sector and meet the demands of industry. To lessen the need for imported labour. To reduce the disparity in skill levels between regions. To encourage continuous skills development. No mean feat. A key part of this will be the reforms to the apprenticeship levy and the introduction of flexibilities that can both enable greater uptake of apprenticeships, particularly among younger people, and the upskilling of the existing workforce via short course provision that can meet the evolving skill needs of a modern workforce.

If Skills England is to succeed in driving productivity growth through skills development, it must align with the new Industrial Strategy and the requirements of a new economy that is shifting rapidly. This includes changes driven by technological advancements in Artificial Intelligence and automation as well as sustainability initiatives, and the green economy. There will be few sectors untouched by the need for skills transformation.

Prioritising higher-level skills for workers in high growth sectors must also recognise the value of mid-level qualifications in filling industry gaps and building careers through continuous, upskilling and reskilling. While balancing the supply and demand for skills will require a reassessment of qualification volumes at all levels, including non-STEM degrees. It will also require a greater emphasis on cost sharing. Employer investment in training in the UK lags other G7 nations and has dropped by 19% per employee over the past decade. Sharing the burden between the employee, the employer and the state will encourage more adults in work to invest in themselves, via initiatives like the Lifelong Learning Entitlement, when this eventually comes online.

If Skills England can do all this, it might just make a valuable contribution to the Government's mission of achieving the highest sustained growth in the G7.

> We have a once in a generation opportunity to clean the slate of skills policy for good and create a holistic, long-term strategy for uplifting our economy through skills provision that works.
>
> While skills and talent are everywhere across the UK, opportunity is not – this is to the detriment of people's life chances, and to productivity and economic growth across the country. Too many people leave school without the skills and direction they need to enter meaningful work and careers in their region, and then don't have the opportunity to upskill throughout their life. It's mission critical that we put that right, and better match people's skills and potential with opportunity.
>
> **Kirstie Donnelly MBE**
> CEO of City & Guilds, on 'Making Skills Work

Understanding the impact of technology on future workforce skills

Clare Porter, Director for Skills, High Value Manufacturing Catapult

Is it possible to look into the future and understand how the world of work will need to adapt to emerging technology?

Building a future fit workforce that is informed by accurate data and an understanding of the skills industry needs now and in the future, is a global endeavour. To maximise the opportunities coming from innovations and technologies developed in the UK, the workforce needs to have the skills to adopt them and importantly, to use them effectively.

People and skills were key themes for consultation within the industrial strategy green paper and the interim summary analysis conducted by the Department for Business and Trade in March shows that respondents recognise the impact of skills shortages on the productivity and growth of the UK economy. It highlights:

> *Shortages are particularly acute for certain sectors and occupations with skills in emerging technologies. It details the mismatch between education and training outputs and industry needs, with a lack of training provision and difficulties attracting both new talent and career changers.*

But is future skills anticipation an achievable goal given the pace of technology change, and the misalignment of supply and demand which is evidenced through the mismatch of skills within the UK workforce and the increase in skills shortage vacancies?

Workforce Foresighting can provide a solution

The Innovate UK Workforce Foresighting Hub (IUKWF Hub) is moving us closer to achieving that goal, by recognising the need to move away from a focus on current skills need to a future education and skills system that is based on the ability to respond to emerging technologies. It is helping to prepare the workforce to adopt and use the new technologies needed for industrial growth that will support government priorities including net zero, digital and healthy living.

The systemic approach considers what skills will be needed in the 2–5-year period known as Horizon 2. This is because the pace of innovation and the time it takes to create training provision for new technologies, can result in a lag between skills demand signals and new provision. Foresighting further ahead can trigger early demand signals, accelerate the skills provision creation process and enable UK businesses to stay ahead by accessing future fit training at the right time.

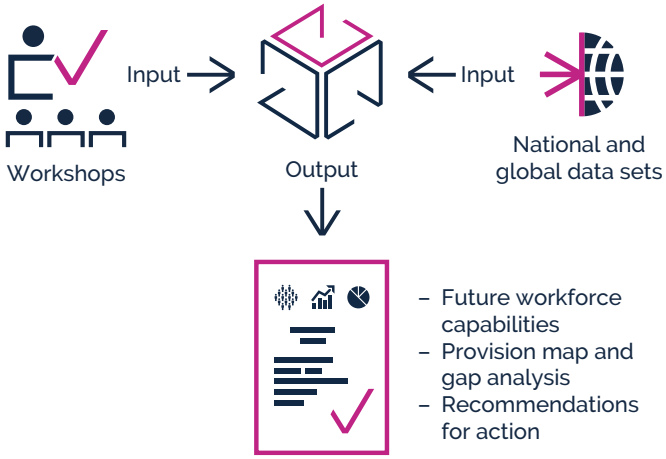
The foresighting approach requires the insights and expertise of different organisations.

The Innovate UK Catapult Network is at the forefront of technology development and supports businesses in transforming great ideas into valuable products and services across priority sectors. The Catapult Network plays the lead role in workforce foresighting by identifying emerging technologies. Catapults contribute to the development of workforce skills within local and regional economies. Owing to their strong connections with industry and government, and through the use of technology roadmapping, they facilitate the identification of emerging technologies that are likely to shape the skills requirements of priority sectors.

The High Value Manufacturing Catapult targets its workforce skills activities across the Skills Value Chain, as set out in the Manufacturing the Future Workforce report. This includes working with others to foresight and articulate skills needs, to curate and create materials and provide modular early-stage training direct to business.

The IUKWF Hub collaborates with the Catapult technologists, with educators (including further and higher education and independent providers) and with industrial partners to facilitate the foresighting cycle process. Through workshops, these experts consider technology impacts on supply chain capabilities, occupational profiles, workforce skills and the changes needed to training provision.

Their insights are combined with open access UK and global data, and AI is used to analyse and generate



outputs on which industry and skills professionals can make decisions. Combined insights have enabled, over 780 Occupational Standards to be analysed in real time when comparing current skills provision to future workforce needs. In addition, over 450 Future Occupational Profiles (FOPs) have been identified with each detailing around 18 responsibilities that include the requirement proficiency level (expert, practitioner, or awareness), and the associated skills, knowledge and behaviours.

There have been 30 foresighting cycles to consider a range of technology impacts including for floating offshore wind, RNA therapeutics and in-orbit satellite applications. Outputs and recommendations, set out in reports published on the IUKWF hub website have led to the integration of workforce foresighting into sector growth plans, local skills improvement plans, as well as collaborations with universities and training partners to develop new degree apprenticeships and short courses.

> This approach comes at the perfect time as we are thinking about how emerging technologies can generate the most growth and good quality jobs for UK offshore wind industry and can be supported by a foresighting process ... there's a huge amount of future potential benefit derived from this ongoing programme.
>
> **Scott Young**
> RenewableUK Foresighting Sponsor, working with the Offshore Wind Renewables Catapult (OREC) on the Supply Chain Capability Requirements for UK Floating Offshore Wind Farms

Get involved

Participation of more stakeholders will build a better understanding of changing workforce skills requirements. Combining foresighting data with that of strategic partners can enable a more accurate picture of workforce skills over different time horizons. The IUKWF Hub is working with the Institute for Apprenticeships and Technical Education through the Skills Compass project to combine Horizon 0 (existing provision) and Horizon 1 (live demand) data with foresighting Horizon 2 data, informing understanding of how skills are changing over the next 5 years.

Foresighting is undoubtedly informing a better understanding of the impacts of technology on future skills and ultimately will enable technology use. It is moving the UK towards better alignment of skills demand and the provision of supply, which is essential for developing the skilled workforce needed for economic growth.

SkillsCompass unites three datasets over three time horizons. It allows us to compare the skills we have now with live demand, as well as the skills valuable for future adoption of technology. Greater participation in workforce foresighting will ultimately lead to better data, better skills training and improved adoption of technology.

Jonathan Mitchell
IfATE Deputy Director for Skills Product Reform with Future Skills & Innovation

Student career readiness in 2023/24

Careers & Enterprise Company

The Careers & Enterprise Company's Student career readiness in 2023/24 report identifies key trends in career aspirations, confidence, and skills development of young people in England as they consider and prepare for their future careers.

The report is based on the largest ever study of its kind: drawing on data from more than 233,000 students who completed the Future Skills Questionnaire (FSQ) across over 1,100 secondary schools. It shows students' career interests evolve significantly over time. Early interests are driven by personal passions such as sport, animal care, and beauty and wellbeing, and shift towards labour-market aligned sectors like healthcare, construction, and digital by Year 11. However, the report also highlights persistent challenges, including declining confidence in key social skills during Years 8 and 9, and lower levels of career readiness among groups facing additional barriers, especially girls who are eligible for Free School Meals. These findings underscore areas where careers education is succeeding, and where targeted, tailored interventions are urgently required.

Career aspirations evolving over time

From the earliest years of secondary education, students start to consider their future career interests. For Year 7 students, these interests are often shaped by personal passions, with sectors like sports and leisure, beauty and wellbeing, and animal care taking precedence. However, as students move through secondary education, their aspirations tend to align more closely with the labour market demands. The Right students right jobs report shows that young people with higher career readiness scores are less inclined toward traditionally gender-biased and oversubscribed industries. This suggests that high-quality careers education can broaden learners' career considerations, ultimately helping to meet local economic needs.

By Year 11, more young people express interest in sectors such as healthcare, construction, and digital, critical sectors linked both to the Government's Industrial Strategy Paper and those identified by Skills England. This shift suggests that careers education is having a positive impact, helping young people to align their aspirations with real-world opportunities. However, the research also shows there is more to do.

Despite this encouraging trend, challenges remain – including marked regional variations in industry interests, persistent disparities in career readiness and confidence (particularly among disadvantaged groups), and gaps in the development of essential work-related skills. Effective careers programmes must reflect labour market trends in order to help students make informed decisions. Schools and colleges should focus on bridging the gap between young people's aspirations and real-world opportunities, ensuring students have clear pathways to fulfilling careers.

Regional variations in industry interests

The student career readiness report highlights notable regional differences in students' career interests, underscoring the influence of local economies and industries. For instance, 20% of Year 11 students in London express an interest in business and finance, compared to just 10% in the South-West. Conversely, construction and trades attract 14% of Year 11 students in Yorkshire and the Humber, significantly higher than in other regions.

Recognising these differences allows for more targeted careers education and employer engagement strategies to align with local opportunities. For example, partnerships with regional employers and industry representatives can provide students with practical insights into growing sectors within their communities.

Disparities in career confidence

Students' confidence and career readiness grows significantly as they progress through secondary education. For instance, while only 49% of Year 7 students feel career ready, this figure rises to 68% by Year 11 and reaches 79% by Year 13. However, this positive trend masks important disparities that demand attention.

Students from disadvantaged backgrounds, particularly girls eligible for Free School Meals (FSM), report lower confidence levels. By the age of 16, girls eligible for FSM are 15%pts less likely to feel confident discussing their skills in an interview compared to non-FSM boys. These findings highlight the need for targeted interventions that provide equitable access to high-quality careers education.

Essential skills development: A key challenge

The development of essential skills – as measured by the Skills Builder Universal Framework – is a cornerstone of preparing young people for the world of work. By the age of 16, many learners feel confident in their abilities to collaborate with others (68%), solve problems (68%), and demonstrate creativity (72%). However, confidence in critical skills such as listening (61%), leadership (62%), and effective communication (68%) dips during Years 8 and 9, with only a partial recovery by the time learners reach Year 11. This trend suggests a critical window in early secondary education when interventions to build these skills could have the greatest impact. A new model of modern work experience that starts early and offers multiple, varied experiences will also focus on building these essential workplace skills.

Implications for careers education

These findings reveal a careers education landscape that is evolving but still fragmented. While students' aspirations are increasingly aligned with labour market needs, critical gaps in skills and confidence, particularly among disadvantaged groups, remain a concern. There are also notable regional disparities in access to high-quality careers education and experiences. Addressing these gaps requires not just incremental improvements, but coordinated, sustained, early intervention. To equip every young person with the confidence and skills they need to thrive in the modern workforce, the report recommends:

- Prioritising tailored and targeted workplace experiences, in line with the equalex modern work experience framework. These should reflect students' varied needs and starting points, with an emphasis on supporting those facing the largest barriers. Employers, working with Careers Hubs, schools and colleges, can create experiences that are scaffolded over time to gradually build students' confidence and essential skills. Learners from disadvantaged backgrounds should be prioritised, ensuring equitable access to opportunities.
- Starting early, targeting the critical Years 8 and 9 period with confidence building programmes. Young people begin to form ideas about their futures during this period. Intervening early with structured careers programmes can help students to develop the foundational skills employers value most.
- Adapting careers guidance to reflect local labour market trends and growth priorities. The data available support understanding of student intentions and target education, sector and employer resources at local, regional and national level to develop the skills system further.
- Driving for the highest standards of careers education. We know the Gatsby Benchmarks drive student outcomes, and those schools that achieve more benchmarks see higher career readiness. Since the report was written Gatsby have published their updated benchmarks which provide a helpful reference point for the careers sector to raise standards and close gaps for those who need it most.

The Careers & Enterprise Company's Student career readiness in 2023/24 report highlights the necessity of tailoring careers education to address disparities in career readiness, especially among disadvantaged students. To ensure all young people are ready for the workforce, educators and employers must prioritise early interventions that strengthen essential skills like leadership, teamwork, and communication. By aligning career guidance with local labour market needs, we can empower students to make informed choices and thrive in their future careers.

Lucie Heseltine
Senior Research and Insights Manager at The Careers & Enterprise Company

Advancing STEM careers provision in England

EngineeringUK

STEM careers education provision in schools and colleges across England face significant challenges, including limited funding, insufficient staff time, as well as more employer engagement. In our recent report, 'Advancing STEM careers provision in England' almost 200 educators and those in career-related roles in schools were interviewed to assess the scale of the challenges they face and present policy recommendations to address them.

Over a third of interviewees (36%) said the lack of funding meant that they were unable to support STEM work experience in their school, while 33% cited a lack of capacity to engage more with STEM employers. Worryingly, the report shows a quarter of Careers Leaders are being allocated less than one day a week to fulfil their roles.

Developing excitement about careers choices and helping young people perceive engineering and technology as a viable and meaningful career pathway, is crucial if we are to fill the critical skills and labour shortages in the sector. Young people who participate in STEM careers activities and work experiences are understandably more likely to be interested in engineering careers.

A recent report by The Careers and Enterprise Company, Student careers readiness in 2023/24

(discussed in the previous article) found that increasing awareness of changing labour market – especially in the context of engineering and technology – strengthens students' approaches to their own transitions and helps with career readiness. Ensuring that careers education is high quality leads to career interests that are better aligned with the labour market. For example: girls with a 100% career readiness score are twice as likely to choose engineering. We need more young people to realise careers in STEM could be for them! This starts by getting more young people excited and enthused by STEM and the earlier that starts, the better.

All schools and colleges are expected to have a designated Careers Leader who has protected time that enables them to carry out their duties effectively. Careers provision in England has evolved significantly over the last few years. Recent data from The Careers & Enterprise Company (CEC) shows that national schools' performance against the Gatsby Benchmarks for good career guidance has more than doubled in the last five years.

Yet, challenges remain.

'Advancing STEM careers provision in England' makes some realistic recommendations, above all, calling on the government to publish a sufficiently funded long-term careers strategy, with a work experience strategy running alongside it to help young people understand the many, diverse, personally fulfilling and rewarding opportunities a STEM career holds.

A broad range of careers exists in engineering and technology, many of which focus on addressing global challenges. It is important to share how both new and existing roles are evolving in response to changes that affect all our lives. These include rapid technological advancements, such as developments in AI, and the growing importance of environmental sustainability in efforts to meet net zero targets. Highlighting the opportunities, skills needed and the people working in science, tech and engineering in our curriculum STEM subjects and beyond, will help young people see how STEM is part of life all around them and can offer them a dynamic, progressive and rewarding career.

Not recognising the vital role of CPD for career leads could be extremely damaging and to not fully fund it, would mean they are not able to advise young people on roles in such a fast-evolving sector. Our report recommends Career Leads, if they aren't already, adopt a whole-school approach to careers provision.

And lastly, a further key recommendation is for career hubs to aim to recruit more local STEM employers and to complete the Employer Standards and get actively involved in programmes such as Equalex and Teacher Encounters.

EngineeringUK has recently launched a new brand, EUK Education, a new go-to place for free primary and secondary STEM education and careers inspiration. Loaded with quality curriculum-linked programmes, lesson plans and resources, accessible funding, engaging activities plus high-quality science, engineering and technology careers inspiration, including motivating role models. The new STEM careers guide for Careers Leaders will feature on EUK Education from the end of April.

We recognise that careers provision in schools and colleges is an important, integral part of the education system. With the demand for skilled workers in the engineering and technology sector on the rise and growing faster than any other, it is vital that careers provision supports young people in making informed career choices.

Engineering and tech has a wide range of careers due to the breadth of industries, and employs 6.3 million people in the UK, accounting for 19% of all jobs. But there is a huge skills and labour shortage, and between now and 2030, engineering and tech jobs are expected to grow more than any other sector. Yet too few young people fully understand what engineers, scientists and technicians do, the fantastic prospects, and above average salaries on offer.

We are excited to share the news of a brand-new free guide for Careers Leaders, launched in April 2025, which aims to support those responsible for careers programmes in schools to enable students from all backgrounds to view engineering and technology as an exciting, meaningful and accessible career option. It will offer practical tips, grounded in the latest research, to help career leads bring to life the dynamic world of STEM.

Rebecca Healy
Career Inspiration Manager at EngineeringUK

From tacit to told: Degree Apprenticeship educators' perspectives on essential teaching skills

Michelle Civile, Fernando Correia, Hilary Duckett, Julie Pepper, Mozi Fani, Stavroula Bibila and Peter Stephenson, University of Exeter

Degree apprenticeships (DA) have grown in enrolment rates due their ability to provide individuals with the ability to work while gaining formal degree qualifications through complementary curriculum. To meet demands, higher educational institutions within the UK have invested in teaching staff to deliver work-based learning curricula.

These staff require specific skills relating to teaching DA students. This research draws from a survey of 13 teaching staff at a Russell Group university, to explore key skills staff considered necessary in DA teaching. Results included linking theoretical knowledge to industry practice, fostering reflective learning, and additional tacit skills among educators related to empathy, flexibility, and community building.

The survey identified a range of effective practices, notably the use of applied industry examples and reflective teaching methods, which engage students by bridging theory and practice. For instance, applied case studies and industry linked assessments were consistently practiced, where teaching staff assessed knowledge application in projects, challenging students to integrate a theoretical lens in their evaluation of organisational challenges. This approach is complemented by widespread use of reflective practices, such as guiding students with questions like "why" or "what next".

Empathy and flexibility were noted as vital skills for DA educators. Faculty members recognised that DA students juggle multiple responsibilities, interpreting examples of disengagement not as a lack of interest but as a reflection of external pressures. This empathic understanding was often accompanied by flexibility,

such as providing pre-reading materials well in advance to accommodate the students' schedules. The teaching staff believed that this willingness to adapt beyond standard institutional policies supported positive student outcomes.

Community building was another skill present. Staff tacitly encouraged group discussion and building safe professionally focused communities, which in turn positively influenced student outcomes. For instance, some staff used groups within the classroom that students then continued throughout the remainder of their programmes as peer-support groups to discuss application of their learning and general challenges faced in the workplace.

What was salient for this project was the abundance of tacit knowledge regarding these areas yet not formalised in training systems (nor would it be easy to). Instead, it develops through experience and intuition. Training programmes related to building staff self-awareness, and the practice of learning from colleague's experiences could be highly valuable. Some staff commented on doing this already. For instance, one lecturer discussed their personal journalling practice of reflecting on their teaching sessions afterwards for professional development. This is one example of tacit knowledge management practices used to hone expertise.

The survey highlighted the skills that teaching staff use in support of positive student outcomes. In addition to linking theoretical knowledge to industry practice and fostering reflective learning, this study brought attention to the tacit knowledge for teaching effectiveness (i.e., empathy, flexibility and community building). This may suggest a need to incorporate tacit knowledge management practices aimed at nurturing self-awareness and peer learning. By prioritising these initiatives, educational institutions can create more effective and responsive learning environments that meet the evolving needs of students.

Our capital, our workforce: a perspective on regional skills shortages in Scotland

Neale Gardiner, Edinburgh College

Earlier this year, Edinburgh College published a research report entitled Our Capital, Our Workforce, which collated and discussed the findings of a study carried out by Edinburgh College researchers into the extent and nature of skills shortages across Edinburgh, East Lothian and Midlothian.

The motivation behind the research was simple: we wanted to get more granular insight into the ongoing skills gaps in our region, a better understanding of how recent policy changes were affecting the ways our employer partners were able to engage with us and, above all, a clearer picture of how the College can do more to support local businesses to tackle recruitment challenges, upskill their staff, and drive productivity growth through innovation.

The survey

We surveyed employers in the region, covering three local authorities: City of Edinburgh, Midlothian, and East Lothian, including to employers the college works with, but the survey was also distributed beyond this via industry bodies. We asked them to reflect on a range of skills-related issues, such as their recruitment (including any hard-to-fill vacancies), the skills needs of their workforce, the types of training and upskilling opportunities they provide for staff, and their engagement with apprenticeship programmes. To develop a more in-depth picture of some of these issues, survey data was supplemented by a small number of semi-structured interviews with selected employers.

Our survey underscored the extent of existing skills gaps and recruitment challenges in our region and, in most cases, aligned closely with findings from existing research into these issues. Of the employers surveyed, 88% reported some of their vacancies were hard to fill due to difficulties finding applicants with the required skills, knowledge and/or experience. Only 35% were confident that their organisation would be able to recruit the right people for the vacancies they need to fill in the year ahead.48% reported that the primary impact of hard-to-fill vacancies was to increase workload for existing staff.

Flexible Workforce Development Fund

From a policy perspective, however, perhaps the most concerning finding related to the impact of the ending of the Flexible Workforce Development Fund (FWDF) on employer plans to provide training for their staff. The FWDF was set up in 2017, using part of Scotland's income share from the UK government's Apprenticeship Levy, to allow Scottish employers to access training (provided primarily by colleges and the Open University) to upskill their workforce. Nationally, 23,486 people (around 1 in every 100 Scottish workers) received training through the fund at its peak in 2021/2022. A 2023 Scottish Government report evaluating the Fund's performance found 'there to be a clear and strong continuing rationale for the Fund' and recommended the establishment of multi-annual funding to support this.

Instead, however, in response to acute budgetary pressure, the Scottish Government decided that the Fund would not be renewed from 24/25 onwards. When asked, in our research, what impact this decision

would have on their plans for on-the-job training, 39% of employers who utilised the fund said they would now do less workforce training, just 19% said they would fund more workforce training themselves, and the remaining 42% said they were still unsure.

Our findings lend credence to the notion of market failure in this area and underline the imperative for some form of government intervention to stimulate a more societally optimal level of employer investment in training. Of course, tackling this market failure, and encouraging employers to invest more in workforce upskilling, is a longstanding challenge. However, it is worth noting that a number of recent policy decisions, such as the changes to employer National Insurance contributions (which effectively raises the cost of employing staff) may arguably make this challenge even more difficult to tackle. Similarly, while it is not a challenge unique to the UK, it is one that has undoubtedly taken on greater importance here in light of our especially troubling recent performance vis-a-vis productivity growth. The findings of our research suggest that, in the Scottish context, the FWDF was a policy intervention that had a positive effect on levels of workforce training, and that reviving or reshaping it, either at a national or a regional level, merits serious consideration.

The future

Such a policy reversal does not appear imminent, however. Instead, while not its sole focus, the nascent reform of post-16 education in Scotland – precipitated by the 2023 Withers Review - may offer an opportunity to take a fresh look at this policy question, and consider it in conjunction with changes to other aspects of the skills system, such as apprenticeship funding and approaches to skills planning. In doing so, that reform process will need to simultaneously address questions on how public investment in skills should be prioritised, how greater employer investment in skills can be leveraged, and how the two can best work in lockstep to address national strategic priorities and achieve maximum economic impact.

For Edinburgh College's part, the research we carried out will help inform how we work going forward whatever policy environment surrounds us - as we look to continue to enhance our role as the region's primary skills provider. In particular, it will help inform ongoing work to develop our curriculum in line with emerging skills needs; expand our engagement with employers (including in emerging areas such as innovation); and grow our already considerable apprenticeship offer.

What comes through strongly from our results is that the last five years have precipitated an even greater pace of change in the nature of work and the future skills needs of our economy. As a college it is incumbent on us to keep pace with these changes. Our vision for the future is shaped by a clear focus on our people, our sense of place, and our combined performance, the three themes that underpin our new strategy. Ensuring that we build on our proud track record in these areas and continue to support employers in our region with a pipeline of highly skilled, work-ready graduates, is a goal that cuts across all of these themes and is central to the College's mission.

Mike Jeffrey
Vice Principal at Edinburgh College

EDGE FOUNDATION

SKILLS SHORTAGES IN FORMULA 1

– An Edge special supplement

INSIDE...

STEMx gets off the starting grid

Oracle Red Bull Racing joins forces with Milton Keynes College to supercharge the talent pipeline in STEM.

Engineering the Future

Owen Carless, Head of Mechanical Simulation at Red Bull Ford Powertrains, explains how he brings F1 expertise to STEMx.

Mission Diversity

Sir Lewis Hamilton's Mission 44 Foundation aims for a more inclusive future for young people. How do Mission 44 partners tackle diversity challenges?

Formula Student: The Ultimate University Challenge

A rigorous test of engineering prowess, teamwork, and business know-how – find out how Formula Student prepares F1's next generation.

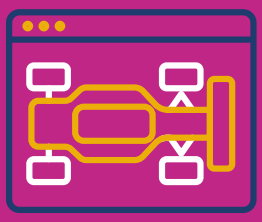
Skills Shortages in Formula 1

Teamwork, creativity, mathematical and engineering genius, with a big dose of competitive spirit - we get under the bonnet of the world of F1. What does it take to bring through the next generation of talent and keep pushing to be the best?

From raising aspirations and levelling the playing field when it comes to gender diversity in STEM careers, to meeting critical skills needs in engineering and design, Edge's Skills Shortages Bulletin F1 special supplement explores the forward-thinking initiatives that are revving things up in motorsport.

61%

of vacancies in mechanical engineering (almost two thirds) are due to skills shortages *(DfE education statistics)*

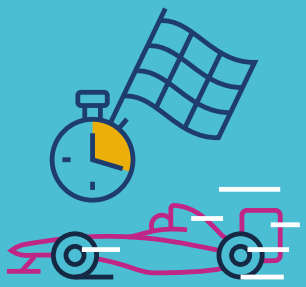


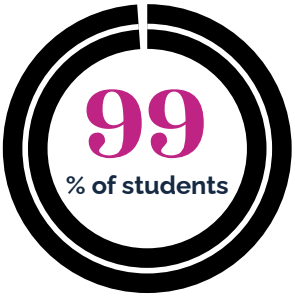
58%

of vacancies in design and development engineering are due to skills shortages *(DfE education statistics)*

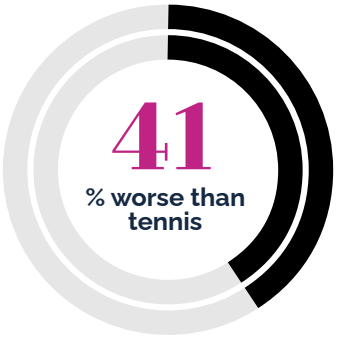
54%

Over half (54%) of vacancies in electrical engineering are due to skills shortages *(DfE education statistics)*





Of every group of school pupils taking part in a trailblazing STEMx programme (a Oracle Red Bull Racing and Milton Keynes College partnership), **close to 100%** reported enjoying and benefiting from the experience *(Milton Keynes Academy)*



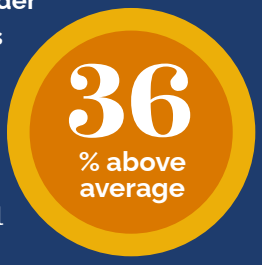
How does motorsport rank against other sports in terms of driving change on EDI? **41% worse than tennis** *(Inside Track: Exploring the gender gap in motorsport (More Than Equal))*

To have a 50/50 gender split on the F1 grid, female participation would need to grow to 84% of the entire global racing population *(Inside Track: Exploring the gender gap in motorsport (More Than Equal))*

84%

Last year, 3,000 university students and 113 teams descended on Silverstone for IMechE's Formula Student competition, with Edith Cowan University, Australia taking first place, scoring 915 points out of a possible 1,000.

The best companies for gender diversity on executive teams were 25% more likely to have above-average profitability than the worst, rising to 36% for those prioritising ethnic and cultural diversity *(Mckinsey & Co)*

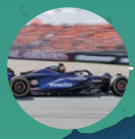


Motorsport Valley

Within the tranquil Oxfordshire and West Midlands countryside, seven of the ten Formula 1 teams have set up headquarters. From McLaren's state-of -the-art wind tunnel in in Woking to Aston Martin's £200m factory near Silverstone, it's just 80 minutes by road (faster in an F1 car). Nicknamed 'Motorsport Valley', the flat airfields and presence of many aerospace engineers in the area after the Second World War made it a prime area for racing teams.

Haas
Banbury

Alpine
Enstone



Williams
Grove

Mercedes
Brackley

Silverstone

Red Bull
Milton Keynes

Aston Martin
Silverstone

McLaren
Woking

STEMx gets off the starting grid

Milton Keynes College has joined forces with six-time F1 World Champions Oracle Red Bull Racing to supercharge the talent pipeline in science, technology, engineering, and mathematics (STEM). Their collaborative initiative, STEMx, is not just an educational programme – it's a long-term strategy designed to inspire young minds, bridge the skills gap, and create direct career pathways into fast-paced, high-performing sectors.

Milton Keynes College, which serves approximately 4,000 students, is ideally located to supply the skilled workforce that powers the seven Formula One teams in Motorsport Valley, the area in the Thames Valley and West Midlands where so much of the sector is based.

CEO and Principal of Milton Keynes College Group, Sally Alexander, spotted an aspiration gap. Whilst some students embraced the idea of a life in the fast lane early into life at the College (like alumnus Greg Auchterlonie – now Head of Brand Design at Red Bull Technology), many arrived with preconceived notions about STEM careers being confined to less lime-lit opportunities. They struggled to see themselves working in bold, shiny motorsport HQs. Sally made the decision to reach out to a Formula 1 team to see if the team and College could work together. She said, "If we want to effect change with young people, we are much more powerful in partnership with employers."

At the same time, Oracle Red Bull Racing were thinking about how to get talent pipelines moving and to diversify its workforce. The team already has an unrivalled reputation for nurturing the next generation of F1 drivers, so It seemed like a natural next step to want to get ahead with their talent off-track to optimise the chance of success.

That sparked conversations about a longer-term approach – getting into schools early, to enhance young people's appreciation of technical skills in digital, mechanics, engineering, media, and E-Sports sounded good. Where better to develop core skills like teamwork, inclusion, communication, problem-solving, resilience and creativity than through the engaging programme now known as STEMx?

Milton Keynes College provided the expertise to map the Key Stage 2 (Primary) and Key Stage 3 (Secondary) curriculum with F1-inspired activities through the STEMx Learning Programme. The experience days cover a range of key subjects in motor racing including the science of speed, maths and strategy in racing, economics, sponsorship, ethics and environmental considerations. The online portal can also be accessed any time, and features personalities like Hannah Schmitz, Oracle Red Bull Racing's Principal Strategy Engineer, on making split-second, data-driven decisions during a race, Team Principal Christian Horner and the drivers.

After getting off the starting line in January 2025, the STEMx team are visiting schools in the area, delivering unique experience days for children aged 9-14, including pit stop challenges, livery design, media training, coding and, of course, racing.

Sangeeta Shergill, Assistant Principal Milton Keynes Academy said, "We wanted to provide our disadvantaged students with firsthand exposure to the career opportunities available, especially with Oracle Red Bull Racing being a local presence. With Year 9 students making crucial option choices, this was an ideal time to guide them toward their future aspirations. The impact has been remarkable. Even students who typically struggle with engagement have been incredibly positive. We've gathered feedback from every group, and almost 100% of them have reported enjoying and benefiting from the experience."

Milton Keynes College and Oracle Red Bull Racing have big plans for STEMx. The goal is to spark aspiration and build skills, with practical pathways through the College to realise those ambitions in the local labour market. As the STEMx team hit the road, the model poses important questions for employers, educators and policymakers: how can we incentivise more of these partnerships?

Engineering the Future: Owen Carless on Red Bull's STEMx Initiative

We sat down with Owen Carless, Head of Mechanical Simulation at Red Bull Ford Powertrains, to talk about how he brings his F1 expertise to Oracle Red Bull Racing and Milton Keynes College's STEMx.

You've said previously that there's no such thing as an average day in your role, but what does a head of Mechanical Simulation actually do?

Good question – I've always been a simulation specialist. We do computer-based modelling and predictions of how components, sub-assemblies or the whole car will perform when it comes to racing. The idea is we can do faster, more intelligent iterations of designs and get a better performant by doing the simulations up front. And it's a subject that continuously evolves. The sort of things we do now didn't even exist as technology when I started doing my job almost 20 years ago. It's quite an exciting place to work in that regard. Our major business focus is the 2026 Project, which Red Bull have been working on feverishly for the last three and a half years. We're developing our own engines and hybrid systems for the racing cars for next year.

You've also said that you had a clear idea you wanted to work in automotive engineering but chose to study Art instead of Design and Technology at GSCE. Do you think that pathway has contributed to success in your current role?

Yes, a little bit. I mean, I wouldn't want to create the impression that I was Banksy or Picasso or something, my art is bang average, but engineering is quite a creative subject. Inherent in what we do is creating new solutions, thinking around problems, coming up with new ways forward. I think it's quite a useful skill to have, something with a bit more panache compared to working a problem from start to end in a uniform, methodical way. Being able to express yourself by drawing and writing things is really powerful.

After studying automotive engineering at university, you worked at Ricardo in engine development. Is that a typical route into F1?

I don't think there's anything like a typical route. I was very keen to work in something that I enjoyed. Fundamentally, I think I like working with people, so working with lots of different types of people and solving problems at Ricardo was good. Now, it's a little more focused. In the time I've worked at Red Bull (since 2008), we've had a big push to take on a lot more placement students. They maybe come back onto the Engineering Academy or as direct hires. We have people come through as apprentices and I guess STEMx is now part of that as well.

What would you say are the essential skills for a career in F1, given the kind of diversity of roles available?

I mean, this is a really hard question because Red Bull have got upwards of a thousand people, if not more, working in one team. And actually, we do almost everything on site. Clearly, there's the usual cliches about teamwork and ability to work in a team but successful employees here tend to be really competitive and you need that sort of drive and determination. One thing I think Red Bull do particularly well is the speed at which the business works. So it's not just the speed of the racing cars, but it's how quickly we iterate our designs. We don't dwell on failures. We accept that if you fire off enough ideas, not all are going to hit the target. You can afford to go off and innovate in different areas, because you're going really quickly, and if it doesn't work out, you can come back quickly as well.

What about the skills needed in the motorsport industry more widely: where do you see the most technical skills deficits currently?

I don't know that there's any one overarching thing where we look at it and go – this is what's holding us back. We always want people who are sharp mathematically.

Maths is the language of engineering, so being able to transform what we're thinking of into mathematics and understand and quantify it is really, really important. That's not to say that you need to be an absolute wizard and come up with brand new ways of solving matrices or whatever, but you need to have a good foundation.

Would you say digital skills are a high priority?

I think more or less essential. Particularly in my area, data handling and how we take in information and process it. Being able to empathise with, okay, I've measured something, is that a realistic number? Does that seem a big number or a small number? How do I then process that in an intelligent way? How do I plot that in a way that makes sense? And perhaps most importantly, I've had an idea, how do I then communicate that? How do I understand the message behind something? How do I share that? There's quite a bit of stuff under the heading of digital skills. That's not saying that everybody is using a computer like it's an extension of their body, but a lot of the detailed engineering is all computer based and driven.

Why did Red Bull Racing decide to work with Milton Keynes College to launch STEMx and what do you hope to gain from the programme?

We want to change the narrative around STEM careers. You referenced the external view of Formula One earlier and the value it brings, because it's an exciting, well publicised, globally renowned sport. You see a team of highly trained mechanics, a couple of drivers and some people on the pit wall. That's the external image, but there's a lot more to the team than that. There's maybe a hundred people track-side. There's ten times that working back in the factory. What we're trying to do is open the door a little bit, show that what happens behind the scenes is, I think, more interesting. This is what goes on. This is what the careers are like. And we've seen some great traction already with Milton Keynes College. And working with an educational provider has helped us understand more about how engineering is presented, digested and understood at schools as well.

We also want to break down some of the perceptions and stigmas. One of the things that has always stuck in my mind is people saying, 'That's not a career for me' or even worse, 'for people like me'. And I think, 'What do you mean by people like you? You're an aspiring engineer, you're a young engineer, you're a school pupil. You can do it! There's no reason not to!' That's one thing that really, really resonated with me. We're trying to break down any ideas of what sort of person works in Formula One. Because actually, anybody can work in Formula One. Okay, it's a competitive environment. You have to work hard. You have to be switched on, but there's nothing that fundamentally stops you.

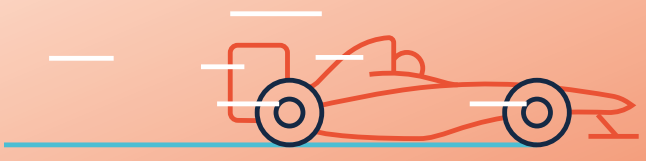
What lessons have you learned as an employer about engaging with schools, colleges and young people that might be useful for businesses looking to do something similar?

To get to this point, the STEMx project has been two or three years from the first conversations to actually having a van with 'Red Bull STEMx' on the side, going to schools, having teachers over the moon, children beside themselves with excitement – that's taken a long period of time. You get out what you put in. Get actual staff in front of people. Don't dumb it down. Make sure that we are representing the company correctly, and we're talking to the right people, and we're saying the right things.

There's a syllabus that schools can follow with different modules and we've helped link that to what happens in Formula One. It's not just engineering and mathematics. There's lots of other things in terms of media and history and marketing and everything else. That's really exciting. I've enjoyed helping the Milton Keynes College team put that together from my side.

And finally, of course, what advice would you give to young people looking to begin a career in F1?

It's really hard to give a generic answer. There's thousands of people working in Grand Prix racing, and they've all got different experience, and they do different things. Fundamentally, some kind of experience in the STEM subjects or engineering is really helpful. It doesn't matter if you don't work in Formula One straight away, the door is never closed. Don't be put off by rejections because you'll get plenty. Researching what the role is about is really helpful. If you're going to apply for a job, understand what a person doing that job does. Be competitive. Drive yourself on.



Mission diversity

In 2021, seven-time F1 world champion Lewis Hamilton launched Mission 44, a charitable foundation which works to build a fairer, more inclusive future for young people around the world and helps them to overcome social injustice and succeed. Hamilton has said that his first-hand experience was of 'an education system that worked against him' and, with this in mind, we want to look at diversity in a little more detail. Insight into the evolution of diversity initiatives within motorsport and the lessons they yield offers valuable guidance for other sectors advancing their own diversification efforts.

Diversity in the workplace is fundamentally rooted in the principle of equity, ensuring that everyone has fair access to opportunities and resources. A wealth of evidence underscores the tangible benefits of diversity. **McKinsey** have demonstrated that the best companies for gender diversity on executive teams were 25% more likely to have above-average profitability than the worst, rising to 36% for those prioritising ethnic and cultural diversity. Providing opportunities for a broader range of people can help address skills shortages, inform new innovations and challenge preconceived notions, **Enterprise Research Centre** evidence has shown.

Nonetheless, barriers in education and the workplace persist. The **House of Commons Science and Technology Select Committee** in 2023 found that girls were less inclined to pursue STEM subjects, and ethnic and socio-economic factors influenced participation. For instance, Black Caribbean students were underrepresented at both GCSE and A Level.

In motorsport, there are further problems. It has a reputation as an expensive, elite, and therefore exclusionary sport. We spoke to two of Mission 44's partners, MotorsportUK, and **Causeway Education**, to hear how they're aiming to tackle these challenges and gather their reflections.

Race for Diversity, launched by MotorsportUK in January 2024, has helped 20 schools in London, Leeds, Manchester, and Birmingham, host hands-on STEM learning activities in the language of motorsport and how these activities could function in the workplace. This might include a school visiting a local motorsport venue, with a chance to go racing in go-karts, for example, while other activities with partners might include Lego challenges, a pit stop challenge, or remote-control cars. By providing these activities and a broader community and network, the initiative intends to cultivate opportunities, particularly for those from underrepresented backgrounds, and to challenge perceptions around barriers to accessing the sport, like wealth, with the ambition of diversifying the F1 paddock. While young people are already studying STEM subjects, they are not always aware their skills can translate into motorsport careers, making it essential to showcase these pathways so they can imagine themselves in the industry. As MotorsportUK told us, 'It's not necessarily a skills shortage, it's an opportunity shortage'.

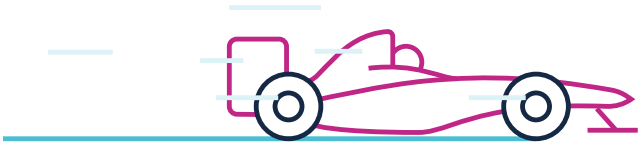
Engaging students at critical decision-making stages can help show that GCSE subjects like combined science or engineering can lead to exciting pathways. To measure impact, surveys are used to assess how many students have chosen STEM subjects as a direct result of the programme's interventions. Challenges remain with engaging schools. Aligning with recent Engineering UK findings discussed earlier in this bulletin, schools, especially in areas of high deprivation, often lack the staffing and resources for extracurricular STEM activities or student trips – a stark reminder that addressing skills shortages in one area may mean addressing shortages in another. MotorsportUK have recently begun issuing a website badge and certificate participating schools as 'Race for Diversity' schools to strengthen their position in reaching out to other funders and education budgets. And, to broaden their reach, they have launched an **Inclusion Hub** for those aged 14-24 to support them in navigating opportunities within the motorsport industry.

The most well-known roles in motorsport are the televised trackside roles: drivers, principals and mechanics. But their work is dependent on design, manufacturing and testing work based at team factories. As in many professions – such as law, where barristers dominate the public imagination – the prominence of one element of the field can obscure knowledge about such opportunities for a diverse pool of applicants. Causeway looked to develop a resource that outlined the different STEM roles in motorsport across the entire process of developing a car from design to race day.

Young people told Causeway that, while existing resources emphasised skills development in the long term, they wanted clear signposting that could inform immediate decisions including the choice of A Levels, apprenticeships, and universities. This proved tricky to accommodate: mapping choices and destinations proved unwieldy and unhelpful given the many possible pathways. Instead, assurances needed to be made about the range of valid pathways to enter the sector.

Secondly, young people wanted salary information. As Causeway said, 'the reality is that young people, particularly from low socioeconomic backgrounds, need to know whether they're going to be well-compensated, so they can compare different routes'. A handful of employers were contacted to provide responses to research questions based on insights from their own organisations. Discussions were positive and, whilst representatives were receptive to the aims of the project, resource constraints impacted sustained dialogue in some cases. While the Causeway resource was successfully launched and is in use, there is a need for mechanisms that enable employers to prioritise such diversity initiatives.

These examples show how thoughtful, targeted initiatives can begin to break down long-standing barriers and open up new possibilities. They also remind us that real change takes time, resources and collective commitment. For others working towards similar goals in different sectors, the takeaway is clear: early engagement, clearer pathways, and strong partnerships are all crucial to making progress towards a fairer, more inclusive and constructive future.



"At Mission 44, we believe all young people - regardless of background - deserve the opportunity to pursue a career that they love. We know that representation in motorsport and STEM remains unequal, which is why we're proud to partner with organisations like Motorsport UK and Causeway Education to break down barriers and open up access to careers in STEM. Whether it's demystifying careers, showcasing potential career pathways, creating powerful peer networks for young people and providing immersive and accessible work experience opportunities, our work is about reimagining what's possible. By creating tangible opportunities and challenging systemic inequalities, we can help build a more inclusive industry."

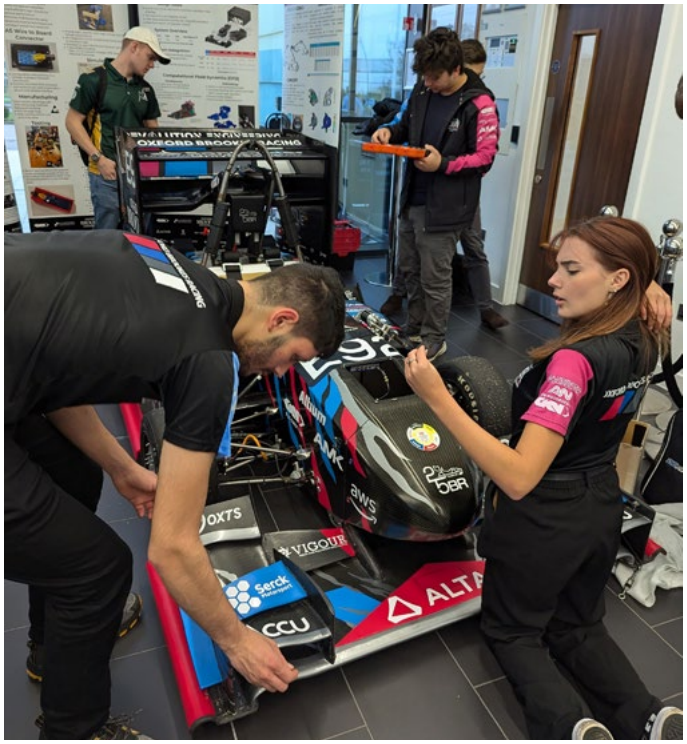
Cara Cinnamon, Chief Impact Officer at Mission 44

Formula Student: The Ultimate University Challenge

This July, Silverstone will be overrun by the brightest young engineering talent from more than 100 universities around the world as the legendary home of the British Grand Prix hosts Europe's most renowned educational motorsport competition, Formula Student.

Established in 1998 by the Institution of Mechanical Engineers (IMechE), Formula Student is more than just a race – it's a rigorous test of engineering prowess, teamwork, and business acumen. University teams design, construct and race single-seater cars, putting students' theoretical knowledge to the test through formal presentations and on-track events assessing speed, handling and reliability.

All participants, regardless of their course background, have the opportunity to demonstrate their technical, engineering, design and manufacturing skills. Competitors must secure sponsorship, manage budgets, and work cohesively as part of a team, all to a strict deadline. There's even a Business Presentation Event when students try to convince an industry panel to invest in their race car business proposal.



Whilst many higher education programmes provide a strong academic foundation in design, CAD-based modelling and simulation, the opportunities to apply these skills in real-world scenarios vary widely. Formula Student bridges this gap, offering a hands-on experience that enhances employability. Christopher Smout, Senior Marketing Executive at the IMechE said, "alumni of the competition can be found on every team on the Formula One grid and in many other motorsport series."

Many of the judges and organisers are ex-competitors, including Chief Judge Dan Jones, who is Team Leader in F1 Customer Engineering at Mercedes AMG High Performance Powertrains, and one of the leading figures in the powertrain for Mercedes AMG F1's Formula OneTM cars. So Formula Student isn't just a learning opportunity, it's a networking extravaganza, connecting students with elite employer supporters including JLR, Bentley, Babcock and AWE and high-profile engineers.

Over the past 25 years, Formula Student has supported and developed the skills of over 40,000 young engineers, opening up pathways into prominent roles in the automotive, motorsport and manufacturing sectors. Last year, 3,000 students and 113 teams descended on the Silverstone track, with Edith Cowan University scoring 915 points out of a possible 1,000 to take them to the top of the leaderboard, the same weekend that fellow Australian Oscar Piastri celebrated his first Grand Prix win.

Now that it's Go! Go! Go! for the 2025 competition season, which future industry leaders will emerge from the Formula Student ranks and who will take the coveted chequered flag?

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