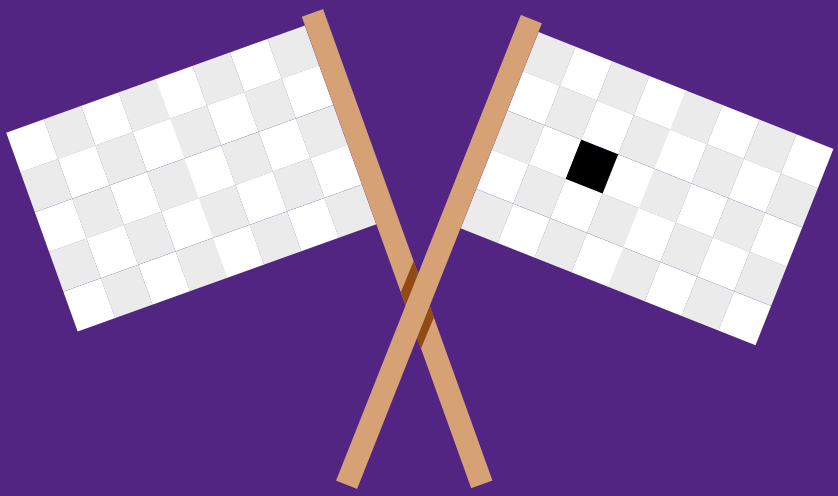
THE HAMILTON
COMMISSION



ACCELERATING CHANGE:

Improving Representation of Black People in UK Motorsport

The Hamilton Commission

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The Royal Academy of Engineering

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SECRETARIAT TO THE COMMISSION:
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SIR LEWIS HAMILTON MBE HonFREng

Stevenage, 1990. I was five years old when my dad bought me my first radio-controlled car. I spent every Saturday and Sunday racing, determined to beat everyone across the finish line. I was obsessed with the thrill of racing, but really I was obsessed with how much I could improve and how good I could get.

Six years later, I started secondary school and was placed in the lowest level set for every subject. No matter how hard I worked, I was told I wasn't smart enough, that I had no potential, no future. Eventually, I was expelled for something I didn't do, a grand finale to the years I spent in the headmaster's office for alleged misbehaviour.

My mental health plummeted and I began to believe what I had been told, and that I didn't have potential. I was convinced I'd be dropped by the McLaren Mercedes Driver Programme and denied my dreams of being a racing driver.

At the time of releasing this report, I'm a Seven-Time World Champion, holding the highest number of wins, poles, and podium finishes in the world of Formula One.

While these two people may seem worlds apart, they're not. The one thing that connects the boy who was told he had no potential in 1996, with me today, is opportunity. I am the same boy who got kicked out of that classroom. I am the same boy who got told he'd never achieve anything.

I, like so many other Black students, lost my confidence in school and struggled to see a future where I could be successful. But like any other child, I was born with potential. It was the system that failed me and almost destroyed my sense of confidence and any dream of living to my full potential. Looking back, it's all so clear to me. Why would I believe in myself, if my school never believed in me?

The answer for me, was my dad. It was his belief in me, and his insistence that I follow my dreams, that led me to where I am today. Turns out, he was right. I did have potential and the determination to succeed. Joining F1 was my absolute dream come true.

Since then, I've won over 90 F1 races and travelled the world. I've loved my career in racing, but it has been a lonely one. While there are no Black drivers, there also remain few Black people in Formula 1 and the wider industry.

But why? There are seven F1 teams in the UK, and over 4,000 companies. That's a lot of jobs, from drivers to engineers, managers to accountants. There are suppliers and sponsors who hire thousands of people a year. If there are so many jobs, and so many different paths in this industry, why do we see so few Black people?

The answer is, our industry is set-up to attract a certain type of person, from a certain background and a certain economic status. It seems as if our industry says "no, not you". And in our wider society it seems that, all too often, kids like me get told they're not good enough, don't get to see their potential, don't think they can achieve their dreams.

Now, 15 years after I first joined F1, it's clear my success has not been enough to inspire a change, as I hoped it might. I remember year after year, looking at our end-of-year team photos and feeling so disheartened by the lack of representation. I don't feel that way anymore. Instead, I feel inspired. In 2019, I realised I couldn't wait anymore, and I could do something. But, you can't demand a change without knowing what the problem was.

This is how the idea of The Hamilton Commission was born. Our Commission, in partnership with the Royal Academy of Engineering, has worked hard to understand the barriers facing Black students at every step of their educational journey, and developed clear recommendations with tangible steps that we hope will encourage more of the Black community to pursue a career in STEM.

My sport is a pretty fantastic discipline. I'm sure you're not surprised to hear me say that. But really, motorsport is an amazing opportunity to show marginalised communities how an education in STEM can lead them onto so many paths. It makes science cool. By introducing underrepresented kids to the vast number of opportunities within our industry, we can inspire these young students to explore a future in STEM.

While our report focuses on motorsport, it uses the industry as a lens through which to explore institutional issues across our society that prevent Black youth from achieving their highest potential. These can range from how our schools place Black students into lower ability groups to how they hire so few Black teachers. It is clear these patterns of discrimination against Black students begin at a young age and can follow them to their future workplaces.

Through The Hamilton Commission, we've developed a comprehensive summary of the systemic issues preventing young Black people from pursuing careers in STEM. Our team focused on evidence, and ensured every claim was followed up with facts and interviews. We've invested in accuracy to ensure our data represents the experiences of minority students, young people and motorsport employees.

We had to be focussed in our approach, and specifically researched the Black community, which is personal to me but also because we shouldn't assume the same barriers affect the same groups. That said, our hope is that where possible, this research will be useful and replicable amongst other underrepresented groups and, hopefully, other industries.

Through our Commission, we make ten recommendations which relate to shifting change within motorsport, maximising early-stage opportunities for Black youth and providing additional careers education support to those who need it most. We know there is so much that needs to change when it comes to racial equality, but it's impossible to tackle everything at once. Instead, we carefully chose these recommendations to ensure we have a focussed approach and, more importantly, recommendations that I can take responsibility for taking forward.

We have always been set on being a 'Commission of Action', not just ideas, and so alongside my foundation and my joint initiative with Mercedes, we have also received support from a range of organisations to follow through on the recommendations, turning them into action. The recommendations will vary in timescale but it's exciting that we can commit to tangible progress.

This report may mark the end of our ten-month research, but it is the beginning of a different phase, where our research and insights can help make motorsport a more diverse and equitable industry. We always had the dream of helping to enact change in this industry. We always had the passion, the focus. All we needed was to know the facts.

I would like to thank everyone who contributed to the report across all the different stages. Thank you to the Royal Academy of Engineering and our incredible Board of Commissioners for their hard work and commitment to this project. I'd also like to give a special thanks to my co-Chair, Dr Hayaatun Sillem, who I feel so honoured to work alongside on this project. I couldn't be more inspired by this team that combines some of the brightest minds in academia, engineering, diversity and inclusion, motorsport and politics. Each member has brought their own passion, experience and insights to this project and it's clear that together, we have all we need to re-imagine the future of the UK motorsport industry.

Thank you all so much. This has truly been one of the most fulfilling milestones in my entire career. ■

DR HAYAATUN SILLEM CBE

The past year has been exceptional for so many reasons. For me personally, those reasons include my role in co-chairing this Commission. It is an understatement to say that being invited to work alongside Sir Lewis on this crucial topic was utterly unexpected and equally irresistible.

As CEO of the Royal Academy of Engineering – and the first woman and person of colour to do this job – accelerating progress on diversity and inclusion within the engineering community is both a personal passion and a professional priority. Engineers shape our world. They design and create products and services that power and define our lives, whether we realise it or not. Yet today our community remains extremely unrepresentative of the society we serve.

In recent years, much progress has been made in understanding how groups and organisations can build more diverse teams, create more inclusive cultures and achieve more successful outcomes as a result. There is now a powerful evidence base that improving diversity and inclusion yields clear and measurable business benefits when underpinned by a systemic approach and driven by committed leadership. It is also, simply, the right thing to do.

However, not all parts of society are benefitting to the same degree from progress – and the past year has brought that into sharp focus. The Covid-19 pandemic and the Black Lives Matter movement have exposed some of the stark inequalities that still exist in societies across the world, including the UK.

The underrepresentation of Black people, including at senior levels, and their differential experiences in the workplace are serious issues for engineering, STEM and motorsport, as much as for any other profession.

Motorsport is a relatively small sector. But it is a very visible one, which inspires and influences hundreds of millions of people around the globe. It is also a sector that is critically dependent on a highly skilled technical workforce. Indeed, Formula 1 exemplifies perhaps better than any other sector the spirit of creativity, innovation and excellence that drives so many engineers, wherever they work.

We know that there is recognition within motorsport that change is needed. With the outstanding support of our expert Commissioners and the personal leadership of Sir Lewis, we have spent the last ten months undertaking research, analysis and engagement to understand what is needed to accelerate the pace of change on racial diversity in motorsport and to foster the conditions in which that change can happen.

My hope is that this report will serve as a catalyst and a stimulus for action by all those who can contribute to the creation of cultures which will attract, retain and inspire many more talented Black engineering and STEM professionals across the full spectrum of UK motorsport roles. And in the process, to make UK motorsport an even more creative, innovative and successful endeavour.

If there's one group that know how to make big things happen fast, it's those who lead the motorsport sector. We look forward to working with them to make UK motorsport an exemplar that others can look to and learn from in their journeys towards a more equitable, diverse and inclusive future. ■

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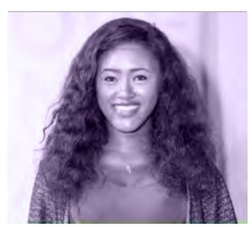

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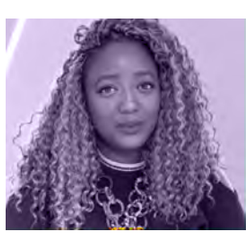

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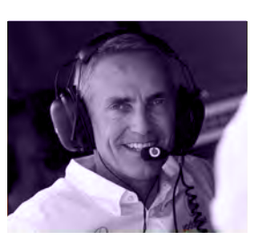

Martin Whitmarsh

Former CEO McLaren Formula 1 team, member of the global advisory board for Formula E and Chairman of BAR Technologies

EXECUTIVE SUMMARY

The Hamilton Commission was launched as a result of Sir Lewis Hamilton's concerns about the lack of ethnic diversity within Formula 1 specifically, and the whole motorsport industry generally. The primary objective of the Commission was to develop a set of recommendations aimed at improving the representation of Black people in UK motorsport. A broader set of underlying causes, many systemic in nature, had to be considered in order to achieve this aspiration. There are ten recommendations, all based in evidence, that the Commission believes will have a long-lasting and positive impact on the representation of Black people in Formula 1 and the wider motorsport sector and which will support the development of more inclusive cultures which will benefit all people working in the sector.

This report is the culmination of ten months of detailed research and literature reviews, as well as interviews with over 80 stakeholders including representatives from Formula 1 teams and the Formula 1 organisation, the Federation Internationale de l'Automobile (FIA) and Motorsport UK, Black engineers working in the sector, representatives across all phases of education, academic researchers and experts in race and education, and leaders and representatives from the Black community. In addition, the research has commissioned a large-scale survey of over 2,400 young people, of which over 700 were from Black ethnic groups. This was followed up with in-depth qualitative interviews with 100 young people from Black and White ethnic groups, presented in Chapter 2.

Throughout the report, we present case studies of the stakeholder interviews with Black engineers and students and organisations that have participated in this work. For the case studies of Black engineers and Black students, as well as organisations, we have changed the names to provide anonymity.

UK MOTORSPORT

The UK is a powerhouse in motorsport and the sector punches well above its weight globally. It is home to seven out of ten Formula 1 teams and over 4,000 companies supporting a range of competitive racing disciplines and the engineering supply chain providing design, development and manufacturing of high-performance elements of cars. These businesses are largely based in *Motorsport Valley*™, an area of England between Warwickshire, Northamptonshire and Oxfordshire.

Engineering roles comprise the largest single group of occupations in motorsport, involved in the design, manufacture and maintenance of cars. To improve the representation of Black people in motorsport, this work has looked beyond the competitive racing aspect of the sport and solely focused on why there are so few Black engineers and technicians in the sector.

DIVERSITY AND INCLUSION IN MOTORSPORT

The case for having a more diverse and inclusive workplace is compelling. Aside from the moral imperative to improve diversity, there is now substantial evidence that shows businesses that have more diverse teams are more competitive, profitable and innovative. The motorsport sector has recognised the need for greater diversity and the FIA, Motorsport UK, Formula 1 and Formula 1 teams have all established programmes to address diversity challenges in the sport, although until 2020 the majority of this focus was on improving the number of women in the sport.

Formula 1 and wider motorsport teams rely heavily on data to improve performance. Yet across most organisations engaged with this Commission, there was almost no data available on the ethnicity of the workforce. From interviews across the sector, we estimate the proportion of Black people in Formula 1 to be less than 1%.

The first task then for Formula 1 teams and other organisations in motorsport to make any meaningful change is to start collecting a broad set of diversity data of their workforce. From this, a baseline measure can be established and organisations can put in place targets and interventions for improvement.

Sustained improvements in diversity cannot be achieved without creating more inclusive cultures in the workplace. The competitive nature of motorsport creates an intense, performance-driven environment. In Formula 1, engineers and technicians work long, unsociable hours in the pursuit of a competitive lead. Race engineering teams travel extensively, being away from home for many weeks of the year. In the wider sector, businesses supplying race teams need to ensure delivery of components ready for race days all over the world or face serious reputational damage. All this leads to a challenging working environment into which leadership teams need to embed an inclusive working culture if they are to diversify the sport and support the wellbeing of their staff.

Among the Black engineers working in the sector interviewed as part of this Commission, there was a general sense of frustration at a perceived lack of progression for Black engineers and the lack of Black engineers in leadership roles. Many also talked of microaggressions and racist 'banter' that they perceived as something that had to be put up with. Many were sceptical about the pace of change within the industry and questioned whether senior leaders across the sport were committed to creating inclusive cultures.

We call on all in leadership roles across motorsport to take personal responsibility for driving measurable progress on diversity and inclusion, to provide equity of access and experience for Black people and other underrepresented groups, and as an enabler of organisational success. Unless this happens, the other actions recommended in this report cannot achieve the intended impact.

RECRUITMENT INTO THE SECTOR

Recruitment into engineering roles in motorsport is extremely competitive. The excitement of working with some of the most challenging, high-performance engineering in existence is highly attractive to many engineers and technicians and so interest in jobs is very high. But the sector is small, with only around 40,000 people employed across the various organisations engaged in the sport, so opportunities for entry are relatively few. In addition, because of the highly competitive nature of the sport, particularly in Formula 1, there is a focus on recruiting the very 'best' people into engineering roles.

For engineering graduates, this typically means Formula 1 teams often recruit graduates with first class honours degrees and, more often than not, graduates who have studied at a few 'elite' universities - a select group of the UK's highest-ranked research intensive universities, from which many of the existing engineers and recruiting managers within teams also graduated.

Technician roles are also critical to Formula 1 and the wider sector. Technicians and mechanics are highly skilled and have intimate knowledge of the cars, their components and systems, whether in the high-precision manufacturing, fabrication and construction, or in the race teams and pit crews that strip down and replace broken parts or rebuild whole cars within hours.

Recruitment into these specialist technical roles is either through apprenticeships or general recruitment, often based on an individual's experience.

A key challenge for many young people interested in joining the sector, particularly at younger apprentice ages, is the geographical location of many of the businesses in rural parts of the country within the *Motorsport Valley*™. With limited public transport infrastructure in the area, opportunities are often restricted to local young people or those who are able to relocate, while the vast majority of young Black people live in major cities across the UK such as London, Birmingham and Manchester.

As is shown in this report, young Black people are less likely to achieve 1st class honours degrees, are less likely to study engineering at the highest ranking universities and are underrepresented in apprenticeships. All this leads to a very small recruitment pool of young Black people unless Formula 1 teams and other motorsport organisations broaden their recruitment practices and take positive steps to promote careers in the sector to a wider and more diverse set of applicants.

KNOWLEDGE OF ENGINEERING AND MOTORSPORT CAREERS

One of the key barriers to progression towards engineering in general, and motorsport in particular, is the lack of knowledge and understanding among young people of engineering careers. In the specially commissioned survey, in which almost 30% of those surveyed were from Black ethnic groups, there was a clear indication that many young people had little knowledge of careers in engineering.

The survey found that younger children tend to be more interested in engineering careers, but this decreases with age. Girls are also less likely to be interested in engineering but there does not appear to be a substantial difference in interest by ethnic group. However, older Black students, especially boys, feel that it is likely to be harder for them and other diverse minority groups to get into engineering. There is also a strong feeling among young Black people that a career in motorsport isn't for them and they wouldn't fit in. The lack of visible Black role models is a factor here. The research also found that young people felt their main influencers - parents, teachers and siblings – did not always advocate for careers in engineering, instead promoting careers in other professions such as law, medicine, and accountancy.

Interviews with young people also highlighted that the elite positioning of Formula 1 may act as a barrier – the strong messaging around 'being the best' turns some young Black people off, and a more nuanced message of 'you can do it' may be more attractive to a more diverse set of potential applicants to the sector. Finally, the primary research showed that although Lewis Hamilton was seen by many respondents as a strong role model for young Black people and ranked highly as someone young people look up to, few young people follow or watch motorsport in their free time, which is also a barrier to engagement with careers in the sector.

THE EDUCATION AND PROGRESSION OF BLACK STUDENTS THROUGH SCHOOL

To try to understand why so few Black people are in these roles across motorsport, the Commission examined the talent pipeline through the education system in England to look at the attainment and progression of young Black people through pathways into engineering and explore the barriers that may be hampering their progress.

To pursue careers in engineering, students need to take a select group of STEM subjects (Science, Technology, Engineering and Mathematics) that

support their learning and progression. The first formal qualifications that students take in England are GCSEs. Science and mathematics are core subjects within the curriculum, which means that almost all students study them at GCSE level.

GCSE attainment data for 2019 shows that Black Caribbean students in particular are already falling behind their peers in achieving high grades in science and mathematics. Deprivation also plays a major role, reducing attainment across all ethnic groups but, again, lower proportions of Black Caribbean students achieve high grades compared with White British students.

The Commission examined a wide variety of research giving insights into the factors affecting Black students' attainment and progression in STEM subjects and their general educational experiences in school.

These include:

- Streaming or 'setting' of young Black students into lower ability groups for mathematics and sciences based on low teacher expectations, limiting their ability to achieve top grades at GCSE, which in turn reduces opportunities to take mathematics and physics at A level.
- Behaviour management practices in schools disproportionately affecting young Black students, including the disproportionately high incidence of temporary and permanent exclusions of young Black Caribbean and Mixed White and Black Caribbean students.
- A lack of Black teachers and leaders in schools limiting the number of positive role models.
- Limited activity in schools to address issues of inequalities of outcomes and attainment gaps across different ethnic groups.

The coronavirus pandemic has exacerbated the challenges of educational attainment among students from lower socio-economic backgrounds. This includes a high proportion of students from Black ethnic groups.

NON-FORMAL EDUCATION SUPPORT

The Commission has explored the use of non-formal education support among Black communities as a mechanism to improve both attainment and engagement in STEM subjects, notably through the use of supplementary schools. Supplementary schools have been established in Black communities across the UK by religious groups, churches and other community groups to provide additional support to young Black people in their education. Young people are given support in core subjects of English and mathematics and are also taught about Black culture and history. As they are not a formal education provision there is little information on how many there are. The Commission believes these schools may offer a unique opportunity to provide additional support to young Black people to increase STEM attainment and encourage them to consider engineering pathways.

POST-16 EDUCATION: THE TECHNICIAN CAREER PATH

Students in post-16 education wanting to pursue engineering careers will take one of two main education pathways: A levels leading to further academic study, or a technical/vocational route.

For A levels, students will most likely study mathematics and physics as two common pre-requisite subjects for entry to university engineering degrees. Analysis of 2019 A level data shows that just 2% of the Black student cohort achieved an A* grade at physics A level, compared with 8% of their White British counterparts who took the subject.

This equates to just 23 Black students, of whom only two were of Black Caribbean ethnicity.

Similarly, for mathematics just 249 Black students achieved an A* grade, representing 7% of the Black cohort, compared with 17% of the White British students who achieved the top grade in the subject.

The technical career pathway into motorsport is through full-time college-based technical education or apprenticeships. Despite the importance of these technical roles in the engineering and motorsport sector, there are very few young Black people following this education pathway, with only around 2,300 Black students studying any form of engineering qualification in 2019/20 and fewer than ten studying a motorsport qualification.

Apprenticeships are a second important pathway into engineering careers for those young people who do not want to follow an academic pathway. In 2019/20, out of almost 60,000 apprenticeship starts in engineering across all skill levels, just 1,120 were taken up by Black students - 2% of the total.

There are various reasons for the low rates of participation of young Black people in the Further Education sector, including lack of parity of esteem, often resulting from lack of knowledge of technical education and technical career opportunities (particularly among parents and other influencers), the availability of apprenticeships in areas where they live and the limited recruitment of young Black people into apprenticeship roles by employers. In addition, there appear to be challenges around the employment of young Black people into technical engineering positions which may be due to limited social capital and opportunities to engage and network with engineers and professionals more generally.

HIGHER EDUCATION: THE PROFESSIONAL ENGINEERING CAREER PATH

For those young Black people wishing to access professional roles in the motorsport sector, a university undergraduate degree is the important final stage of their education. In 2019, around 5% of the people studying engineering in UK universities were from Black ethnic groups, roughly reflecting the proportion of Black students in the school system. Just under a quarter of this Black engineering student cohort (820) study at the high-ranking Russell Group universities from which Formula 1 teams largely recruit their graduate engineers.

In terms of degree attainment, 20% of the total Black graduating cohort of 2019 achieved a first-class honours degree. This compares with 43% of the White British cohort which achieved the same degree classification. In terms of absolute numbers, just 210 Black engineering graduates achieved a first-class degree across all engineering disciplines. The talent pool from which Formula 1 teams will likely recruit is therefore very small.

The employment outcomes of Black engineering graduates generally is less favourable compared with White graduates. Black engineering graduates are less likely to have progressed into engineering roles (at 35%) than their White engineering graduate counterparts (at 57%). Black engineering graduates are also twice as likely to be unemployed (at 14%) than their White counterparts (at 7%). This differential transition into engineering employment is troubling and suggests that employers in engineering generally need to scrutinise their recruitment processes and practices. Additional careers education support may also benefit Black engineering students in Higher Education, by providing more opportunities to engage with employers, careers networking and job application support.

The data and insights the Commission reviewed in the course of this research highlighted that there are a wide variety of inter-related factors impacting on the representation of Black people in STEM roles in UK motorsport. As set out in the recommendations below, there are three key strands of action that need to be addressed to achieve the step change that this Commission is seeking:

SUPPORT AND EMPOWERMENT:
Empowering and engendering a sense of agency among young Black people so that they can better access motorsport and other engineering careers

ACCOUNTABILITY AND MEASUREMENT:
Strengthening the accountability of those in positions of authority and influence for delivering environments in which young Black people have equal access, support and opportunity, and to evidence that through consistent collection and sharing of data and learning from that data

INSPIRATION AND ENGAGEMENT:
Maximising the opportunities to inspire and engage young Black people so that they can visualise what these careers involve and, crucially, see themselves in these roles.

We also identify a series of Immediate Opportunities that can be found throughout the report. These are things that could be started now, and could have potential for considerable impact.

The case for diversifying motorsport is clear and the time for change is now

RECOMMENDATIONS

The recommendations fall into the following three categories:

SUPPORT AND EMPOWERMENT

Engendering a sense of agency among young Black people and supporting progression to engineering careers.

ACCOUNTABILITY AND MEASUREMENT

Accountability of those in authority, evidenced through consistent collection and sharing of data.

INSPIRATION AND ENGAGEMENT

Enabling young Black people to visualise what these careers involve and see themselves in these roles.

SUPPORT AND EMPOWERMENT

1 **We recommend that Formula 1 teams and other motorsport businesses broaden access to motorsport by expanding the apprenticeships provision to include higher apprenticeships and degree apprenticeships as an alternate pathway into the sector, as well as availability to paid work placement and work experience schemes.** To aid this, FIA should add an exemption to the cost cap that would exclude the salaries of new apprentice recruits from capped spend, so as to encourage teams to take on new apprentices and provide training to young people. Motorsport organisations should also broaden access to, and appeal of, careers in the industry by offering students paid industry placements and industry work experience. To address the geographic and socio-economic barriers facing many people from underprivileged backgrounds, we recommend all schemes provide financial assistance for travel, subsistence and accommodation where necessary, along with forms of remuneration. We encourage the industry to particularly focus on students undertaking the new T level vocational qualifications in engineering and manufacturing being introduced in England from 2022.

2 **We recommend that a new exclusions innovation fund be established, developing programmes that address the factors that contribute to the high proportion of students from Black backgrounds being excluded from schools.** The fund will drive collaboration between key bodies in education: schools, local authorities, alternative provision institutions and other agencies. The programmes will be shaped by young people who have been, or are at risk of being, excluded from education, focusing on systemic issues such as school behaviour management policies, teacher attitudes, inclusive classroom management and teaching. In addition, the fund will provide programmatic support for young people at risk of exclusions across a number of activity areas but including the development of STEM and motorsport related activities as a way to engage these young people.

3 **We support the piloting of new approaches to increase the number of Black teachers in STEM subjects that lead to careers in engineering, namely mathematics, physics, design and technology, and computing.** These approaches should encourage more Black students from engineering, physical sciences, mathematics, and computing studies subjects in Higher Education, and existing Black engineers and scientists, to become teachers in UK secondary schools. This would increase the number of Black role models in STEM subjects that lead to engineering and motorsport careers. The pilots should be evidence based and fully evaluated, with lessons disseminated to influence a wide range of teacher recruitment organisations.

4 **We recommend the creation of targeted support programmes for Black students in post-16 education to enable greater progression into Higher Education courses and work-based training opportunities linked to the motorsport sector.** These programmes, co-created with young Black students, Black community groups, and STEM subject bodies, will aim to improve academic attainment for STEM A Levels, provide careers advice and guidance, pastoral support and peer-mentoring, and signpost to traineeship and apprenticeship opportunities. Programmes should also explore new motorsport engagement and education activities, including summer schools, to support Black students to develop their knowledge of the motorsport industry.

5 **We support the creation of scholarship programmes to enable Black graduates from degrees in engineering and allied subjects to progress into specialist motorsport roles.** We support all scholarship programmes aimed at improving diversity and inclusion. Our recommendation is that a programme is set up to provide scholarships for Black students to undertake specialist MSc study in subject areas that are of relevance to Formula 1 teams and the wider motorsport sector. The programmes should also provide additional careers support activity including professional networking opportunities with motorsport employers, training for CV writing, interviews and assessment centre testing and a range of experiences of motorsport activity across different disciplines of the sport.

ACCOUNTABILITY AND MEASUREMENT

1 **We ask that Formula 1 teams (and other Motorsport organisations) take the lead in implementing a Diversity and Inclusion Charter for motorsport to commit the sector to improve diversity and inclusion across all organisations.**

UK motorsport leads the way in engineering excellence. The Charter should be a rallying cry for all motorsport organisations to make the sector a beacon of excellence in inclusion. Inclusion makes all people feel valued regardless of their background and brings about real benefits to businesses and individuals. This needs to be a shared endeavour, with leadership from the top of motorsport right down to grassroots organisations. By working together to improve diversity and inclusion, motorsport can lead UK sport and engineering.

2 **We support the promotion of the National Education Union Anti-Racism Charter for schools, and we call on teachers' unions and other leadership bodies in education to work with us to ensure widespread adoption of the Charter.**

We strongly encourage as many schools as possible across the UK to adopt the framework, measure their performance and take steps to improve race equality in their institutions. Until schools fully embrace this agenda, there will not be more equitable progress of Black students in STEM subjects and engineering careers.

3 **We call on the Department for Education and other bodies holding education data to enable easier public access to disaggregated data on student and staff characteristics at subject level.**

Specifically, to the Department for Education:

- Student participation and attainment - subject level by student diversity characteristics at GCSE
- Student participation and attainment - subject level by student diversity characteristics at A level
- Student participation and attainment - subject level by student diversity characteristics at Vocational Related Qualifications and applied general (all levels)
- College workforce data – lecturer diversity characteristics by subject

INSPIRATION AND ENGAGEMENT

1 **We recommend the development of best practice guidance for STEM inspiration and outreach activities to enable inclusive engagement with Black students in schools, and with those who influence them.**

We recommend working with Black community organisations, young people and STEM activity providers to develop this guidance and we encourage all organisations and employers providing STEM inspiration activities, including Formula 1 and motorsport, to follow this guidance.

2 **We recommend that additional STEM activity support be provided to supplementary schools that are led by Black community groups across the UK.**

Non-formal supplementary schools are powerful community-led vehicles for promoting STEM and engineering careers to young Black children. New support materials should be developed and co-created that enable students to have exciting, hands-on practical activities and learn about Black scientists and engineers and their contribution to the field. Training should be provided to school leaders and teachers along with careers support materials for young Black people. A STEM education enrichment fund should be established to provide supplementary schools with small grants to undertake STEM projects.

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HOW THE RECOMMENDATIONS FIT INTO THE PATHWAY TO MOTORSPORT CAREERS

2

ACCOUNTABILITY AND MEASUREMENT

The promotion of the Anti-Racism Charter for schools, supported by teachers' unions and other leadership bodies in education

1

SUPPORT AND EMPOWERMENT

Formula 1 and motorsport companies to expand apprenticeships provision and paid work placement and work experience schemes

1

ACCOUNTABILITY AND MEASUREMENT

Formula 1 teams (and other Motorsport organisations) to take the lead in implementing a Diversity and Inclusion Charter for motorsport, to commit the sector to improve diversity and inclusion

1

INSPIRATION AND ENGAGEMENT

Development of best practice guidance for STEM inspiration and outreach activities

APPRENTICESHIPS

3

ACCOUNTABILITY AND MEASUREMENT

Department for Education and other bodies holding education data to enable easier public access to disaggregated data on student and staff characteristics at subject level

MOTORSPORT TECHNICIAN/ MECHANIC ROLES

SCHOOL EDUCATION AND GCSES

FULL-TIME FURTHER EDUCATION QUALIFICATIONS

MOTORSPORT ENGINEERING ROLES

2

INSPIRATION AND ENGAGEMENT

STEM activity support to be provided to supplementary schools led by Black community groups across the UK

A LEVELS

UNDERGRADUATE ENGINEERING DEGREE

POSTGRADUATE ENGINEERING DEGREE

2

SUPPORT AND EMPOWERMENT

A new exclusions innovation fund to be established, developing programmes that address the factors that contribute to the high proportion of students from Black backgrounds being excluded from schools

3

SUPPORT AND EMPOWERMENT

Piloting of new approaches to increase the number of Black teachers in STEM subjects that lead to careers in engineering, namely mathematics, physics, design and technology, and computing

4

SUPPORT AND EMPOWERMENT

Creation of support programmes for Black students in post-16 education to enable greater progression into Higher Education and work-based training linked to motorsport

5

SUPPORT AND EMPOWERMENT

Creation of scholarship programmes to enable Black graduates from degrees in engineering and allied subjects to progress into specialist motorsport roles

CHAPTER 1:

FORMULA 1 AND THE UK MOTORSPORT SECTOR

THE STRUCTURE OF THE UK MOTORSPORT SECTOR

The UK holds a prominent position within motorsport globally, with a long historic tradition in the sport. The first Formula 1 world championship race took place at the Silverstone Circuit in 1950 and seven out of the ten Formula 1 teams are based in the UK. The UK currently hosts rounds of the Formula 1 World Championship and the World Rally Championship, among many other racing events.

Motorsport within the UK is valued at around £9Bn[1] and splits roughly into two parts: a sports and entertainment sector and an engineering sector. The sports and entertainment side involves all the companies and organisations involved in running the races within the various motorsport disciplines and includes the race organisers, teams, events management and marketing businesses and a wide range of other companies from caterers and merchandise vendors to international broadcasters.

The engineering sector of motorsport comprises the high-performance engineering companies that form the supply chain from which race teams across all disciplines, including Formula 1, acquire their specialist manufactured components and other supplies. The majority of the engineering sector is concentrated around 200 square miles of what is colloquially termed *Motorsport Valley*™ - a triangular area of England that stretches from Warwickshire and Northamptonshire southwards into Oxfordshire - within which there are more high-performance motorsport engineering companies than anywhere else in the world. These businesses are among some of the leading engineering companies globally, specialising in a variety of niche areas such as computer aided engineering and simulation, advanced electro-mechanical control systems and high-precision machining. These companies increasingly exploit their capabilities not just in motorsport, but in a range of sectors where they can provide their expertise.

There are around 4,000 motorsport companies the UK. Most are SMEs, with typically between 10 and 50 people employed, and with annual turnovers of the order of £3-5M[2].

[1] https://the-mia.com/page/reviewofindustry

[2] Interview with Chris Aylett, CEO Motorsport Industry Association, March 2021

While there are many different occupations serving the businesses and organisations within motorsport, this Commission has focused exclusively on employment and education relating to engineering, as this aspect of the sport provides the majority of occupations in the sector.

MOTORSPORT DISCIPLINES AND GOVERNANCE

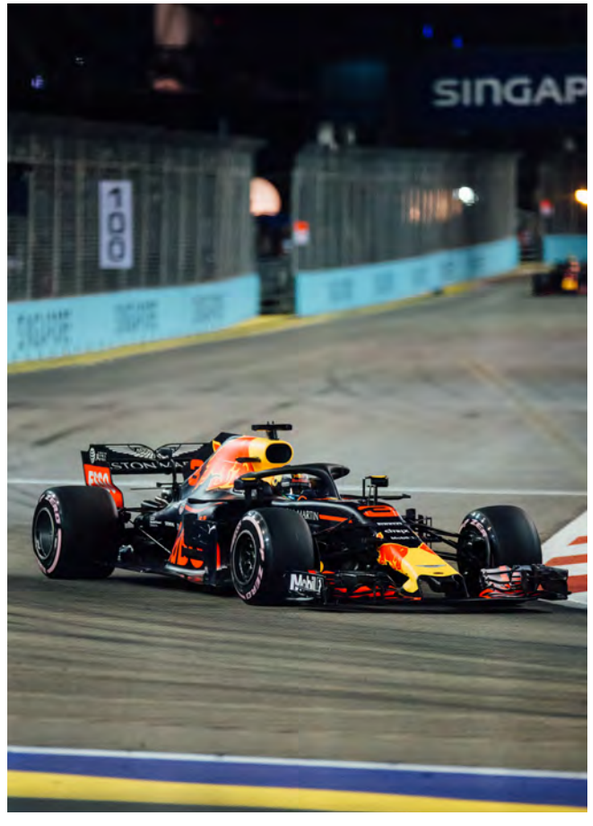
In the UK, the national motorsport governance body is Motorsport UK, which oversees membership of over 700 clubs, the licences of 30,000 competition licence holders and 5,000 race event permits. Motorsport UK is also responsible for the supervision of races, and oversees and coordinates some 4,000 officials and 10,000 marshals who scrutineer and support races, and who form one of the largest volunteer bodies in UK sport[3].

The global governing body for motorsport is the Federation Internationale De l'Automobile, (the FIA) based in France and Switzerland. It is responsible for the oversight of the 245 motoring and motorsport club members across 146 countries, which represent some 80 million individual members[4]. The FIA oversees the rules and regulations for all racing disciplines in the sport globally and also coordinates a range of international campaigns around motoring-related issues, road safety and environmental sustainability.

There is a wide array of disciplines in motorsport, ranging from Formula 1 - the pinnacle of the sport which has a global reach and world-famous racing teams and drivers - to many other circuit or track-based competitions such as lower division Formula 2 and 3, Endurance, Touring Car, Formula E, and other disciplines such as Cross Country, Offroad and Rally. Each discipline has multiple levels of competition both nationally and internationally.

The scale of organisations involved in motor racing varies significantly. Formula 1 teams are by far the largest, with budgets running over a hundred million pounds and employing hundreds of engineers, with the largest teams employing over a thousand staff. This is because Formula 1 is the only discipline where teams design and build cars completely from scratch. In addition, some of the larger teams have spin-off technology and consultancy companies[5,6,7].

Below Formula 1 there is a different scale to teams and organisations. Single-seat race teams in Formula 2, 3 and 4 and other disciplines such as Formula E have smaller numbers of employees, typically in the region of 20 to 30. This is largely because teams are required to use a standard chassis, engine and tyres, with limited opportunity within the rules and regulations for modification, so as to encourage fairer competition between drivers.



[3] https://www.motorsportuk.org/

[4] https://www.fia.com/fia

[5] https://www.mclaren.com/group/companies/mclaren-applied-technologies/

[6] https://www.mercedesamgf1.com/en/applied-science/

[7] https://www.redbulladvancedtechnologies.com/

Across other categories, the vast majority of teams will employ just one or two engineers or mechanics on a full-time or part-time basis and will otherwise depend significantly, and sometimes entirely, on the volunteer support of engineers, technicians and mechanics who are hugely passionate about the sport and provide their skills freely at race weekends.

EMPLOYMENT IN UK MOTORSPORT

Given the relatively small scale of the sector, the competition to find employment opportunities in motorsport can be significant. In total, some 40,000 people are employed across the various businesses in the sport, with around half of those working in engineering supply chain companies[8].

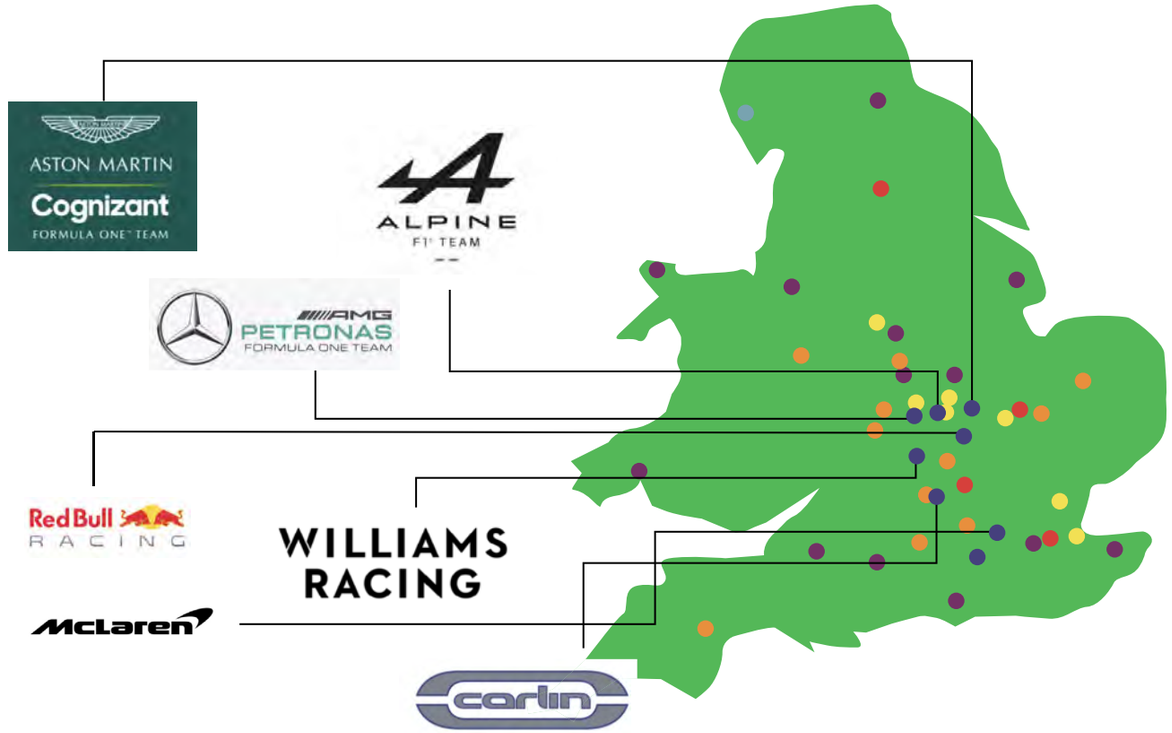
Focusing on engineering and technical roles specifically, as with most engineering sectors, there are generally two main entry routes for young people into motorsport. The first is the technician/mechanic pathway sometimes, though not exclusively, accessed through apprenticeships. The second route is recruitment into graduate or professional roles. Both pathways will often require individuals to demonstrate a passion for, and experience of, motorsport. This experience is mostly gained through informal activities, either as extra-curricular education activities or through attending race events and providing volunteer support to small, independent or privateer racing teams[9]. The opportunities to experience race events can be a significant barrier to many young people. While costs of entry can be low (or indeed free to younger children), circuits, such as Silverstone, Brands Hatch and Donnington, are mostly based away from major cities and are often not easily accessible by public transport.

For most people working in motorsport in the UK, employment is outside Formula 1 and only a small minority of talented engineers, technicians and mechanics experience the pinnacle of the sport.

[8] https://the-mia.com/page/reviewofindustry

[9] Privateer racing teams – small independent teams not owned or directly supported by an automotive manufacturer

FIGURE 1: Formula 1 teams and other motorsport businesses in the UK



KEY

- RACE CIRCUITS
- RACE CAR CONSTRUCTORS
- ENGINE BUILDERS
- FORMULA 1 TEAMS & FORMULA ONE MANAGEMENT (FOM)
- COMPONENT MANUFACTURERS

EMPLOYMENT IN FORMULA 1

The Commission has had substantial engagement with Formula 1 teams, the Formula 1 organisation and the FIA during the course of this work. The following information on employment, recruitment practices and diversity and inclusion within the sport comes from this engagement.

There are seven Formula 1 teams based in the UK with almost all activity based within *Motorsport Valley*™ as shown in figure 1.

In terms of Formula 1 racing, the business of the teams can be seen as three distinct strands: car design, manufacturing and racing. The majority of roles are in the design and manufacturing activities across a myriad of highly complex engineering elements, from chassis and aerodynamics to engine design and manufacture, advanced materials, braking systems, vehicle dynamics and suspension, electronics systems, high-speed telemetry, tyres and fuels and much more. Over many years the teams have built significant in-house expertise but, nevertheless, there is also a reliance on supply chain companies for some specialist components, advanced fabrication techniques, or systems development and integration. This is particularly the case for smaller teams.

The racing strand of Formula 1 is highly specialised and is largely restricted to a much smaller number of experienced engineers and mechanics who have built up detailed engineering knowledge and skills involved in racing, often through many years of working in other disciplines and junior categories such as Formula 2 and 3. Race engineers and mechanics are the small team most often visible during Formula 1 races in the pit lanes and paddock. They are expected to travel around the world to the race events.

Engineering roles in Formula 1 teams are highly sought after. They are seen by many engineers and technicians as among the most desirable jobs in engineering due to the cutting-edge technologies used, the challenging engineering, the fast pace of development and the exciting, competitive environment. Formula 1 teams also pay higher salaries compared with other motorsports and the engineering sector more generally[10].

However, because of the highly competitive nature of the sport, many engineers interviewed as part of this Commission talked of a high-pressure working culture with long and often anti-social hours, weekend working often required and high expectations of performance and delivery. Many also highlighted the fact that the majority of roles are largely office or factory-based with little of the glamour of the Formula 1 racing as seen by millions of viewers around the world.

An interesting differential between employment in larger teams compared with smaller teams is the scope of work expected from engineers. In larger teams, much of the working experience of engineers and technicians is limited to specific aspects of the car, to derive incremental improvements and marginal gains, whereas in the smaller teams engineers and technicians may be expected to work on multiple aspects of the car, undertaking both mathematical design and more practical engineering. These differences in approaches lead to a requirement for different skillsets for individuals who work in the teams.

[10] Reference – e.g. Glassdoor salaries in F1 and engineering generally

CASE STUDY

JAMES

Black Male • 32 • Motorsport Consultant

SCHOOL AND EARLY INTEREST IN MOTORSPORT

James went to a monster truck show with his dad at a young age, which inspired his interest in engineering. At school he felt some teachers put him down, which led to his dad complaining to the school about racism. At secondary school James liked science so put more focus into those lessons.

At around 13, James had a friend who used to do go-karting and invited James to join on a few occasions. He feels video game exposure was pivotal in his interest in modifying and racing cars but did not see the potential, at this stage, for a real-life career.

UNIVERSITY EXPERIENCE

James entered university to study automotive engineering on an MEng programme, starting with a foundation year degree. He found university hard to adapt to and made use of the support and workshops available. He joined the Formula Student team (see p.142) in his third year and found it to be an essential learning experience which confirmed that he wanted to pursue a career in motorsport.

During his time at university, James tried to apply for summer placements with F1 and motorsport teams and companies to no avail. His university did not offer support for getting placements and he sent 20 to 30 applications but received no feedback.

JAMES'S CAREER IN MOTORSPORT

After unsuccessfully applying for roles on his own, James contacted a recruiter. He was hired as a contractor for an automotive company with 3,000 employees, fewer than 15 of whom were black.

"I was always aware I was a Black man in a white space – so I would be very conscious of how people reacted to me."

When his contract wasn't renewed after five years, and after another job working in design for a small startup company, James went on to found his own company, a consultancy offering engineering design, vehicle dynamics, aerodynamics and trackside engineering. He saw this as the only way to demonstrate his value, realise his dreams and find sustainable work within motorsport.

"It became apparent to me that the students finding their way into motorsport were from a small group of universities and were from similar socio-economic class and ethnicity."

RECRUITMENT INTO FORMULA 1

Recruitment into Formula 1 teams tends to occur through three distinct routes: apprenticeships, graduate recruitment and experienced hires. The number of recruits in any given year is relatively small as, despite the very high profile of the teams, they are relatively small organisations. While recruitment numbers will vary by team size, annual recruitment for individual teams (including both churn and growth) is around the following:

Between **10 and 45 PROFESSIONAL ENGINEERS**

Between **4 and 25 GRADUATE ENGINEERS**

Between **7 and 43 TECHNICIANS/ MECHANICS**

Between **1 and 20 APPRENTICES**

APPRENTICESHIP OPPORTUNITIES

Apprenticeships are offered by most teams as a route in for young people following a technician pathway into Formula 1. The teams which offer apprenticeship opportunities tend to target school and college leavers in the age range of 17 – 23, however some teams recruit apprentices as young as 16, and as old as 35.

Apprentices are recruited into Junior Engineer, Junior Technician or Junior Mechanic roles, with teams most often targeting level 3 (A level equivalent) apprenticeship qualification levels. Some teams specifically want apprentices to fill areas where they have had long-standing problems with recruitment so they can train them internally in the particular discipline. The role of electronics technician was one such area identified by a team interviewed for this report.

A key challenge, recognised by many of the teams, is the rural locations in which they are based, with limited public transport infrastructure acting as a significant impediment to all but local young people to work with them. Given the relatively small populations of Black, Asian and minority ethnic people living around *Motorsport Valley*™ (Northamptonshire, Bedfordshire and Oxfordshire) this is one of the factors that limits the number of young people from minority ethnic groups who might apply for apprenticeship roles.

"Minorities tend to live in urban areas, with most F1 teams based in rural areas. The only team close to London is McLaren. I fully believe that F1 teams will have to go further afield and try harder in general… Having said that I do feel that minorities would jump at the relocation - yes it's difficult initially but it does get better."

BLACK ENGINEER, WORKING IN MOTORSPORT

THE FORMULA 1 COST CAP

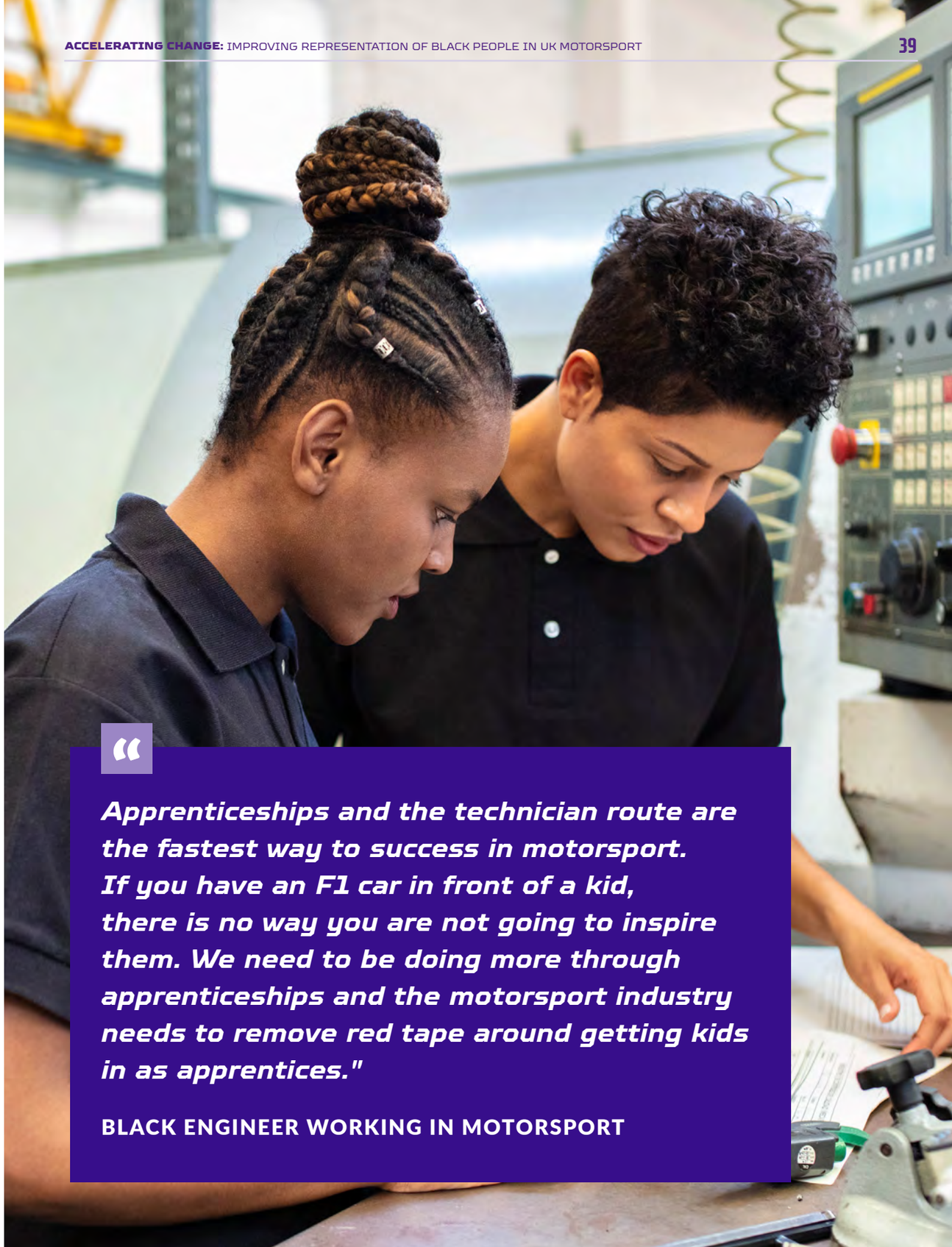
The 2021 season has seen the introduction of the cost cap - a new set of financial regulations introduced into the sport alongside the usual technical rules. The purpose of the cost cap is to re-balance competition among the teams and introduce financial sustainability into the sport over the longer term. The cost cap will limit the amount of money that a team can spend on elements that impact on its race car's performance. The cap does not include costs associated with marketing and communications and there are exceptions in the rules such as drivers' salaries and the costs of each of the teams' three highest paid personnel.

The cost cap is already having an impact on the scale of the workforce in Formula 1, with some of the larger teams already making redundancies as they look to reduce the costs associated with car development[11]. Competition for roles among new graduates and technicians is therefore likely to increase further as teams restrict new recruitment.

An important specific concern regarding the cost cap is its potential impact on the recruitment of apprentices. The current rules around the cost cap disincentivise teams from taking on new apprentices as the salaries would be considered as contributing to race car performance.

Apprenticeships are paid jobs with a substantial element of training for young people who have chosen to take a work-based-learning route into employment. Engineering businesses take on apprentices with the knowledge that, in the short term (12-18 months), they are a cost to the business, requiring in-house training support and an additional 20% off-site education until they have developed sufficient knowledge and skills to be an asset.

Moreover, apprenticeships provide a useful pathway for young people from lower socio-economic backgrounds to continue education up to degree level without incurring large levels of student debt. As such, the training of apprentices should be seen as a socially responsible investment in young people, as well as a means of strengthening the talent pipeline.

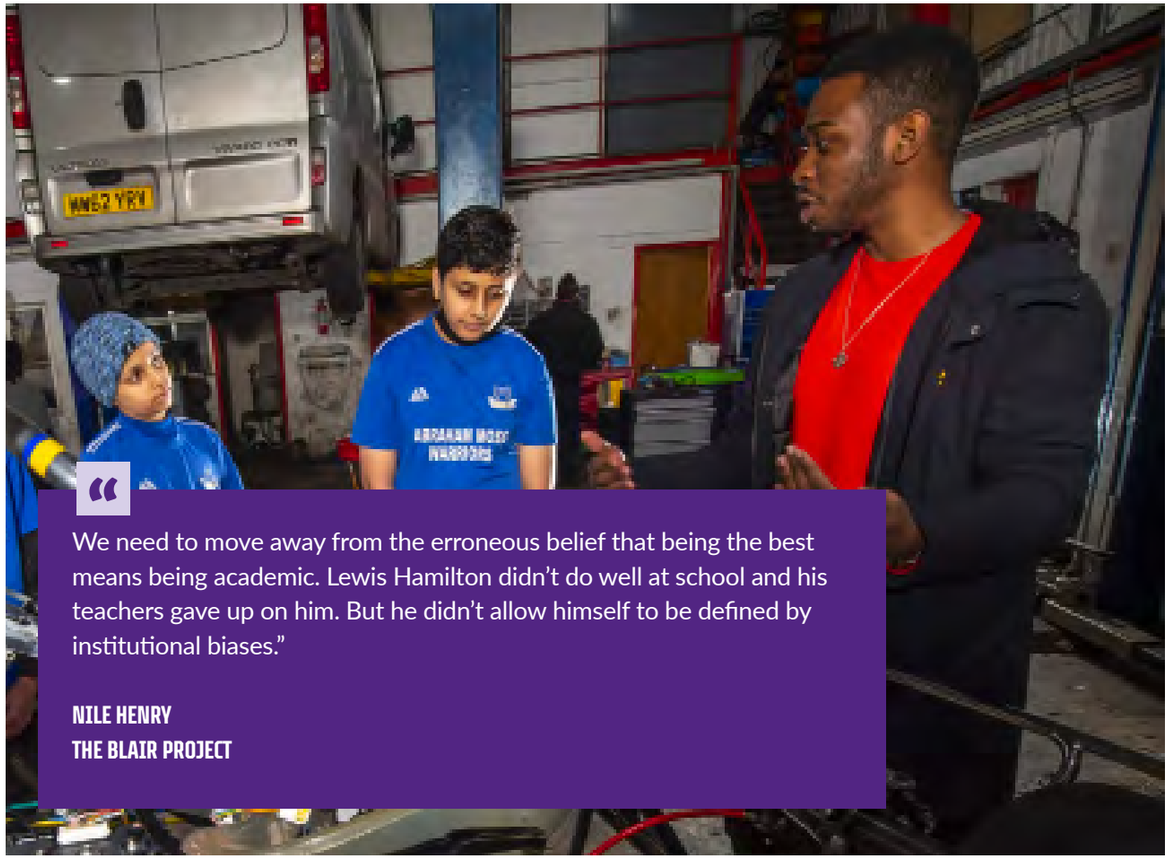


> ***Apprenticeships and the technician route are the fastest way to success in motorsport. If you have an F1 car in front of a kid, there is no way you are not going to inspire them. We need to be doing more through apprenticeships and the motorsport industry needs to remove red tape around getting kids in as apprentices."***
>
> **BLACK ENGINEER WORKING IN MOTORSPORT**

SUPPORT AND EMPOWERMENT

RECOMMENDATION 1

We recommend that Formula 1 teams and other motorsport businesses broaden access to motorsport by expanding the apprenticeships provision to include higher apprenticeships and degree apprenticeships as an alternate pathway into the sector, as well as availability to paid work placement and work experience schemes. To aid this, FIA should add an exemption to the cost cap that would exclude the salaries of new apprentice recruits from capped spend, so as to encourage teams to take on new apprentices and provide training to young people. Motorsport organisations should also broaden access to, and appeal of, careers in the industry by offering students paid industry placements and industry work experience. To address the geographic and socio-economic barriers facing many people from underprivileged backgrounds, we recommend all schemes provide financial assistance for travel, subsistence and accommodation where necessary, along with forms of remuneration. We encourage the industry to particularly focus on students undertaking the new T level vocational qualifications in engineering and manufacturing being introduced in England from 2022.



> We need to move away from the erroneous belief that being the best means being academic. Lewis Hamilton didn't do well at school and his teachers gave up on him. But he didn't allow himself to be defined by institutional biases."
>
> **NILE HENRY**
> **THE BLAIR PROJECT**

GRADUATE ENGINEERING ROLES

The majority of graduate engineering roles in Formula 1 have historically been recruited from a narrowly defined set of engineering disciplines: mechanical, aerospace and electronics engineering and, particularly for smaller teams, recruitment from specialist motorsport degree programmes. Increasingly, teams are also recruiting from computer science, data analytics and IT subject areas. In addition, teams will recruit for a smaller number of specialist roles in academic disciplines such as materials science, chemistry and chemical engineering.

ADVERTISING AND PROMOTION OF EMPLOYMENT OPPORTUNITIES

Like many engineering employers, Formula 1 teams use a variety of methods to advertise and promote roles in their organisations. These include job websites and social media channels, direct advertising of career opportunities on team websites and (prior to 2020) physical events through the traditional university 'milk-round', where engineers and recruiting managers visit universities, give presentations and answer questions about employment opportunities in the team.

The majority of F1 teams have historically tended to concentrate these employment promotion events in a small number of universities - often a cluster of Russell Group universities (high research-ranking universities) and other Higher Education institutions where teams have had a good track record of recruitment. However, as is shown in Chapter 5, Russell Group universities tend to have less diverse student cohorts, particularly with respect to students from Black backgrounds.

> We would usually go on milk-rounds to where we know we can get strong engineering capabilities, so that's your Baths, your Cranfields, your Oxfords - we would go and do targeted recruitment. That's how it's been done historically. This year we have new plans in place around diversity and inclusion – we have done a huge amount of research into university graduates and the demographic profiles of those graduates at different universities, and we will now start broadening our university engagement to target underrepresented groups."
>
> **FORMULA 1 TEAM HR MANAGER**

> If the industry is serious about making changes, they have to start making it easier to access motorsport. Teams should select from a wider pool of universities, set up mentoring programmes and promote diverse role models externally."
>
> **BLACK ENGINEER WORKING IN MOTORSPORT**

In some teams there is now a recognition that to attract and recruit more diverse talent, the number and types of universities targeted will need to be broadened; we are pleased to see some teams actively working with a wider set of universities.

IMMEDIATE OPPORTUNITY

If all Formula 1 teams were to target students across a wider range of universities in their recruitment process, this would help to attract and recruit more diverse talent. We strongly encourage all Formula 1 teams to take this approach.

An interesting point that emerged from discussion with smaller teams was that the 'elite' image of Formula 1 risked putting off candidates from non-Russell Group universities from applying for roles, the suggestion being that students would consider it a waste of time to apply as they would not have a high chance of securing employment.

The competitive nature of Formula 1 drives a strong 'no-compromise' culture within teams of wanting to recruit the *best*. How *best* is defined does seem to differ by size of organisation - in some of the larger teams, recruitment tends to be concentrated around highly mathematically able graduates from a select number of Russell Group universities. Often the senior engineers or the recruiting engineering managers will have attended these universities themselves and have good knowledge and understanding of the abilities of the graduates they can expect from the institutions.

> We are all fish in a pond that is very small, so there is less chance to find diverse people."
>
> **HEAD OF HR, FORMULA 1 TEAM**

However, in some teams, typically smaller ones, recruitment is broader, drawing on graduates from universities offering specialist motorsport degree programmes or where graduates have experienced more hands-on, practical work as part of their education.

There was an acknowledgement by the HR staff we spoke to during interviews of the need to build more diverse teams. Some focussed on the moral imperative, while others recognised the value of diversity of perspectives for creative thinking and problem solving. Nevertheless, there was still a prevailing view that diversity (of any kind), while important, was secondary to identifying the best candidate to achieve the goal of improving car performance - and that was often narrowly defined by having a good degree from a top university.

> We do not care about ethnicity – if the guy is a genius and he can make the car go faster, we will hire him."
>
> **HEAD OF HR, FORMULA 1 TEAM**

CASE STUDY

QUAASHIE

Black Male • 32 • Automotive engineer in Formula 1 (electronics support engineer)

SCHOOL AND EARLY INTEREST IN MOTORSPORT

Quaashie grew up in north-west London and enjoyed sports at a young age. He found his passion for engineering and tinkering early when he was given a bicycle, and he was a fan of Formula 1, Michael Schumacher and Ferrari. Throughout school Quaashie had a good relationship with the sciences; his favourite subject was Design and Technology (D&T), where he recalls having an inspirational teacher.

UNIVERSITY EXPERIENCE

Quaashie was accepted into a non-Russell group University in the Midlands for a foundation year degree to study engineering, as he did not have the A levels for direct entry. This was despite his family believing that a career in medicine, law, or finance would be preferable.

There were only four Black people on his automotive course. He became aware of Formula Student during his first year but was not allowed to join as it was restricted to motorsport engineering students only.

He sent around 60 applications for his placement year and managed to secure a job at an automotive company as a reliability engineer. Prior to graduation, one of his lecturers helped him obtain a second placement with an automotive company, where he was a software tester, initially as unpaid work experience.

QUAASHIE'S MOTORSPORT CAREER

While on the placement, Quaashie was offered a full-time car software testing position. He was still enthusiastic about getting into motorsport but was told at the company that no one moves from automotive into F1.

Despite this, he was determined to get into motorsport. In his spare time, he would visit the simulator and testing sites and network with engineers and drivers; he was approached by a test driver and asked to lead on a project to transform a road car into a grand touring (GT) track car.

While Quaashie enjoyed his role, he found banter to be common. To play it safe, he tried to laugh it off and carry on but felt powerless to stop it.

Quaashie remained in GT, with no pay rise for five years, and waited to try and get an opportunity in F1. His break came when he secured a role in an F1 team and flew out to the next race in Japan.

> "Things got off to a bad start. We were trackside and jokes would be made about Black people; jokes about afro combs and fried chicken, to jokes about crime rates or poverty in Africa, which were inappropriate. I felt powerless. I was the only Black person trackside in my team."

Due to changing family circumstances Quaashie re-joined the team he had been at previously on its F1 side. The environment was different compared to the GT team, but there was no emphasis on the team to be inclusive. He approached the marketing manager about doing something to showcase diversity, but it was deemed unnecessary. Quaashie grew jaded with his lack of progress and has now joined another team, which has renewed his confidence, as he feels that the culture is different. He is hoping to be working trackside for the 2021 season.

SME RECRUITERS

The high media profile of Formula 1 masks the fact that most teams are relatively small organisations with limited HR capabilities and without the kind of automated recruitment software used by large corporate organisations. As such, recruitment to five or ten graduate positions may result in over a thousand applications which need to be sifted by hand.

> Motorsport teams are not sophisticated blue-chip recruiting machines; some of our HR departments are about three people strong."
>
> **FORMULA 1 TEAM HR MANAGER**

Teams adopt different approaches to sifting applications. All require a 2i honours degree in the relevant engineering discipline, and some teams will filter to those candidates with 1st class honours degrees as a first sift to reduce the number of applications. Although most teams recognised filtering by particular university groups resulted in less diversity and was discouraged as an outdated practice by their HR departments, many recruiting managers acknowledged that they sought out applications from universities with which they had strong relationships, either as alumni of those institutions or because of previous positive recruitment outcomes from them. These were, more often than not, high-ranking Russell Group universities. The notion of being 'meritocratic' with regards to recruitment was a commonly held view, but few considered the equity of candidates' prior educational experiences.

> We think we are very diverse because we are not concerned where a person is coming from. We are trying to hire the people who are fit for our environment, who can bring value."
>
> **HEAD OF HR, FORMULA 1 TEAM**

In some teams, even with limited HR capacity, there was a conscientious approach to recruitment with recruiting managers taking great care to examining a wide range of skill sets, education experiences and outcomes in order to explore a range of suitable candidates for positions.

INDUSTRIAL PLACEMENT OPPORTUNITIES

Almost all teams use undergraduate industrial placements as a mechanism to identify potential future talent early. Placements vary in length and style, with some teams offering work shadowing, work experience, summer placements or year-long placements as part of degree programmes. Internships are also offered by some teams as a stepping-stone between graduation and full employment. For recruiting managers, placements are used as an elongated interview process, enabling engineers to work with undergraduate students to see how they perform and meet the expectations of the role and the culture of the organisation. Placement students who have successfully integrated with the team are often offered guaranteed roles at the end of their studies.

However, competition for placements is equally as strong as for employment opportunities, with many hundreds or thousands of applicants. As such, many of the teams again reported that these placement opportunities were limited to universities where they already had strong existing relationships – most commonly Russell Group universities.

EXPERIENCED PROFESSIONAL AND TECHNICIAN/MECHANIC ROUTE

The final recruitment method used by teams is general, open recruitment of experienced engineers and technicians or mechanics. These individuals will be expected to have developed substantial experience in the motorsport sector, for example as part of the race teams in other single-seat disciplines, or through working in supply chain companies. Individuals may often be targeted by teams from supply chain companies for their specialist knowledge and expertise.

There is some movement of people across Formula 1 teams but this appears to be relatively limited (largely due to competitive secrets) and the limited flow of recruits that does exist tends to be from large teams to the smaller teams. There is some movement from Formula 1 teams back into the wider motorsport sector, particularly for older members of staff who no longer want to continue working in high-pressure and fast-paced environments.

Formula 1 teams also recruit engineers and technicians from other sectors such as automotive or aerospace, for a range of roles including machining, composites manufacturing, metrology and other specific high-precision engineering skills.

CASE STUDY

CHRIS

Black Male - 26 - Automotive Engineer in Formula 1 (Electronics Support Engineer - Current Role)

SCHOOL AND EARLY INTEREST IN SCIENCE AND MOTORSPORT

As a child, Chris had enjoyed going karting, and in his teen years, he got a moped and immediately began trying to get it to go faster, building his interest in vehicles and engineering. Chris was engaged with the sciences from an early age. He recalls his mother working hard to pay for him to receive education at a public school, however, he had a troubled relationship with the institution early on due to racism.

"When I was 8, I was off sick and during the course of the day the school called my home to tell my mother I had just been involved in a fight and I punched a boy."

Chris continued into the secondary school where he felt the teaching priority was on getting students onto the Oxbridge pathway; there was little interest in students who might have been going in a more practical, hands-on career direction.

"D&T was not taken seriously. We never had teachers who told you about the engineering and science behind these things. It was workshop for an hour – nobody hurt themselves."

COLLEGE EXPERIENCE AND APPRENTICESHIP

When Chris left school, he was not sure exactly what he wanted to do. He worked for a local mechanic giving him a taste of working hands on with cars. Chris decided to attend the National College for Motorsport at Silverstone believing it would open his career options.

By his second year, he was placed on an apprenticeship at a Motorsport Team. Chris enjoyed his college experience but notes there was a lack of diversity, both in terms of ethnicity and gender.

"The college was a huge thing for me because that is what provided me the opportunity. Had I already had a qualification as a mechanic – if I didn't go to that college - I probably wouldn't be in motorsport. It was where all of the local teams came looking for apprentices. The first race I ever did, I got by walking around the paddock one lunch time while I was at college, asking teams if they would let me help them for the weekend."

CHRIS'S MOTORSPORT CAREER

After his apprenticeship at a motorsport team in the lower leagues, Chris was taken on as a Number 2 Mechanic. On his way to becoming the Number 1 Mechanic, a role with a small Formula 1 team came up, working in assembly within the factory. Chris was able to work his way up to a position in the pit crew and remained with the team for 3 years before financial difficulties at the team forced him to look for a new role in Formula 1.

THE CULTURE IN MOTORSPORT

At the team, Chris recalls banter which he feels was important to building comradery, but also feels the culture was not as inclusive as it could be. He also discovered a large pay gap between himself and other mechanics; when he raised concerns, he was not given an explanation, but his contract was amended. On moving to his new team, Chris has experienced a shift in culture, and has enjoyed his time there.

CASE STUDY

"I have colleagues who are a bit old school and would still use terms like coloured lads – but wouldn't mean anything malicious by it.

I just don't think people realise... One of my colleagues told me that before I started on the F1 team, the chief mechanic gathered the team together and felt the need to warn them that some of their jokes may no longer be appropriate - which made me think, how bad were they?"

DIVERSITY IN SPORT

Discrimination and underrepresentation in sport are not new challenges. There have been many organisations set up to address these across a variety of sports, most notably in football. These include Kick it Out, a campaign organisation tackling all forms of discrimination within football[12], and Show Racism the Red Card, which uses football and education as a strategy to challenge racism in society[13].

Beyond football, organisations such as Sport England have sought to promote participation by underrepresented groups in sport, and campaigns such as This Girl Can have focused on encouraging more women to get involved in sports and physical activity[14].

Despite the many organisations and campaigns working to increase diversity and inclusion within sport, many challenges persist. In 2020, Sporting Equals, a charity that works to support racial equality and diversity in sport, found that 83% of people from Black, Asian and minority ethnic groups had experienced racism within sport[15]. Disturbingly, the 2019-20 season saw an increase in "racist and indecent chanting" in football,[16] reports of racist chanting in rugby,[17] and racist, homophobic, and sexist chanting in cricket[18]. A 2020 report into UK athletics found half of British Olympic and Paralympic teams at the Rio 2016 Olympics fielded all White athletes, with some of the least diverse sports also receiving the most funding[19].

In 2020, Sport England published its 'Sport for all?' report examining participation of different groups in a wide range of sports[20]. The findings provide interesting insights into the types of sports and physical activities Black people tend to participate in, and the barriers that prevent them from engaging in others. Black adults are over-represented in sports such as basketball, football and athletics, while being underrepresented in sports such as golf, tennis, canoeing, sailing and mountain biking. These latter activities often have higher costs of entry, for example due to specialist equipment (mountain biking and sailing) or costs for participation (tennis and golf). The cost of participation in motorsport is also considerable. Estimates for competing in karting at a national level, for example, are of the order of £30,000, per annum making the sport accessible to only the most affluent in society. Motorsport UK is working to address this with efforts to reduce costs of participation, particularly at the grassroots levels of the sport[21].

[12] https://www.kickitout.org/aims-and-objectives
[13] https://www.theredcard.org/ourstory
[14] https://www.thisgirlcan.co.uk/
[15] http://www.sportingequals.org.uk/news-and-blogs/ceo-statement-racism-in-the-sport-sector.html
[16] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920624/football-related-arrests-banning-orders-1920-hosb2720.pdf
[17] https://www.itv.com/news/wales/2020-06-11/welsh-rugby-player-ashton-hewitt-believes-education-is-key-to-eradicating-racism-in-wales
[18] https://www.manchestereveningnews.co.uk/news/greater-manchester-news/cricket-fan-claims-racist-homophobic-16890791
[19] https://summussports.files.wordpress.com/2020/06/diversity-team-gb-pres-2.pdf
[20] https://sportengland-production-files.s3.eu-west-2.amazonaws.com/s3fs-public/2020-02/Sportforallreport.pdf?VersionId=td0pMbTNOs7caOjvMZ0HCRPwsI3jGnFA
[21] Interview with Dave Richards, President of Motorsport UK'

The Sport for all? report also showed how geography can impact a group's access to certain activities, noting that over 50% of Britain's Black, Asian and minority ethnic populations are located in three cities - London, Greater Birmingham and Greater Manchester.

The report also revealed the complex ecosystem which shapes a person's attitudes, behaviours and experience of sport and physical activity. This ecosystem is comprised of many components including, but not limited to: geography and access to sports equipment, social environment and cultural factors, laws and regulations. All of these intersect with a person's individual characteristics such as ethnicity, gender, age and sexuality and impact on an individual's perception of whether they have the opportunity, capability, and motivation required to participate in sport. The report suggests that the current ecosystem is resulting in lower levels of participation and engagement in sport amongst Black, Asian and minority ethnic groups[22].

With respect to improving representation of Black people in professional sport, one of the most often referenced schemes is the *Rooney Rule* from the United States of America, aimed at increasing the number of Black people in high-level coaching positions. The *Rooney Rule* requires teams to include African American candidates in shortlists for interviews for coaching positions[23]. There have been calls for a similar scheme to be adopted in the English Premier League, and the English Football League has already agreed to implement a version of it[24].

Formula 1 and motorsport have faced previous criticism for practices that undermine diversity and inclusion. Historical concerns regarding sexism in the sport led to the 2010 FIA Women in Motorsport Commission[25] but the use of so-called 'grid girls' only ended in 2018. In recent years, the FIA has been increasingly championing gender diversity, for example through Girls on Track, a campaign to promote and develop opportunities for young women in motorsport at grassroots level. The *Women in Motorsport Commission* now includes over 70 representatives around the world appointed by their National Sporting Authorities. The mission of these representatives is to implement the Women in Motorsport Commission initiatives in their countries to create a culture that facilitates and values the full participation of women in all aspects of motorsport[26].

The wider motorsport industry has also been active in addressing gender diversity, with Formula 1 teams engaging in a range of activities to improve the representation of women in the sport. The W series competition, launched in 2018, is championing women racing drivers through a women-only competition. Following a successful first season in 2019, it is now partnering with Formula 1 for 2021 and beyond[27].

[22] https://sportengland-production-files.s3.eu-west-2.amazonaws.com/s3fs-public/2020-01/sport-for-all.pdf?6LJ9XFHhwVzzcV7GBSPeRZHS2hvJlU6d
[23] https://www.profootballnetwork.com/what-is-the-rooney-rule-more-on-the-nfls-diversity-policy/
[24] https://www.independent.co.uk/sport/football/premier-league/rooney-rule-fa-football-association-england-manager-premier-league-efl-a8150561.html
[25] https://www.fia.com/news/women-motorsport-decade-diversity
[26] https://www.fia.com/women-motorsport
[27] https://wseries.com/

CASE STUDY

FORMULA 1 DIVERSITY AND INCLUSION ACTIVITIES

MCLAREN F1

Becoming a more diverse and inclusive employer in F1, while using its platform to inspire and drive positive change within the sport and beyond is a core feature of McLaren F1's Sustainability Manifesto. In 2020 the team leadership created a ten-year strategic plan for diversity, equality and inclusion with extensive internal engagement with staff to ensure their experiences and expectations were captured.

A Social Impact Working Group has been formed which comprises 30 colleagues from across the team, working with senior leaders to deliver the plans. Advertising and recruitment processes have been overhauled with new technologies being used to ensure bias is removed from selection processes and that career opportunities appeal to a wider candidate pool. The recent appointment of two women to the senior leadership group is an early reflection of the team's commitment to this important programme of change and provides momentum in their mission.

WILLIAMS F1

Diversity and inclusion has always been a core element of Williams F1. Its inclusion work began with gender and disability but now includes race, religion and LGBTQ+ among other characteristics. There is an emphasis on how these connect with the organisation's values and, given Frank Williams' personal disability, the team has strong connections with the Spinal Injuries Association.

Williams is also one of the first teams to be run by a woman and it has long championed women in the sport. The team has been a strong promoter of female drivers and, in 2012, Williams signed Susie Wolff as a development and test driver, and more recently in 2020, Jamie Chadwick joined the team's Driver Academy.

MERCEDES AMG PETRONAS

In 2020 Mercedes AMG Petronas announced the launch of Accelerate 25, a five-year programme of action which commits to an ambition of at least 25% of all new employees in the team coming from underrepresented groups in each year up to and including 2025. To deliver this commitment, the team has begun a range of internal and external initiatives to accelerate its learning, benchmark its processes and reach talent pools it has not previously accessed.

An extensive internal diversity and inclusion training programme has been launched for over 200 managers responsible for recruitment, with focus on unconscious bias and inclusive leadership; there is a target for all team members to have 'Accelerate Inclusion' training by mid-2021.

The team is also engaging in many external partnerships including the establishment of the Mulberry STEM Academy in collaboration with the Mulberry Schools Trust - extra-curricular provision with inspirational role models, imaginative teaching and a variety of experiences for up to 180 young people each year between the ages of 7 and 18, to develop their passion and aptitude for STEM subjects; a partnership with Stemettes to support its ambition for women to be proportionally represented in STEM careers; and a partnership with the Association for Black and Minority Ethnic Engineers UK to build awareness and improve access to future roles with the Mercedes F1 Team in particular. The team also continues its F1 in Schools and the FIA's Girls on Track programme, both of which aim to inspire and connect girls with an interest in motorsport as a career.

CASE STUDY

SAUBER F1

Sauber has teamed up with one of the leading research hubs in Switzerland, the *Competence Centre for Diversity & Inclusion* at the University of St. Gallen, to undergo a diversity and inclusion benchmarking process which will analyse the team's human resources processes, identify areas for action and provide concrete recommendations.

Alfa Romeo Racing ORLEN and the Sauber Group will receive the *We Pay Fair* certificate by the Competence Centre for Diversity & Inclusion of the University of St. Gallen in July 2021, following an in-depth analysis of the salary gap between men and women and between employees of different national origin. The team continues to look at ways to improve the inclusivity of its organisation and is committed to making the company a safe, equitable place of work for all employees, irrespective of individuals' backgrounds.

HAAS F1

Since 2020, Haas has grown or implemented numerous initiatives in recruitment, career development, training, policies and community outreach.

Human resources activity has focused on implementing gender-neutral language job postings, descriptions and policies. Recruitment outreach has been expanded to a more varied selection of institutions, websites and organisations with a focus on attracting candidates from varied underrepresented groups into the sport. The team has expanded the number of apprenticeships and internships offered at its various international locations.

Training of managers and employees continues across the organisation to better understand equality, diversity and inclusion in the workplace as well as the importance of understanding and reducing unconscious bias in recruitment, advancement and engagement. The team has engaged an external partner to revamp its recruitment website to be more engaging for all applicants.

ALPINE RACING

Alpine Racing launched the Infiniti Engineering Academy as a global campaign to offer career opportunities in the team through high profile events, held annually in seven regions across the world. The academy creates a culturally diverse global platform to target and inspire individuals around the world. The current primary diversity and inclusion initiatives focus on gender and race, supported with media campaigns around #engineereddifferently with community level events in China, Mexico, UEA, South America, Asia, Europe and USA. Previous winners and alumni of the academy become inspirational role models at a local level in their home region, attending events and showcasing the opportunities created.

At a local and community level, Alpine has worked across a number of initiatives, using the appeal of F1 to create STEM events and awareness, with a particular current focus on Women in Engineering. The team has engaged with local universities and girls schools, providing factory tours and also engaged in online events directly around careers, CV guidance and employability. Alpine has partnered with the Wychwood Girls' School, with some of its current women graduates and interns giving an insight into their own career paths and goals, as well as supporting D&T teaching and learning through student projects which engineers will mentor in autumn 2021.

The team also works with The Talent Tap to provide work placement opportunities for disadvantaged students, including summer placements and year in industry opportunities and promote the inclusive opportunities that are accessible to all young people who wish to apply.

Alpine also continues its support for F1 in Schools and, in 2021, two of its technical staff have been picked to join the select team of professional judges covering the World Finals.

Despite this collective effort, there is still a significant underrepresentation of women in the sport. To date there have been only five women Formula 1 drivers with only two competing in official Formula 1 races. There are also shortages of women in wider roles within motorsport, such as race officials and scrutineering. A prominent race official bucking this trend is Carol Glenn, who is championing diversity through a new racing academy.

Efforts to improve the representation of women in motorsport are relevant to the focus of this Commission, both because of the opportunity to learn from this experience, and because in considering race and ethnicity it is important to take account of intersectionality: the way in which a person's social and political identities combine to create different modes of discrimination and privilege.

CAROL GLENN

CASE STUDY

CAROL GLENN

The Next Racing Generation Academy

THE FIRST BLACK FEMALE RACE MARSHAL

Carol Glenn has been a trail blazer within UK motorsport. Her involvement goes back to the 1970s when she would watch F1 races from Brands Hatch on television, captivated by the commentary of Murray Walker as the likes of James Hunt and Niki Lauda raced. In 1988, Carol made her first visit to Brands Hatch, shortly after which she joined the 'orange army' marshal team as a volunteer.

Carol went on to work in numerous positions as a marshal in the paddock and track and then into race administration as championship co-ordinator, secretary of the meeting and clerk of the course. Carol has officiated in some of the most iconic races, including the Le Mans 24-hour, the Nürburg ring and the A1 Grand Prix. Despite these achievements, Carol has at many times in her career, experienced discrimination within the industry that was frequently excused as 'banter' but would certainly now be seen as sexual and racial discrimination.

> "In the early days I would get called 'Whoopi' or they would laughingly warn others 'Stand by your car, she might pinch your wheels.' Sometimes, people would speak in what they thought was 'gangster' or a Jamaican accent when talking to me."

THE NEXT RACING GENERATION ACADEMY PROJECT

Despite this, Carol remained passionate about the sport and was keen to see more people from a wider array of backgrounds given the opportunity to participate. The concept for the Next Racing Generation Academy (NRG) was born from Carol's long held passion for diversity within motorsport, inspired by watching Sir Lewis Hamilton 'taking the knee' following the tragic murder of George Floyd.

> "With the rise of the Black Lives Matter movement taking hold across the country and Lewis highlighting racism at the top, I wanted to highlight that it is happening at the lower levels where I am too."

Through NRG, Carol plans to encourage young people from diverse and underserved communities to undertake training within motorsport, giving them an insight to the careers possible within the industry. The NRG Academy will highlight careers within engineering, hospitality, marketing, media and logistics through to management and leadership.

The NRG Academy plans to recruit a cohort of young people and take them through various disciplines from karting to the junior car championships. Carol hopes to be able to unearth new young talent that can be nurtured into the next generation of drivers, engineers, mechanics, and marshals. In the future, Carol hopes the NRG academy will be the go-to place for motorsport teams looking for underrepresented talent passionate about motorsport.

THE BLACK LIVES MATTER MOVEMENT AND THE LEWIS HAMILTON EFFECT

In 2020, the Black Lives Matter movement gained global public attention and many sporting organisations and sporting professionals made commitments to address racism and the long-standing underrepresentation of Black groups within their sports.

The Premier League signalled their support, by replacing players' names with "Black Lives Matter" on shirts for the first 12 matches of the restarted 2019/20 season and allowing players to take the knee at the beginning of matches[28]. More recently it launched a *No Room For Racism* campaign and boycotted social media for a four day period in May 2021[29]. Across various sports, several personalities have joined campaigns and initiatives to highlight racism[30,31]. In rugby, a *Rugby against Racism* campaign was created, with Premiership Rugby committing to making professional club rugby more diverse as well as allowing players to take the knee.

[28] https://www.forbes.com/sites/mikemeehallwood/2020/12/18/premier-league-players-will-keep-taking-the-knee-after-union-says-they-overwhelmingly-support-continuing/

[29] https://www.premierleague.com/NoRoomForRacism

[30] https://www.reuters.com/article/uk-minneapolis-police-blackouttuesday-te-idUKKBN23A0UA

[31] https://www.skysports.com/football/news/11679/12008283/black-lives-matter-raheem-sterling-leads-powerful-new-anti-racism-campaign-on-social-media

The England Rugby Football Union has made diversity and inclusion a core priority and a new independent advisory body has been established, led by former England Rugby international Ugo Monye, to develop plans to improve representation in the sport. The Lawn Tennis Association (LTA), the governing body for tennis in the UK, has established the *Idea Group* to help drive diversity and improve representation in the sport and in March 2021 the Royal Yachting Association, the national body for sailing and various water sports, also launched a new equality, diversity and inclusion strategy to bring greater equality and diversity to the sports that it governs.

Examples of racism have been evident in motorsport since the outset of Lewis Hamilton's career, most notably during an incident targeting his family at the 2008 Spanish Grand Prix in Barcelona[32]. In response, the FIA threatened to remove the Spanish motor racing authority's two Grand Prix and launched *Race Against Racism* a campaign to "drive home the message that racism will not be tolerated at any level of the sport". Lewis Hamilton remains the only Black driver in Formula 1[33].

In 2020, Lewis Hamilton became increasingly vocal about the need to tackle racism and the lack of diversity in motorsport[34]. Taking the knee ahead of Formula 1 races became a commonplace practice during 2020, with several drivers including Daniel Ricciardo and Sebastian Vettel publicly voicing support for the practice[35].

At the start of the 2020 season, Formula 1 launched the *#WeRaceAsOne* initiative aimed at tackling racism, inequality and other challenges facing the sport[36]. In July 2020, Formula 1 announced that it would focus specifically on creating employment and education opportunities for underrepresented groups, with a personal contribution of $1 million from Non-Executive Chairman, Chase Carey, to finance primarily, but not exclusively, engineering-focused scholarships for underrepresented students[37]. This was alongside the creation of a Diversity Taskforce which comprises the senior human resource leaders across all the teams, with an action focused agenda to make fast progress within diversity and inclusion.[38] At the time of writing, Formula 1 are expected to announce further initiatives and opportunities as part of their efforts. During the 2020 season, the FIA donated one million euros to support the creation of a new Foundation for improving diversity in motorsport[39].

> "I have been in the paddock for the best part of a decade, and we have never had an opportunity to talk about these issues. No one has ever asked us, so you have to admire Lewis for the stance he has taken and opening this conversation up."
>
> **BLACK ENGINEER, WORKING IN MOTORSPORT**

[32] https://www.thetimes.co.uk/article/formula-one-chiefs-threaten-spain-after-hamilton-racism-row-jxtv6n7vgw2

[33] https://www.espn.com/f1/story/_/id/22868088/lewis-hamilton-calls-greater-diversity-formula-one-says-changed

[34] https://www.theguardian.com/sport/2020/nov/14/lewis-hamilton-the-man-from-stevenage-who-became-the-moral-compass-of-f1

[35] https://www.racefans.net/2020/07/30/drivers-divided-as-hamilton-gets-his-way-over-end-racism-protests/

[36] https://www.formula1.com/en/latest/article.formula-1-launches-we-race-as-one-initiative.3s2AhNDApNDzrCoQDc1RY8.html

[37] https://www.skysports.com/f1/news/12433/12014529/f1-launches-diversity-foundation-chase-carey-makes-1m-donation

[38] https://www.formula1.com/en/latest/article.formula-1-announce-details-on-new-task-force-and-foundation-to-increase.qCa2493AP98sTLiL8bAMr.html#:~:text=%22That%20is%20why%20we%20will,sexual%20orientation%2C%20or%20physical%20abilities

[39] https://www.fia.com/news/fia-gives-one-million-euros-contribution-diversity-motor-sport

CASE STUDY

MOTORS FORMULA TEAM
A NEW ETHNICALLY DIVERSE MOTORSPORT TEAM

A SHARED EXPERIENCE

The idea for this project came about through the meeting of Jahee Campbell-Brennan, Director of Wavey Dynamics, a UK based motorsport engineering consultancy and Ludovic Pezé, Director of Motors Formula Team (MFT), a racing team and driver management agency based in Monaco. Both being of Black heritage, they had faced similar barriers and obstacles within the motorsport industry, and they shared a desire to bring about change. They realised that, between them, they had the capability to create a racing team with Black drivers, engineers and pit crew that could have a real impact on the international motorsport scene.

DIVERSE AND INSPIRATIONAL

With the infrastructure of management, engineering and drivers already present within their organisations, the project has everything required to get racing and start competing for medals; the pair are also excited to take on the responsibility of representing the sport to new audiences and inspiring the next generation. For Jahee and Ludovic, motorsport is a valuable tool for developing skills relevant to all technology industries and they believe that everyone should have a fair chance to be involved. With this in mind, the team has begun talks to work with universities to deliver student learning projects with a direct link to the motorsport industry.

Jahee and Ludovic are also hoping that the positive representation of diversity in motorsport their team will provide will lead to an increasingly race- and gender-diverse fan base through media content. The team has chosen an entry point in the European GT4 championship and is now searching for commercial partners who want to help make motorsport truly diverse.

"John Barnes was transformational for the Premier League. He attracted audiences from the Caribbean to Africa and now the English Premier League is a global phenomenon. That is what diversity can do. That is what this project can do. For all of motorsport. If the sport wants a truly global reach, ethnic diversity has to be embraced and Black people empowered." JAHEE CAMPBELL-BRENAN

FUTURE PLANS

The short-term goal is to compete at Le Mans by 2024, continuing to build on this momentum to establish themselves as one of the top competitive motorsport teams. It's important to them that they remember why they started this project and continue to draw the link between the outside world and the sport's potential, inspiring and enabling the generation behind them to pursue careers in the sciences and develop the fanbase in previously neglected spaces.

"I want our work to create a much more inclusive and inspirational reality for motorsport and enable Wavey Dynamics to export the knowledge, experiences and skills we develop there into global tech industries. We've got a lot of work to do but with projects like this we'll make it happen." JAHEE CAMPBELL-BRENAN

"Through MFT I want to be a role model and game changer. I want to show what we can achieve and work with our partners to share these experiences. I want to provide opportunities and inspiration for people." LUDOVIC PEZÉ

DIVERSITY AND INCLUSION WITHIN MOTORSPORT ORGANISATIONS

Across wider society, there has been a growing focus on diversity and inclusion in the workplace over recent years and there is a now a robust evidence base for the business benefits of diverse teams and inclusive leadership[40]. Analysis of data from 366 companies by the consultancy McKinsey revealed a statistically significant connection between diversity and financial performance. The companies in the top quartile for racial/ethnic diversity were 30% more likely to have financial returns above their national industry median, and companies in the top quartile for gender diversity were 15% more likely to have financial returns that were above their national industry median. This and other studies clearly show a correlation between diversity in a company and business success[41,42].

Notwithstanding the clear moral case for diversity and inclusion, founded on the premise that everyone should have fair access to training, employment and progression, many companies now recognise the commercial benefits. Research undertaken by the Royal Academy of Engineering examining diversity and inclusion across engineering companies generally, found that one of the top three business imperatives driving diversity and inclusion activity was "enhancing capacity for innovation and creativity" (cited by 83% of engineering organisations)[43].

Importantly, to achieve these benefits, organisations need to focus on advancing diversity and inclusion[44]. While the two are related, there are important distinctions[45]:

DIVERSITY: Diversity considers similarities and differences in terms of age, ethnicity, disability, gender and religion, and less visible differences such as sexual orientation, disability, religion, educational background, personality type, nationality and so on. Measures of diversity typically include the numbers and proportions (the 'representation') of different demographic groups at different levels or in different roles in an organisation, or their representation in relation to core 'people' processes such as recruitment, performance management, pay, promotion and attrition.

INCLUSION: The term 'inclusion' is used to describe what brings people together – typically referring to workplace culture and the behaviours of leaders, managers and peers that lead to staff feeling included. Inclusion is about the culture, environment and processes created by an organisation. It is measured by how people feel, and it needs effort to achieve. Creating a culture of inclusiveness is about establishing behaviours that support inclusion. Leaders have a critical role to play in this as employees will look to the most senior levels as an indication of what is acceptable and what is the norm.

[40] McKinsey & Company, 'Diversity wins; how inclusion matters', May 2020, https://www.mckinsey.com/~/media/mckinsey/featured%20insights/diversity%20and%20inclusion/diversity%20wins%20how%20inclusion%20matters/diversity-wins-how-inclusion-matters-vf.pdf

[41] https://www.bcg.com/en-us/publications/2018/how-diverse-leadership-teams-boost-innovation

[42] https://www.hays.com.sg/direport

[43] https://www.raeng.org.uk/publications/reports/creating-cultures-where-all-engineers-thrive

[44] Note: Equality is not included here as it is a legal duty on all organisations in the UK

[45] https://www.raeng.org.uk/publications/reports/creating-cultures-where-all-engineers-thrive

Evidence suggests that organisations, including in sport, sometimes have an unhelpful and erroneous view that diversity can be addressed through a "free-standing policy" that can be "implemented without necessarily changing the underlying structure of the institution and its day-to-day operations"[46]. This can mean that leaders assert their own "colour and gender blindness", put the emphasis on tradition and "the way things are done" or underline their meritocratic principles as a way of externalising the issue, rather than looking inwards at how their own culture and practices may impact diversity.

Many of the Formula 1 teams interviewed for the Commission displayed some of these characteristics, adopting the language of diversity, while maintaining that the culture is meritocratic, colour and gender blind and that practices are based on traditions that have served the organisation well in the past.

If motorsport organisations are to deliver increases in diversity at a faster pace, senior leaders will have to look inwards at their workplace cultures, practices and behaviours to ensure that they are inclusive for all people.

MEASURING DIVERSITY

Following discussions and surveys of all the Formula 1 teams, the Commission has found that teams either do not collect data or are unable to generate a sufficiently reliable and robust dataset of ethnic diversity in the sport. There is no requirement on businesses to collect this data and, across engineering, many companies have only recently started doing so, as part of their efforts to improve diversity and inclusion in their workplaces. In a survey of 300 engineering employers (large and small) in 2018, fewer than one in 20 (4%) had a set of metrics or measures in place for monitoring diversity - although the proportion of companies with measurement systems in place tends to rise in larger companies[47]. The lesson is, without meaningful measures in place, it is very difficult to assess progress in this area.

[46] Spaaij, R, Knoppers, A and Jeanes, Ruth (2020), "We want more diversity but . . . ": Resisting diversity in recreational sports clubs" Sports Management Review, Volume 23, Issue 3, June 2020, Pages 363-373 https://www.sciencedirect.com/science/article/pii/S1441352318305813

[47] https://www.raeng.org.uk/publications/other/diversity-and-inclusion-in-engineering-employment

CASE STUDY

NIKKI

BLACK FEMALE • 26 • CHEMICAL ENGINEER IN FORMULA 1

EARLY INTEREST IN ENGINEERING AND MOTORSPORT

Nikki was born in South-East Africa where she spent the first ten years of her life before moving to the UK. She was exposed to engineering at a young age; her father and grandfather were both engineers, and she was inspired by visits to their workshops. Due to her early exposure, Nikki always knew engineering was an option for her and she was also aware of motorsport early on. At A level she studied all STEM subjects with a focus on getting into engineering.

"I was exposed to motorsports from very young. My parents would watch Formula 1 with my elder siblings before I was born, so once I came I joined them, and I really took a liking to the sport and watching it. I had cousins who competed in karting at a young age, so the racing blood was always in our family."

UNIVERSITY EXPERIENCE

Nikki studied chemical engineering at university, having done research on a degree course she would enjoy, whilst still allowing her to get into Formula 1. Despite diversity being limited among the engineering student population, there was some representation of Black and women engineers which allowed Nikki to feel comfortable and form strong support groups.

"When I was choosing what I wanted to do at university, I looked at what career paths could get you into F1, just to see if I could get in with what I had chosen. I did not want to set my sights on F1 as I know it is very competitive."

The university was proactive around employment and hosted careers fairs, but Nikki found that engineering and motorsport companies were not present. She initially struggled to find a placement, but was able to secure one with a chemical company.

"I went through so many applications and a lot of rejection but I started without the help of the careers services at university, and once I went to them and they ripped my CV apart and helped me with my cover letter, I started to get through to interviews."

Nikki also struggled with her transition to Master's study at a Russell group university where there was more gender diversity, but a lack of ethnic diversity, and she experienced sexist comments from male students who put her and her work down.

NIKKI'S CAREER IN MOTORSPORT

Nikki initially went back to her placement chemical company as a graduate, but was keen to transition to Formula 1. When a role came up within a Formula 1 team, she competed against over 7000 applicants to win the role.

"There is banter. A lot of banter. I enjoy the workplace banter but, sometimes, it will be a case of me putting my headphones in because they were all guys, so some of the banter got a bit inappropriate at times. I think, without it, it would be hard because you spend so much time away from home and everyone gets to know each other. They know what they can and can't say to you, or if you get offended by sexist jokes for example."

Regarding diversity in Formula 1, Nikki feels that initiatives such as kneeling before races have been brilliant but doesn't understand why Lewis Hamilton has been targeted by some sections of the sport for campaigning for equality. She feels the reaction suggests there may be unconscious bias at the highest levels of the sport.

WORKPLACE CULTURE WITHIN FORMULA 1

Inclusive workplace cultures cover all aspects of an organisation's business, from leadership and governance to progression, development, and remuneration. Organisations often start their diversity and inclusion strategies with a focus on recruitment, but wider practices impacting on the workplace culture and environment also need to be addressed.

Different groups also experience workplace cultures differently. In a survey of workplace cultures in engineering companies, engineers from Black, Asian and minority ethnic groups, as well as those who were women and from other underrepresented groups, consistently reported lower levels of inclusion . This leads to a phenomenon of 'inclusion privilege', where the people who already feel most included are the least likely to recognise the need for a more inclusive culture. White engineers and male engineers are most likely to experience the inclusion privilege, and they are also most likely to be in management and leadership positions and therefore in the best position to influence change - but may not see the need for that change to happen.

These observations in the wider engineering sector across the UK also exist in Formula 1 and motorsport companies. The Commission interviewed a number of Black engineers from Formula 1 teams and the wider motorsport industry to try to understand their lived experiences in the workplace. They all reported experiences of 'microaggression' and banter in the workplace. For some it was seen as friendly, for others it was uncomfortable, but all perceived it as something they had to put up with. While most enjoyed their work and reported many positive experiences, for a few, colleagues had crossed the line, making them question whether they were in the right industry.

> "Beyond banter, there were more serious incidents. On one occasion, there was some confusion over an issue with a car whilst I was off work. A manager overheard the argument, listened to both sides and shrugged saying "Oh, that N****r fixed it". Only one person asked if I was okay in private, everyone else laughed it off."
>
> **BLACK ENGINEER WORKING WITHIN MOTORSPORT**

In addition, there was a general sense of frustration at a perceived lack of progression for Black engineers, and a widespread feeling that where motorsport organisations spoke about diversity and inclusion, the focus was on gender and not ethnicity, making them feel unimportant. Black engineers working within motorsport were largely sceptical about the pace of change within the sector and questioned whether recent work on recruitment would be expanded to address the creation of inclusive cultures and the progression of Black engineers into senior positions.

> "The culture of Formula 1 can be quite off putting – a couple of years ago I was nearly done with the industry...since Hamilton and Black Lives Matters I know a lot of teams now have targets to get X amount of ethnic minority engineers, but nothing's being done about culture."
>
> **BLACK ENGINEER WORKING WITHIN MOTORSPORT**

> "I don't think things will change. Formula 1 teams only do things that will make them money or make them win - but I am interested to see how things go. Right now, it feels like White men at the top reviewing D&I (diversity and inclusion) codes. Where is the Black leadership in Formula 1?"
>
> **BLACK ENGINEER WORKING WITHIN MOTORSPORT**

THE ROLE OF LEADERSHIP AND GOVERNANCE

One of the most enduring and critical priorities for diversity and inclusion is the commitment of leaders to driving positive change, and their willingness to be held accountable, personally and on behalf of their organisations. Inclusive leaders set the tone for the organisation and are uniquely placed to demonstrate that diversity and inclusion are critical to the organisational vision and definition of success.

For motorsport, this means the Team Principals and Chief Executives of Formula 1 Teams, as well as the leadership of the governing bodies, including Formula 1. It is also relevant to those who lead the bodies that represent wider motorsport, the FIA and Motorsport UK, and the companies in the supply chains that support the motorsport industry.

Without the full commitment and support of those in leadership roles across the motorsport sector, it will not be possible to achieve meaningful and sustainable change in diversity and inclusion.

> "You can guarantee that if your senior leaders are not visibly committed to diversity and inclusion and hold people to account, their managers and teams will not either. This creates a culture where diversity and inclusion is seen as an add-on, is done for show or because it is mandated, rather than because it matters to the business, to the employees and to your customers, suppliers and stakeholders."
>
> **SENIOR DIVERSITY LEAD IN UK ENGINEERING COMPANY**

While it is evident that diversity and inclusion is rising up the agenda of those in leadership roles in motorsport, we believe there is much further to go. It is not sufficient for leaders to say that they run meritocratic organisations, with their diversity deficits simply reflecting the lack of diversity in the talent pools they are drawing from. Motorsport companies, and Formula 1 Teams in particular, embody a passion for excellence and display creativity and innovation at the very highest levels in engineering. This commitment to excellence and creativity now needs to be applied to the challenge of diversifying their workforces and creating inclusive organisational cultures. In so doing, they will open up the opportunities for these rewarding and exciting careers to people across all parts of society, and reap the clear and evidenced business benefits associated with higher levels of diversity and inclusion. As a highly visible sector with a massive global audience, it will also send a powerful signal about what the sector stands for and who it is relevant to.

There have only been two female and no Black Team Principals in all of Formula 1's history.

Now is the time for change.

We believe this is a unique opportunity for the UK motorsport sector to make a positive, public commitment towards diversity and inclusion. Inclusive workplaces support everyone, including those currently in employment. There are likely to be many people across the sector with caring responsibilities for children or the elderly. Others may have disabilities. The coronavirus pandemic will have stretched many employees who are balancing needs at work and home. Adopting workplace cultures that value and recognise individuals regardless of their background will support mental health and wellbeing and ultimately result in happier and more productive employees and lead to the business benefits presented. We believe that the sector can come together under a collective commitment and be an exemplar and a beacon to the wider engineering sector in the UK for diversity and inclusion.

Those in leadership roles across motorsport must take personal responsibility for driving measurable progress on diversity and inclusion, to provide equity of access and experience for Black people and other underrepresented groups, and champion inclusive workplace cultures which will in turn, act as an enabler of organisational success. Unless this happens, the other actions recommended in this report will not achieve the intended impact.

ACCOUNTABILITY AND MEASUREMENT

RECOMMENDATION 1

We ask that Formula 1 teams (and other Motorsport organisations) take the lead in implementing a Diversity and Inclusion Charter for motorsport to commit the sector to improve diversity and inclusion across all organisations.

UK motorsport leads the way in engineering excellence. The Charter should be a rallying cry for all motorsport organisations to make the sector a beacon of excellence in inclusion. Inclusion makes all people feel valued regardless of their background and brings about real benefits to businesses and individuals. This needs to be a shared endeavour, with leadership from the top of motorsport right down to grassroots organisations. By working together to improve diversity and inclusion, motorsport can lead UK sport and engineering.

CHAPTER 2:

YOUNG BLACK PEOPLE'S INTEREST IN ENGINEERING AND MOTORSPORT

HOW MUCH DO YOUNG BLACK PEOPLE KNOW ABOUT ENGINEERING AND MOTORSPORT?

As part of this review, the Commission has sought to understand young Black people's knowledge and feelings about careers in engineering in general, and motorsport in particular, and the influences on their career decision making. It was also relevant to explore the extent to which young Black people watch or engage in motorsport as an interest or for entertainment. An external agency was commissioned in November 2020 to undertake an independent survey of 2,444 young people aged between 7 and 19 (of which 704 were from Black ethnic groups through an additional population 'boost') to understand their attitudes towards careers in engineering and motorsport. This was augmented with an additional series of in-depth interviews with 100 young people to explore the findings from the survey in more detail. The sections below summarise the key findings from the surveys. Detailed reports on the survey findings and the in-depth interviews are available separately.

WATCHING MOTORSPORT

The survey and interviews found that few young people follow or watch motorsport in their free time. Interest in the sport is relatively consistent across ages and ethnicity, but at low levels.

FIGURE 2.1: Interest in sports (watch or follow)[49]

46%	FOOTBALL
18%	SWIMMING
15%	TENNIS
13%	ATHLETICS ▪ RUGBY
11%	FIGHTING
9%	MOTORSPORT ▪ CRICKET
7%	BASKETBALL
6%	NETBALL ▪ GOLF ▪ BADMINTON

> "We're from Camberwell. Motorsport isn't for us. We're from the inner city, not the suburbs. So, it's quite inaccessible."
>
> **BLACK CARIBBEAN, MALE**

However, Lewis Hamilton was seen by many respondents as a strong role model for young Black people and ranked highly as someone young people 'look up to', especially among younger Black people, aged 7-16. Among Black boys aged 7-11 and 12-16, who were asked 'Which, if any of the following famous people do you like or look up to?', Lewis Hamilton was ranked first and second respectively in a list of 18 people including Marcus Rashford, Billie Eilish, Stormzy and Elon Musk.

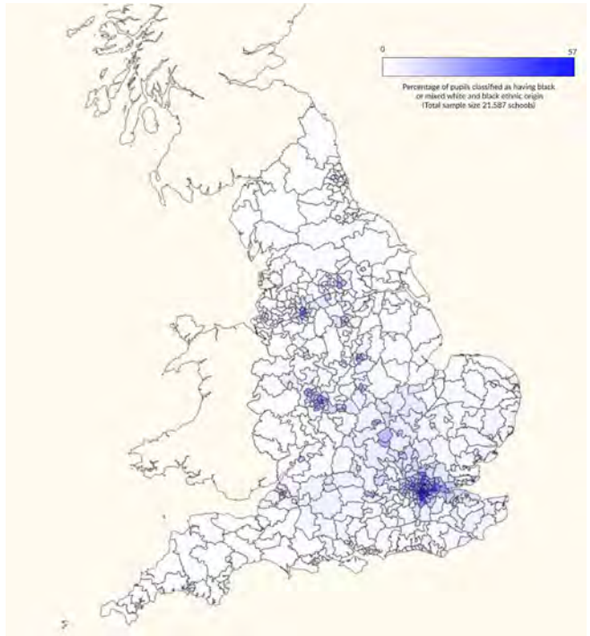
> "I want to be the next Lewis Hamilton. I want to drive the car but, if I can't, I want to be a technician."
>
> **BLACK CARIBBEAN, MALE**

[49] Do you watch or follow any of these sports? Base (Black 7-11: 86 / White 7-11: 420 / Black 12-16: 127 / White 12-16: 807 / Black 17-19: 491 / White 17-19: 324)

GEOGRAPHICAL BARRIERS TO ENGAGING IN MOTORSPORT

The vast majority of young Black people in England live in areas clustered around major cities: London, Birmingham, Manchester, Bristol, Leeds, Sheffield and Nottingham, as figure 2.2, a population density map of Black students in schools across England, shows. As discussed in Chapter 1, the majority of roles in the sector are within the Motorsport Valley™ and the opportunities for young people in cities to experience live motorsport is severely restricted by the locations of race tracks.

FIGURE 2.2: Population density of Black students in schools by Parliamentary constituency (2018 school census)[50].



The issue of geographical barriers to engaging young people in motorsport is a significant challenge and one that is not easily solved. *This is Engineering*, a social media campaign, has taken a digital approach to engaging with young people across the UK. Short videos of a diverse group of young engineers undertaking a range of different jobs across a wide variety of engineering sectors are targeted at young people through the social media channels they consume. In the last three years it has had significant reach, with over 50 million views of the campaign videos[51].

An alternative approach is to harness the increasing popularity of E-sports among young people (video-game, console-based sports). E-sports is one of the fastest growing industries globally with audiences of over 500 million, the majority of whom are in the target age group for considering motorsport careers. Prior to the coronavirus pandemic, many thousands of young people would attend large scale events to watch E-sports competitors compete in a range of games, including car racing.

We believe there is an opportunity for Formula 1 and the wider motorsport sector to connect with the E-sports industry to promote engineering careers in the sector to a whole new generation of young people. We would support organisations within the motorsport industry working with developers of E-sports (games console sports) as a mechanism for engaging young Black people to engage in motorsport activities. E-sports are emerging as a significant vehicle to engage and educate young people and provide a unique opportunity to reach students of all ages across the UK. As such, they can help address geographical challenges that prevent young Black people from experiencing live motorsport races and can be used to promote careers in the sector directly.

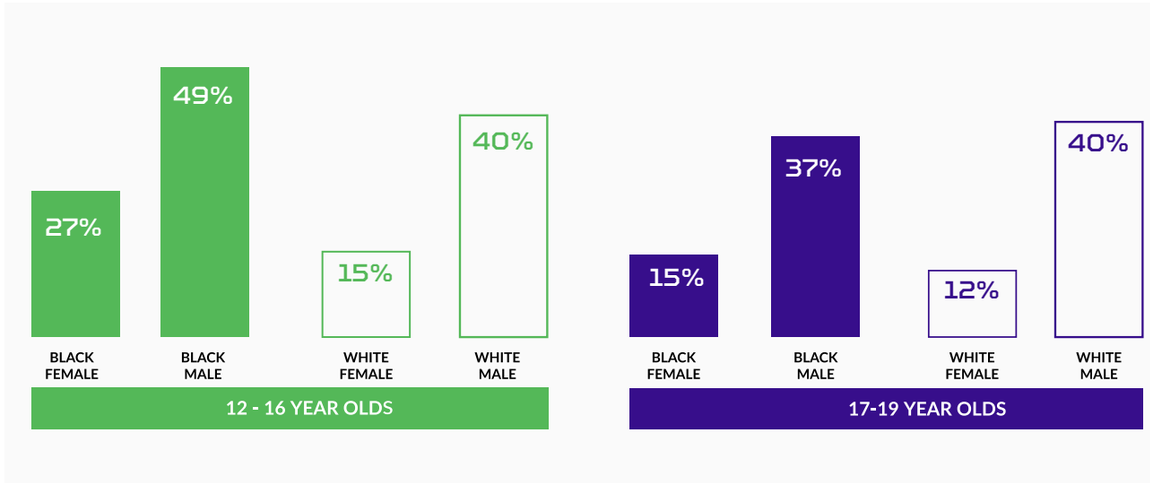
[50] Image extracted from SchoolDash www.schooldash.com

[51] https://www.thisisengineering.org.uk/

CONSIDERATION OF ENGINEERING CAREERS

The survey asked young people how likely they were to consider engineering as a career. Figure 2.3 shows the responses. Boys, regardless of ethnic background are more likely to consider engineering as a career compared to girls of the same age. However, this consideration among boys from Black ethnic groups fades over time, from 49% at age 12-16 to 37% at age 17-19, whereas for boys from White backgrounds, consideration remained the same, at 40%, across both age groups.

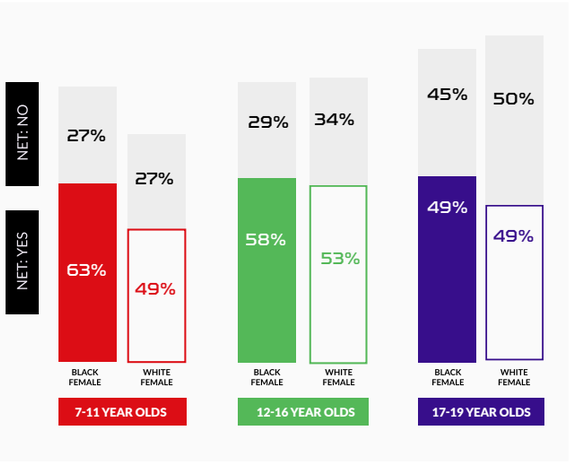
FIGURE 2.3: Likelihood to consider a job in engineering[52]



[52] How likely, if at all, would you consider a job in the following areas? Base (Black males 12-16: 53 / Black females 12-16:74 / White males 12-16: 402 / White females 12-16: 403 / Black males 17-19: 154 / Black females 17-19: 332 / White males 17-19: 104 / White females 17-19: 214) Male responses all significantly higher than female. Black male 12-16 significantly higher than Black male 17-19

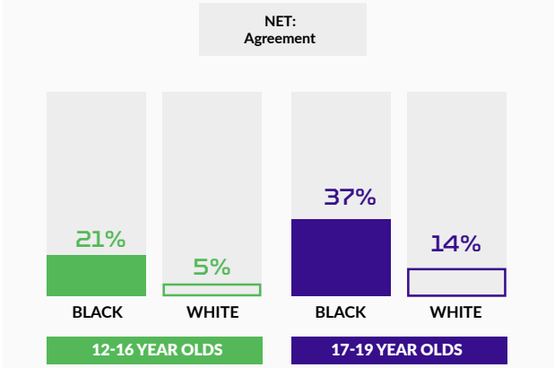
In a different framing, the survey asked young people whether they could become an engineer if they wanted to, as shown in figure 2.4. Among 7-11 year olds, there was a positive response, with young Black children in particular agreeing with the statement, suggesting a strong sense of self-identity and self-efficacy towards engineering that could potentially be encouraged and nurtured with effective, targeted engagement activities. Again, this fell with age, and by 17-19, 45% of young Black people responding said they could not become an engineer if they wanted to, rising to 50% among young White people. This is perhaps to be expected as the respondents might feel that subject choices they have made at age 16 may have closed off opportunities and pathways towards engineering.

FIGURE 2.4: If you wanted to, could you become an engineer?[53]



Young Black people were also more likely than White people to agree that it is harder for them and other minority ethnic groups to get into engineering, with the proportion of young people agreeing with the statement almost doubling between the ages of 12-16 to 17-19, as shown in figure 2.5.

FIGURE 2.5: It's harder for Black and minority ethnic groups to get into engineering[54]



Other questions in the survey highlighted that, as young people grow up, whatever previous interest they may have had in engineering seems to wane, regardless of ethnicity:

- Almost 60% of 17-19 year olds reported that engineering was 'not for them'
- Older girls were more likely to agree with the statement, with 70% agreeing that engineering 'was not for them' compared to around 40% for boys.
- Nearly 40% of those surveyed who would not consider a career in engineering said they had been interested when they were younger.

[53] If you wanted to do you think you could become an engineer? Base (Black 7-11: 86 / White 7-11: 420 / Black 12-16: 127 / White 12-16: 807 / Black 17-19: 491 / White 17-19: 324) Black 7-11 'Yes' significantly higher than White 7-11. Black and White 17-19 'No' significantly higher than 12-16 and 7-11.

[54] What do you think it is that could stop some young people from working in engineering? Base (Black 12-16: 127 / White 12-16: 807 / Black 17-19: 491 / White 17-19: 324) Black agreement significantly higher than White in both age groups. Black and White 17-19 significantly higher than 12-16.

During interviews, it became clear that many young people knew little about engineering as an academic subject or as a career. However, this was not across the board, and those who were most interested and engaged were also the most well informed.

The lack of knowledge of engineering does seem to be a significant barrier to young people considering these careers. Where there is a lack of knowledge, assumptions abound. Young people often responded that the subject was "too hard", "too technical" and "too narrow". Others said they wanted a career with more creativity, highlighting a lack of understanding of the creativity in engineering – particularly in the design aspects. In addition, there appeared to be a lack of understanding from young people of the pathways to engineering careers, with confusion over the right A levels to take and lack of awareness about vocational pathways and apprenticeships.

There is also an apparent paradox when it comes to young people's understanding of engineering, with young people simultaneously thinking it is manual and hands-on, therefore seemingly for low-skilled people, while also being more suited to students with higher academic abilities because of the need for high levels of mathematics and physics problem solving.

CONSIDERATION OF MOTORSPORT CAREERS

The survey also found that that younger Black people, and boys in particular, are more likely to consider a career in motorsport than older people; they also have the self-belief that they could pursue careers in the sector if they wanted to, but this consideration again falls with increasing age, although older Black people are still more likely to have this belief than their White peers.

FIGURE 2.6: Likelihood to consider a job in motorsports[55]

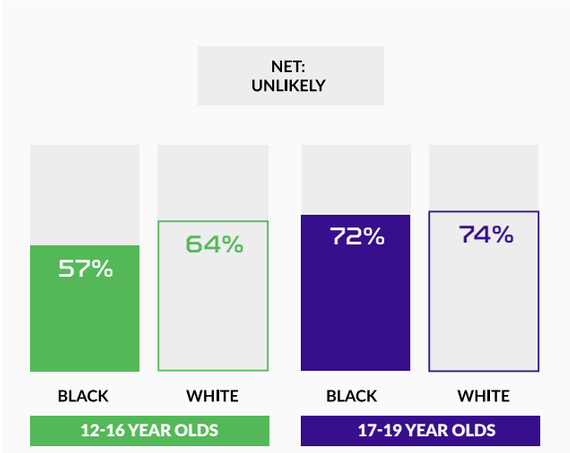
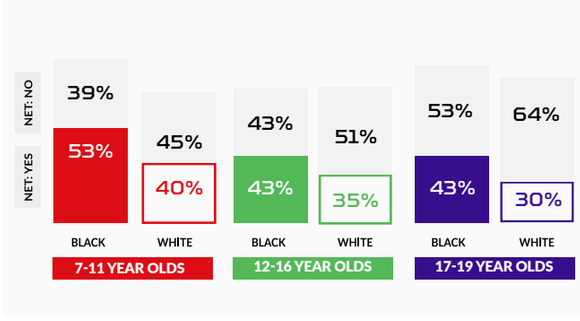


FIGURE 2.7: If you wanted to, could you work in motorsports?[56]



[55] How likely if at all would you consider a job in the following areas? –Motorsports. Base (Black 12-16: 127 / White 12-16: 807 / Black 17-19: 491 / White 17-19: 324). Black and White 17-19 'Unlikely' significantly higher than Black and White 12-16

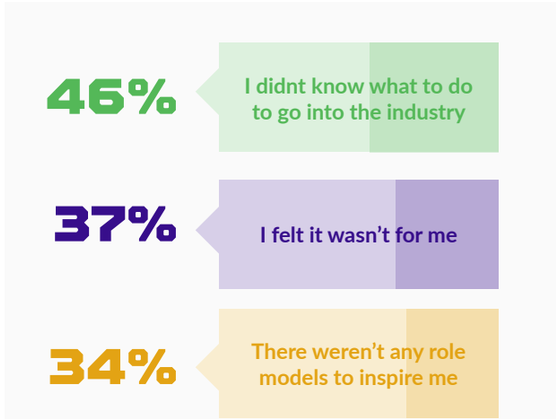
[55] If you wanted to do you think you could work in motorsports? When talking about jobs in motorsports we mean pit stop work/pit crew, engineers, drivers, project managers, marketing & communication etc. Base (Black 7-11: 86 / White 7-11: 420 / Black 12-16: 127 / White 12-16: 807 / Black 17-19: 491 / White 17-19: 324) Black 7-11 and 17-19 'Yes' significantly higher than White. Black and White 17-19 'No' significantly higher than 7-11 and 12-16.

> I'm not into cars and wouldn't even think about watching. It's just fast cars."
>
> **BLACK CARIBBEAN, FEMALE**

Once more, the concept of self-identity and 'seeing myself in the role' appears to be a key factor here, and as young people get older they are more likely to feel a motorsport career isn't 'for them'. This is particularly so among girls.

In general, the awareness of motorsport careers, particularly engineering, was low among the students surveyed and interviewed. Most had limited exposure to the sport unless a parent, friend or sibling had introduced it to them. Even then, the focus was on the racing driver – a role that is largely unattainable. Those young people who said they were previously interested in motorsport careers at an earlier age expressed a lack of knowledge of how to get into the sector. In the absence of further knowledge, again assumptions come in to play and hinder interest: 'you have to love cars', 'it's hard to get into' or 'you have to know the right people' and so on. Stereotypical roles also played a part in shaping thinking, with a major assumption being that 'car mechanic' was the most typical job in the sector after racing driver. A lack of relatable role models was another key issue highlighted, reinforcing the inability of young Black people being able to see themselves in motorsport roles.

FIGURE 2.8: Why did you become less interested in motorsport careers?



Can you tell us what it was that made you become less interested in a career in motorsports at that time? Base (Black 17-19 who said yes at Q6. n= 68)

There is a suggestion from the interviews with young people that there is an element of exclusive messaging in motorsport that is putting young Black people off. While excellence is undoubtedly a requirement to participate in Formula 1, young people's differential levels of self-confidence and ability to visualise themselves succeeding in these roles is having an impact on whether they think it is worth pursuing a career in motorsport. As such, it is worth Formula 1 teams and motorsport organisations more generally exploring a change of messaging, from the 'best of the best' to a more inclusive tone - 'you can do it' - to attract a more diverse set of applicants to roles.

BARRIERS TO CONSIDERATION OF ENGINEERING AND MOTORSPORT CAREERS FOR BLACK STUDENTS

The key barriers to young Black people

considering a career in engineering generally and motorsports more specifically appear to be around self-identity: a sense that it is "not for me" and "I won't fit in". The findings from the survey and interviews also showed that young Black people think it is harder for them and other underrepresented groups to get into engineering. However, those from professional families are more likely to believe they can become engineers if they want to, compared with those from less affluent backgrounds.

Other students said that the low expectations of teachers was a barrier, and that they would be more likely to be put into lower sets in STEM subjects irrespective of their academic ability. These low expectations are also exhibited by their parents which, in turn, leads to less confidence in the young people themselves.

Many of the young Black people interviewed held a desire to run their own business, and this was in some cases because of expectation of discrimination in employment - the need to "be my own boss" but it was also driven by a need to be "in control" and a desire for young people to "follow my passion".

CASE STUDY

YOUR FUTURE, YOUR AMBITION

YFYA is an award-winning organisation that has been encouraging young people from diverse backgrounds into science, technology, engineering, arts and mathematics (STEAM) careers for the last ten years and bridges the gap between education and industry. At its annual events, companies from various sectors, including banking and finance to high-tech engineering, provide a range of inspiring engagement activities, careers workshops, seminars and mentoring to help young people from underrepresented groups navigate their progression pathways and career trajectories.

Continuous learning and innovation around engaging young people from diverse backgrounds are two key elements of YFYA. From the outset YFYA has worked to collaborate with both grassroots and corporate organisations who reflect the local communities in which they operate across the UK and internationally, and represent the diversity of the young people attending. Those in attendance are encouraged to question and probe prospective employer representatives on the career pathways, corporate culture and diversity and inclusion within in their organisations. The businesses in turn have access to upcoming talent and inspiring fresh perspectives, as well as gain invaluable insights into young peoples' future career expectations and aspirations. Evaluation and feedback are also embedded and carefully considered to ensure that for future events, the employers attending and activities and workshops provided reflect the needs of the young people of tomorrow.

© Your Future, Your Ambition

CASE STUDY

ASSOCIATION FOR BLACK AND MINORITY ETHNIC ENGINEERS

The Association for Black and minority ethnic engineers (AFBE-UK) was launched in in 2007 by siblings, Dr Nike and Dr Ollie Folayan following the UK Business and Enterprise Committee and the Royal Academy of Engineering report about the shortage of engineering skills in the workforce and the underrepresentation of people of ethnic and minority backgrounds.

"At the time, it was common and even acceptable to speak to CEOs and business leaders about diversity and hear them say 'we don't do race'. Even today, post Black Lives Matter, as far as diversity is concerned, ethnic diversity is one of the least favoured elements of diversity to address."

AFBE-UK

Nike and Ollie, both engineers, were aware that while there were conversations on the need to encourage more women into the sector, there appeared to be little interest in bridging the ethnicity gap. In response to this, Nike and Ollie set up AFBE-UK, a community initiative to increase the visibility of role models of minority ethnic origin within the engineering sector, and to enable Black and minority ethnic engineers to support each other whilst challenging the prevailing lack of ethnic inclusivity.

In the early days of AFBE-UK, many engineering organisations did not understand the need to prioritise ethnic diversity but, in recent years, some have become more willing to go beyond gender in their diversity and inclusion strategy, particularly after the tragic murder of George Floyd. Despite this, there have been few advances in support of the careers of Black employees.

"The Black Lives Matter movement has made a change and there are a lot of organisations now claiming to be interested in ethnic diversity. Yet, beyond statements of solidarity, there are still very few actions and tangible outcomes being seen."

AFBE-UK

CASE STUDY

A COMMUNITY APPROACH

The AFBE-UK have developed a community approach through the *Making Engineering Hot* programme which works with schools, youth groups, supplementary schools, parents, and churches to engage young people in STEM. The programme includes career days in which young people are brought together with the AFBE-UK's corporate partners, and support to help young people secure placements within the industry.

"We take a community based, grassroots approach to our work and this allows us to connect with the groups we work with... For example, one student was worried about missing an opportunity for a work placement interview because he did not own a suit. We were able to get vouchers for him to get a suit. Understanding some of these socio-economic challenges helps us to offer a platform and to engage both the industry and the community."

AFBE-UK

Although the work of AFBE-UK began with a focus on promoting STEM to young people from Black and minority ethnic backgrounds, the fact that students from these backgrounds account for over a quarter of the engineering cohort, but only 9% of the industry was also a concern. To this end, AFBE-UK set up Transition, a programme that offers mentorship to Black engineering students as well as hosting employability workshops in association with their corporate partners to allow Black students to become familiarised with the application process prior to graduation.

"Companies routinely say we need to do more to attract ethnic minority groups to engineering, and we do, but the real issues are around where companies choose to focus recruitment, and then retention.

Why are over quarter of engineering students from Black and minority ethnic backgrounds and only 9% in the sector with an even smaller number reflected in leadership positions?"

AFBE-UK

CORPORATE PARTNERS

Beyond working with young people, AFBE-UK also works with their corporate partners, providing advice and support to companies looking to increase their ethnic diversity and make their companies more inclusive. AFBE-UK has recently began working within Mercedes-MG Petronas Formula One Team and the partnership has got off to a great start. The real test for Mercedes, and the motorsport industry more widely, will be how much these activities result in a tangible change. AFBE-UK note that it is important that Black engineers are not just brought into companies, but that these companies become truly inclusive, allowing Black engineers the opportunity to progress into senior positions.

POSITIVE REASONS FOR PURSUING ENGINEERING AND MOTORSPORT

Many of the young people engaged in the interviews recognised the value of engineering. These students were already predisposed to STEM subjects or recognised that engineering and motorsport would fit with their existing interest and passions. With further explanation and discussion of engineering generally, and motorsport more specifically, many more young people became more enthused, not having realised previously the breadth of opportunities and career prospects the subject offered. Some young people also welcomed the opportunities engineering provided to follow more vocational pathways such as apprenticeships rather than academic study which they did not want to pursue.

> "I just didn't realise that there are so many things you can do. I'd be interested in the design side."
>
> **BLACK CARIBBEAN, FEMALE**

> "I love data analysis. I would never have considered motorsport engineering."
>
> **MIXED WHITE AND BLACK HERITAGE, FEMALE**

THE ROLE OF INFLUENCERS ON CAREER CHOICE

The survey and interviews also explored the role that parents, teachers, careers advisers and older siblings play as sources of advice for young Black people around career decision making. The responses from students suggest that these influencers are not always well-informed about careers in engineering and motorsport. Some young people interviewed said that their parents would actively discourage them from working in the sector, preferring other careers that were perceived as more 'professional' such as law, medicine, health, accountancy and so on.

Many young people felt their parents' role was to provide more general and moral guidance rather than specific advice on individual careers. They said parents offered encouragement to them to follow their passion and choose subjects that lead to good employment prospects and high earning potential.

Teachers also came out strongly as influencers, playing a pivotal role in instilling general confidence and nurturing the talents and aptitudes of students. Many talked of how the passion of a teacher would inspire them to follow a path they might not have previously considered. However, the young people also suggested that motorsport was not a career direction that would usually be discussed. This is unsurprising, as it is a relatively niche sector and teachers would likely have limited knowledge of careers in the industry. More generally, there is a need to support teachers in building their knowledge of how STEM subjects are used in industrial environments through experiential activities in different sectors.

CASE STUDY

TOSIN

BLACK FEMALE • 25 • AEROSPACE ENGINEERING

SCHOOL AND EARLY INTEREST IN ENGINEERING

Tosin decided that she wanted to be an engineer when she first saw an aeroplane, aged six. She moved from Nigeria to the UK during primary school and found that she was ahead of her classmates. However, at secondary school, identity became a prominent theme, and she encountered the idea of an 'Oreo' (Black on the outside, White on the inside) and felt that she had to conform to a stereotype of what it meant to be Black. In year 10, Tosin was given the opportunity to do an engineering GCSE, which allowed her to become more aware of motorsport as she built a go-kart engine as part of the GCSE.

> "Secondary school – I don't even like to talk about it... There was so much going on. At secondary, identity becomes a big thing. That's when you realise, oh wow I am Black, but I am not your kind of Black, or their kind of Black, and she's Asian, and she's White, and just a lot of opportunity for confusion."

Tosin went to a sixth form for A levels (maths, physics, chemistry and English) but struggled with applied science and failed her exams.

UNIVERSITY EXPERIENCE

Despite not getting her desired grades, Tosin applied to various universities and started a foundation year to enable her to get on to a full degree programme. She was able to work out what had been going wrong with her approach to science at A level and excelled from this point. In her first year of university, she noticed that the environment felt ethnically segregated, but she maintained a diverse friendship group.

Tosin was aware of Formula Student at university but was apprehensive about whether she would be good enough at applying the theory in practice.

> "I didn't join Formula Student because I still had hang ups about applied engineering. I was happy with the theory, but did not want to go into Formula Student and experience similar struggles."

CAREERS IN MOTORSPORT

Tosin feels that encouraging more Black people into motorsport engineering must start in the community, engaging with STEM, building a culture of resilience and contesting the impact of media representation. Black youth need more prominent role models beyond entertainment, sport and music. She also believes this is a two-way street, and companies should actively endeavour to be more inclusive of Black people within their outreach projects and during the recruitment process.

CAREERS EDUCATION

The lack of exposure to engineering and engineering careers via school and through parents appears to be a significant barrier to young people. This is despite decades of collective effort from major corporate businesses, engineering professional bodies, charitable trusts and many other organisations to promote engineering careers in schools[58].

In recent years there have been substantial efforts to improve careers education, advice and guidance in England through the Department for Education Careers Strategy along with the Gatsby Careers benchmarks[59] and the creation of the Careers and Enterprise Company[60]. The DfE Careers Strategy has now come to an end, and it is not clear exactly what the next phase of a careers strategy will look like. However, what is clear is that the coronavirus pandemic has made careers education more difficult over the past year.

A recent report from EngineeringUK, an organisation that provides leadership and coordination on careers education and engineering engagement activities for the engineering community, has highlighted that over three quarters of school careers leaders and STEM teachers surveyed have found it more difficult to engage with STEM employers since the start of the pandemic[61]. Further, the report highlights the impact of a digital divide exacerbated by Covid-19, with lack of technology or internet access acting as a significant barrier for many disadvantaged students; this disproportionately affects Black students, with almost 50% living in poverty[62].

Among the key recommendations in its report, EngineeringUK calls on the Department for Education to publish a new careers strategy, expand the provision of careers hubs to support all schools across England, provide extra funding for careers education with additional support for specialist STEM careers guidance and to develop a fully funded, digital learning strategy for schools, all of which this Commission supports.

PROMOTING ENGINEERING THROUGH ENGAGEMENT ACTIVITIES

The science, engineering and wider STEM communities have been working for many years to provide STEM enrichment and engagement activities in schools, intended to enthuse and excite students and provide them with a better understanding of STEM career opportunities and progression pathways. In its 2016 report, the Royal Academy of Engineering identified over 600 charities, professional bodies and other third-sector organisations (excluding universities and businesses) providing STEM activities in schools across the UK[63]. Within this group of organisations, there are apparently very few activity providers working at scale that promote motorsport specifically. Two notable examples being Formula 1 in schools[64] and Greenpower[65].

[58] https://www.raeng.org.uk/publications/reports/uk-stem-education-landscape
[59] https://www.gatsby.org.uk/education/focus-areas/good-career-guidance
[60] https://www.careersandenterprise.co.uk/
[61] https://www.engineeringuk.com/media/274342/euk2535_careers_provision_report_lr.pdf
[62] https://cpag.org.uk/policy-and-campaigns/understanding-and-responding-ethnic-minority-child-poverty
[63] The UK STEM education landscape. Royal Academy of Engineering 2016. https://www.raeng.org.uk/publications/reports/uk-stem-education-landscape
[64] https://www.f1inschools.co.uk/
[65] https://www.greenpower.co.uk

CASE STUDY

F1 IN SCHOOLS

RAISING AWARENESS IN STEM

F1 in Schools was launched in the UK in 1999, with the aim to be a truly global educational programme that raises awareness of the opportunities presented by STEM. The project also aims to raise awareness of sustainability issues, equality, diversity and inclusion among students and school children.

Working with students aged 9 to 19, the project aims to nurture talent and help change the perceptions of STEM by creating a fun and exciting learning environment using the appeal of Formula 1. Participants are given the opportunity to develop their understanding of careers in STEM, as well as in project management, marketing and communication.

THE PROJECT

The F1 in Schools project asks students to design, test and manufacture the Formula 1 'car of the future' simulating the design and engineering processes employed by a real Formula 1 team. Students are given the opportunity to use STEM skills in a practical way, for example, using a 3D Computer Aided Design, Virtual Wind Tunnels and Computer Aided Manufacture to help engineer their car and eventually bring it to race. Students start with the Primary STEM Project and compete in the Primary Class Competition. In secondary school they continue their journey through the Entry, Development and Professional Classes.

The teams are judged on the speed of their car over 20m of the Official F1 in Schools track, with students learning about aerodynamics such as downforce, and drag. Car performance on track is combined with scores for project management skills such as teamwork, branding and budgeting, and presentations of their work in engineering and enterprise portfolios, with the winning teams progressing through the competition from local in-school events, through regional finals, national showcase events and on to the world stage at the annual World Finals. Throughout this, the teams are encouraged to collaborate with industry, forge business links and seek mentorship.

DIVERSITY AND INCLUSION

Now active globally, with 26,000 schools and 1.3 million students involved annually, F1 in Schools have made equality, diversity and inclusion central to their values. The project aims to break down barriers to entry for young talent looking to get a career within motorsport and the wider engineering industry. At the 2019 World Finals event, 40% of the participants were female and 57% from Black and minority ethnic backgrounds.

"From humble beginnings in 1999, we've grown to be the largest STEM challenge in the world... Not only do the students learn from practical application of classroom learning, they also develop many essential life skills that they will benefit from throughout their careers, from confidence and communication to time management and social awareness. We are very proud to help equip so many students with the foundation they need for the future."

ANDREW DENFORD,
FOUNDER AND CHAIRMAN, F1 IN SCHOOLS

Despite the significant investment in STEM outreach activities across the UK in the last 20 or more years, there has been limited success for engineering, with little, if any, proportional increase in the number of students studying the subject at Higher Education compared with overall growth in participation in Higher Education over the same period. The Academy report highlighted there is a lack of robust evaluation or monitoring being carried out by STEM activity providers to properly understand what works well in terms of engaging with young people and addressing their careers information needs. In addition, it is clear that provision of STEM enrichment activity to schools is not uniformly distributed across the country and many schools have little opportunity to bring in external support for STEM engagement.

To address these two challenges, a new *Tomorrows Engineers Code*[66] has been established with the support of employers and the Department for Education, to encourage employers and activity providers to:

- Ensure programmes contribute to a sustained and rich STEM journey for all young people
- Ensure all young people have opportunities to engage in engineering-inspiration activities, so that no one is left behind
- Promote a positive, compelling and authentic view of engineering, and showcase the breadth of opportunities
- Improve the monitoring and evaluation of programmes and activities to develop a shared understanding of what works.

The Code is managed by EngineeringUK which has, in addition, established a new online platform, *NeonFutures*, linking STEM activity providers and engineering employers with schools to address the lack of STEM engagement coverage across the UK[67].

While these developments of coordination and extending reach are encouraging, there is still a question as to whether STEM engagement activities are effective in encouraging and supporting young people in considering engineering careers - especially those from underrepresented minority ethnic groups.

[65] https://code.tomorrowsengineers.org.uk/
[66] https://neonfutures.org.uk/

CASE STUDY

GREENPOWER EDUCATION TRUST

THE MISSION

Greenpower is on a mission to get more young people between the ages of 9 to 25 into STEM industries using motorsport as the hook through its design-build-race a car challenge series. As well as providing exciting racing challenges aimed at young people from, the programme also helps young participants to develop ways of thinking, practical and transferable skills that will serve them in their professional and personal lives.

Over 750 teams and more than 11,000 young people compete in the racing challenges each year and former participants have gone on to become engineers in Formula 1 and other high performance sports and wider engineering roles.

OPPORTUNITES FOR YOUNG PEOPLE

Greenpower has a principle of bringing in as many young people as possible to engage in its activities regardless of their background or opportunities. Ensuring a focus on diversity, the organisation provides additional support to schools and youth groups that may find it challenging to engage, including financial grants, assisting teachers with skills and materials, and linking with local mentors to help teams during their project journey. There is also a strong focus on working in regions with high levels of social deprivation.

"The Greenpower challenge has allowed us to broaden our knowledge and take on lots of opportunities. We come from a diverse background which lacks a lot of financial support, so for us to take this opportunity is a great privilege. The team are all studying towards our GCSEs and the Greenpower challenge has allowed us to consider engineering as a path for us to pursue in the future. Coming from a background where there are many stereotypes that women shouldn't be in the engineering field, a lot of us weren't aware it was an option for us and now we've broken this stereotype."

GREENPOWER PARTICPANT

There has been substantial research to better understand effective STEM engagement provision. A view gaining increasing traction is the need for greater equity in STEM outreach programmes. Access to, and opportunities within, informal STEM learning approaches remain limited for young people from historically underrepresented backgrounds in the UK. Research being undertaken at University College London is developing new understanding of how and under what conditions young people from underrepresented groups participate in informal STEM activities over time and how they may connect these experiences to form pathways into STEM careers[68].

An important element of the new approach is to recognise and value difference – considering young people's needs in relation to who they are and what their lives are like. Through this approach differences are seen as positive aspects of our society, to be recognised and respected[69].

This work builds on previous work by the UCL research team[70] that introduced a new concept, 'Science Capital'[71]. Science Capital is a way of thinking about the collective science social and cultural capital that a young person has, through the people they know, the activities they do, and what they know and how they think about science. A young person's ethnicity and their socio-economic background affect the likelihood of young people having high science capital.

As this work develops and new insights are gained, it is important that this information is disseminated to the wider community and to those in the motorsport sector working to promote engineering careers. To this end, practical guidance needs to be developed to support organisations to transition their STEM outreach activities to approaches that ensure greater impact with more diverse groups of students.

Direct engagement with employers is also an important feature of careers education, and it is increasingly clear that multiple interactions with employers at an early age can help young people to become more aware of opportunities beyond their own experience and tackle unhelpful stereotypes[72],[73].

EngineeringUK research has found that young people could not remember having had much interaction with employers when at school: with the exception of work experience, only 40% of those surveyed said they had benefited from any employer engagement activity. Where young people had met and interacted with employers at school, they reported that these experiences had been useful in helping to get a job following full-time education. However, the findings showed that young people from independent and grammar schools were more likely to have taken part in a greater number of employer engagement activities than their peers at comprehensive schools[74].

[68] https://www.ucl.ac.uk/ioe/departments-and-centres/departments/education-practice-and-society/youth-equity-stem
[69] http://yestem.org/wp-content/uploads/2017/06/Equity-brief-Youth-Equity-Pathways-in-ISL.pdf
[70] https://www.ucl.ac.uk/ioe/departments-and-centres/departments/education-practice-and-society/aspires-research
[71] Drawing on sociologist Pierre Bourdieu's original work on capital and social reproduction
[72] Engineering UK. Engineering UK 2015: The state of engineering. 2015 www.engineeringuk.com
[73] https://www.educationandemployers.org/wp-content/uploads/2019/06/Motivated-to-Achieve-Final-Full-report-Embargo-6th-June-1.pdf
[74] Engineering UK. Engineering UK 2015: The state of engineering. 2015 www.engineeringuk.com

INSPIRATION AND ENGAGEMENT

RECOMMENDATION 1

We recommend the development of best practice guidance for STEM inspiration and outreach activities to enable inclusive engagement with Black students in schools, and with those who influence them.

We recommend working with Black community organisations, young people and STEM activity providers to develop this guidance and we encourage all organisations and employers providing STEM inspiration activities, including Formula 1 and motorsport, to follow this guidance.

CHAPTER 3:

YOUNG BLACK PEOPLE AND STEM SUBJECTS AT SCHOOL

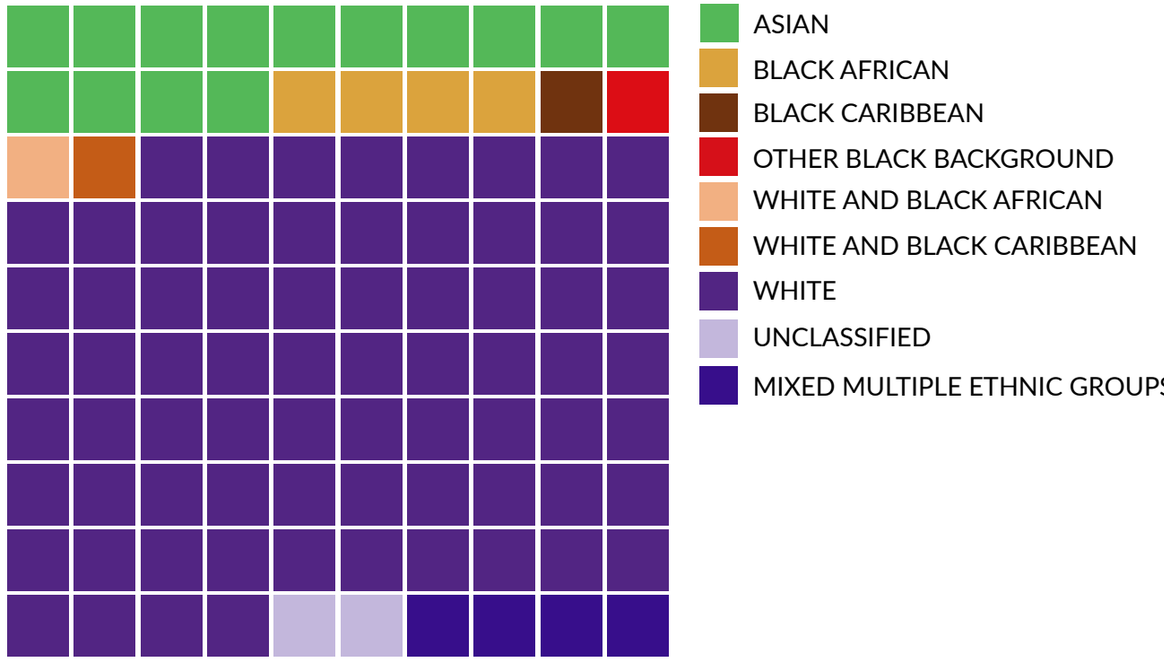
THE POPULATION OF YOUNG PEOPLE IN SCHOOLS

The journey towards careers in engineering or in motorsport starts in school with STEM subjects. This chapter explores how the school system is supporting young Black people to progress towards engineering career opportunities, by examining their attainment and progression in STEM subjects and the barriers that hamper their continuation with subjects that lead to engineering careers.

It is useful to first understand the population of young people in schools. There are 8.3 million students in schools across England based on 2020 school census data[75]. Of these, 34.5% are from minority ethnic groups, as presented in figure 2.1 (with details in table A1.1 in Annex 1).

In England, 5.7% of the school population are from Black ethnic backgrounds with a further 2.3% of students from Mixed White and Black ethnicities. In total, this equates to just under 475,000 Black students and almost 200,000 students from Mixed White and Black ethnic groups across all year groups.

FIGURE 3.1: Population of school students in England by ethnic group, 2020[76]



[75] Schools, students and their characteristics 2019/20. Department for Education (accessed from Pupil Characteristics – free school meals, ethnicity and language csv data. May 2021) https://explore-education-statistics.service.gov.uk/find-statistics/school-pupils-and-their-characteristics

[76] Schools, students and their characteristics 2020. Department for Education. https://explore-education-statistics.service.gov.uk/find-statistics/school-students-and-their-characteristics (accessed November 2020)

ATTAINMENT AND PROGRESSION OF YOUNG BLACK PEOPLE IN STEM SUBJECTS

STEM GCSES

The first formal measure of student attainment in schools in England, Wales and Northern Ireland is GCSE examinations. In Scotland, a different examination system is used. For simplicity, this Commission is only examining the GCSE qualifications system in England. The analysis predominantly focuses on students from Black backgrounds and those from Mixed White and Black ethnic groups, and uses White British students as a comparison. The analysis also provides information by available gender data[77] and by eligibility for Free School Meals (FSM), which applies to students whose parents are in receipt of state benefits[78] over the past 6 years – a proxy measure for low socio-economic status.

Science and mathematics are core subjects. That is, all students are required to study them to Key Stage 4 (GCSE level). Figure 3.2 shows the entry and attainment data of students by ethnic group for mathematics GCSE in England in 2019 – the latest year available at the time of the research. For the science subjects, students will study either Combined Science (worth two GCSEs) or Triple Science (a commonly used term to describe the three individual GCSEs in Biology, Chemistry and Physics). Figure 3.3 shows the entry and attainment data for combined science GCSE and figure 3.4 provides physics GCSE data as one of the Triple Science subjects in the same year. Annex 1 provides further data on entry and attainment data in other subjects for Black and Mixed heritage students.

[77] Non-binary student gender is not currently collected or reported in school or college subject entry and attainment data

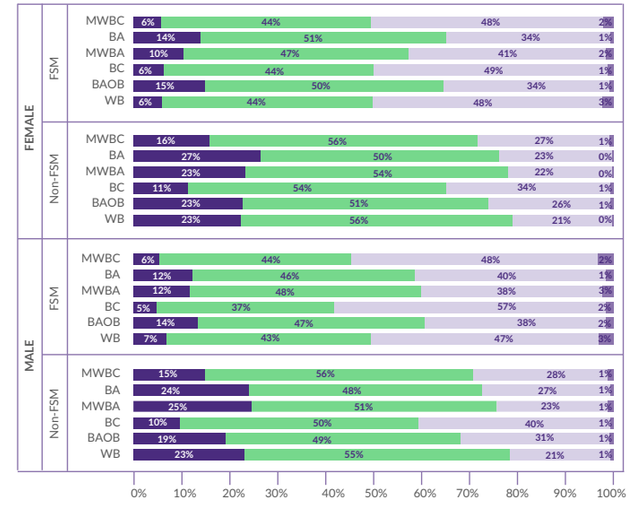
[78] https://www.gov.uk/apply-free-school-meals

[79] https://www.stem.org.uk/impact-and-evaluation/data

[80] https://www.stem.org.uk/impact-and-evaluation/data

[81] https://www.stem.org.uk/impact-and-evaluation/data

FIGURE 3.2: Participation and attainment data for mathematics GCSE 2019 [78]



AXIS KEY
MWBC: Mixed White and Black Caribbean
BA: Black African,
MWBA: Mixed White and Black African,
BC: Black Caribbean
BAOB: Black any other background
WB: White British

FSM: eligible for Free School Meals over the past 6 years
Non-FSM: Not eligible for Free School Meals over the past 6 years

SERIES KEY
- **7 to 9:** achieving grades 7 to 9
- **4 to 6:** achieving grade 4 to grade 6
- **U to 3:** Unclassified up to grade 3
- **Not entered:** did not enter the examination for assessment§

FIGURE 3.3: Participation and attainment data for combined science GCSE 2019[79]

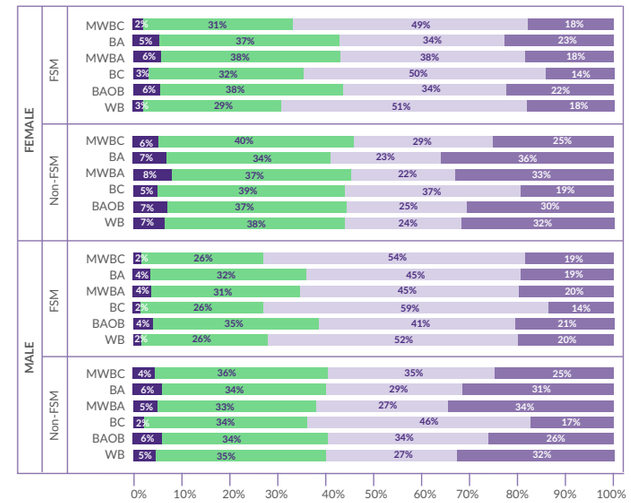
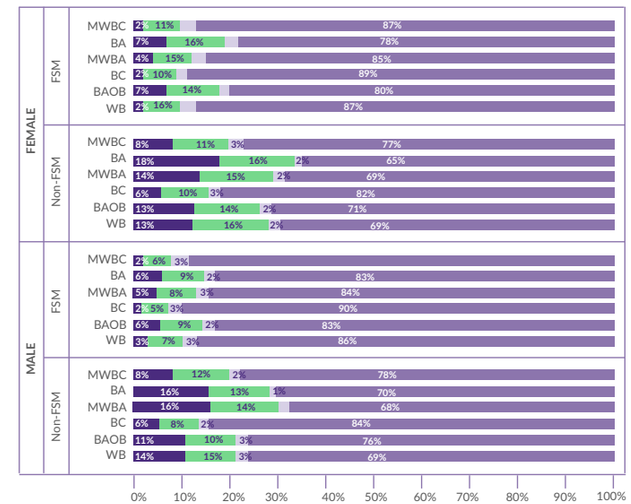


FIGURE 3.4: Participation and attainment data for physics GCSE80 2019[80]



The graphs show the following key points[82]:

MATHEMATICS ENTRY AND ATTAINMENT

- Mathematics is a core subject and therefore the vast majority of students are entered for GCSE. However, male students eligible for Free School Meals were most likely to not be entered for the exam and students from the Mixed White and Black Caribbean ethnic group had the highest level of non-entry, at 3.4%.
- Black Caribbean and Mixed White and Black Caribbean students have the lowest levels of attainment across both male and female groups and by socio-economic indicator (FSM), with the exception of White British girls eligible for free school meals who also perform relatively poorly compared with other groups.
- There are differences between Black Caribbean students and their peers in the 7-9 grade group. Black Caribbean students achieve half the percentage of grades 7-9 as other ethnic groups in the male, non-FSM category (with exception of students of Mixed White and Black Caribbean heritage). However, the differences in attainment between ethnic groups are very small and poverty is the dominant factor in these outcomes.

COMBINED SCIENCE ENTRY AND ATTAINMENT

- Black Caribbean students have the highest number of entries for combined science but the lowest attainment of all ethnic groups, regardless of gender and free school meal eligibility.
- The proportion of pupils achieving a level 7 to 9 is lower than for physics. This is due to the fact that higher attaining pupils are typically selected for triple science and a greater proportion of pupils taking combined science sit a foundation paper in which the top grade is limited to 5.
- Student deprivation, as indicated by eligibility for free school meals, results in lower attainment in combined science for all ethnic groups.

PHYSICS ENTRY AND ATTAINMENT

- Physics GCSE entry numbers for Black Caribbean and Mixed White and Black Caribbean students are lowest among all ethnic groups regardless of gender or free school meal status.
- Black African students have the highest GCSE Physics entry rates of all ethnic groups.
- Pupils eligible for free school meals are less likely to be entered for GCSE Physics regardless of gender and ethnicity.
- Black African and Mixed White and Black African students typically obtain the highest proportion of 7 to 9 grades in GCSE Physics
- Black Caribbean students consistently achieve the lowest proportion of physics grades at 7 to 9 and 4 to 6.
- The patterns observed in GCSE Physics are repeated in GCSE Biology and Chemistry.

[82] Note: While the data analysed here has not been explicitly tested for statistical significance, the data is based on entire student populations, not samples. As such, differences are based on verifiable conclusions, not hypothesized conclusions.

This data shows that, while Black African students are performing as well as, or indeed better than, the average among all ethnic groups in science and mathematics GCSE, Black Caribbean students are already well behind at this critical first formal stage of assessment, reducing their chances to continue with engineering subjects that could lead to motorsport careers.

It can also be seen that fewer Black Caribbean students are studying the Triple Science route. Previous research has shown that, in many schools, students are not always given the opportunity to choose whether to take the triple science pathway, but have the decision made for them through, for example, setting or streaming. Top set students are more likely to be offered triple science pathways compared with middle and bottom sets, but evidence shows that Black students are less likely to be placed in these top sets in schools[83]. This follows a more general trend of low teacher expectations towards students from Black Caribbean backgrounds in particular[84]. The issue of entry to triple science matters because triple science is often required by schools and colleges for progression to A levels in the sciences[85].

A report by the All Party Parliamentary Group on diversity in STEM education found that approximately 8% of schools do not enter any pupils for triple science[86]. The majority of these schools are located in deprived areas. The report also highlights that, in schools where both triple science and combined science is offered, pupils studying combined science are more likely to receive lower quality teaching while the triple science pathway is prioritised with specialist STEM teachers[87].

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[83] https://www.tandfonline.com/doi/pdf/10.1080/02671522.2016.1219382?needAccess=true
[84] https://cfey.org/wp-content/uploads/2018/12/LKMco-and-GLA-Boys-on-Track-FINAL-version-for-web.pdf
[85] https://www.britishscienceassociation.org/Handlers/Download.ashx?IDMF=debdf2fb-5e80-48ce-b8e5-53aa8b09cccc
[86] Inquiry on Equity in STEM education, APPG on Diversity and Inclusion in STEM, 2020
[87] Shift learning: Science timetables models research, Elsie Lauchlan, 2018

For combined science, the proportion of students attaining 9-7 is much smaller, never reaching 10% of the cohort across all ethnic groups in the chart. This may be explained partly because students expecting to perform well in sciences are likely to have been guided towards the triple science GCSE and also because many students that schools expected to perform less well are likely to have been entered for the foundation tier paper for combined science, where the maximum grade obtainable is a grade 5. The data also shows the additional impact of poverty on GCSE science attainment, and analysis from the Child Poverty Action Group highlights that almost half of Black children in the UK are living in poverty, further compounding the low grades achieved[88]. This complex interaction of poverty and race, that contributes to lower educational achievement, is crucial to address. There will be little progress made in improving attainment of Black students from the poorest households if the underlying socio-economic challenges are not resolved. There is already substantial evidence to show how the Covid-19 coronavirus pandemic has exacerbated the educational attainment gap between students from deprived backgrounds and their more affluent peers[89]. The research shows a consistent pattern: students have made less academic progress compared with previous year groups, and there is a large attainment gap for disadvantaged students, which seems to have grown. While the majority of research has focused on the widening gap in primary school education, the evidence shows that school closures have disproportionately impacted disadvantaged students. With high levels of Black students in low-income families, this is likely to impact on their attainment and progression in STEM subjects for many years to come.

DESIGN AND TECHNOLOGY

Design and technology (D&T) is the subject in school where most students first encounter practical, hands-on learning and the opportunity to design and make products in the school environment, although it is no longer formally considered a STEM subject by the Department for Education[90]. Nevertheless, the subject introduces students to a wide range of design and engineering principles that, when taught well, can inspire future generations to pursue engineering careers.

The number of pupils studying GCSE and A level D&T has been in steep and continued decline since the removal of its status as a compulsory subject at key stage 4 in 2004. Between 2006 and 2017, GCSE entry numbers have fallen from 326,000 to just 121,000, a decline of 60%[91]. Over the same period, entries among Black students for the subject have fallen from just under 10,000, which represented 46% of the Black student cohort, to 4,000, representing just 15% of the cohort.

The reduction of entries generally has been caused by a unique combination of factors that are making the delivery of quality D&T increasingly challenging.

Education reforms introduced by the Department for Education over the past ten years have emphasised the importance of a narrow selection of subjects listed in the English Baccalaureate accountability measure on schools[92] which, in turn, has created a hierarchy that places these 'academic' subjects above those that are viewed as more practical and creative, such as D&T, art and design and music.

[88] https://cpag.org.uk/policy-and-campaigns/understanding-and-responding-ethnic-minority-child-poverty

[89] https://educationendowmentfoundation.org.uk/eef-support-for-schools/covid-19-resources/best-evidence-on-impact-of-school-closures-on-the-attainment-gap/

[90] https://www.gov.uk/government/news/next-generation-of-young-people-gaining-the-skills-britain-needs

[91] https://seedash.iop.org/line.html

[92] https://www.gov.uk/government/publications/english-baccalaureate-ebacc/english-baccalaureate-ebacc

In addition, the increasing Academisation of schools in England is resulting in fewer schools being required to follow the National Curriculum, enabling them to opt out of teaching D&T altogether. Another key factor hastening the decline of the subject is the chronic under-recruitment of new teachers in D&T, with teacher recruitment well below 50% of target for the past five years and more. All these factors, including the relatively high cost of the subject, the need for large amounts of space, expensive capital equipment and an ongoing need to supply consumables for student projects is strongly influencing school leadership to remove the subject entirely, as responses from teacher surveys in a forthcoming report[93] from the Royal Academy of Engineering demonstrate.

The decline in D&T and the reduction in practical learning opportunities more generally in school curricula have potential detrimental longer-term implications for the development of future engineering talent for the motorsport sector. Practical learning leads to development of other capabilities desirable in future engineers such as problem solving, creativity, communication and collaboration. The lack of opportunity to experience hands-on engineering activity is also likely to impact on young people's career decision towards further study of the subject, both along academic pathways and technical, vocational pathways and apprenticeships.

[93] www.raeng.org.uk/D&T_stateofthenation

BARRIERS PREVENTING YOUNG BLACK PEOPLE FROM PROGRESSING WITH STEM SUBJECTS IN SCHOOLS

The data on student participation and attainment in STEM subjects at GCSE for young Black people, highlights concerns, particularly for those from Caribbean backgrounds, that require further investigation, in order to understand the underlying causes.

BEHAVIOUR MANAGEMENT

School behaviour management has seen increasing levels of public interest over the last few years with news stories of schools creating environments with strict discipline and increasingly severe sanctions against students for rule breaking[94,95,96]. In 2020, the Department for Education launched a £10 million three-year programme to create behaviour management hubs to improve pupil behaviour in schools.

Good behaviour in schools is an essential element of ensuring successful educational outcomes for students. Yet there is divided opinion on what successful behaviour management looks like. Tom Bennett, the lead behaviour adviser to the Department for Education suggests that the skills and habits of good behaviour are not innate but can be learned through being taught what those behaviours should be[97]. However, an alternative behaviour management approach is espoused by many senior leaders in schools, based on building trust and relationships through dialogue and communication.

There is concern within the Commission that the current trend in behaviour management in schools towards stricter policies and escalating sanctions leading to the use of isolation units and fixed-term exclusions is disproportionately affecting Black students. In research commissioned by the National Education Union on behaviour and belonging in education, academics at University College London highlighted:

"There is strong evidence that student perceptions of school safety, implementation of safety strategies, exclusion as a behaviour management mechanism and perceptions of belonging are 'racialised'"[98].

[94] https://www.birminghammail.co.uk/news/midlands-news/mums-fury-daughter-13-put-20854346

[95] https://www.edp24.co.uk/news/student-punished-for-short-haircut-lynn-grove-yarmouth-8073528

[96] https://www.independent.co.uk/news/education/education-news/afro-hair-discrimination-student-legal-action-payout-ruby-williams-urswick-school-a9323466.html

[97] https://tombennetttraining.co.uk/wp-content/uploads/2020/05/Tom_Bennett_summary.pdf

[98] Belonging, behaviour and inclusion in schools. What does the research tell us? National Education Union 2019. https://neu.org.uk/media/13036/view

Other research has suggested that that the use of some security measures are perceived differentially along racial lines:

"Approaches such as installation of CCTV result in increased sense of safety among White male students but increase a sense of threat amongst Black male students."[99]

The colloquial use of phrases such as 'zero tolerance' in school behaviour strategies has become increasingly common - a catch-all device that does not discriminate between low-level, infrequent behaviour issues or serious offence and harm. The increasing use of zero-tolerance policies for minor infractions of school policies, such as dress code and uniform, suggests the approach is contributing to a rise of students being given fixed-term and permanent exclusions[100]. While it is not possible to make a direct comparison with the UK system, it is interesting to note that experiences of students in the US suggest that sanctions in zero-tolerance behaviour management approaches are enacted disproportionately and most commonly upon students from low socio-economic backgrounds and on minority ethnic groups, in particular Black male students[101].

There has also been an increase in school-based police officers in English schools, and higher use of police in schools with higher proportions of students from minority ethnic groups[102]. In a survey of over 550 young people, parents and teachers on the use of police in schools in Greater Manchester, responses from young people who attended the schools suggest "that officers act in ways that discriminate against different minority ethnic groups, and particularly Black students"[103].

EXCLUSIONS, OFF-ROLLING AND ALTERNATIVE PROVISION

Fixed-term and permanent exclusions are used as sanctions by schools for dealing with poor student behaviour. In the 2018-19 academic year, fixed-term or temporary exclusions reached over 438,000, the highest level in thirteen years, while permanent exclusions were just under 7,900 across England, up 27% on permanent exclusions ten years previously[104]. Table 3.2 shows fixed period exclusion and permanent exclusion rates by selected ethnic groups in England between 2016/17 and 2018/19.

TABLE 3.2: Fixed period and permanent exclusion rates for selected ethnic groups[105] 2016/17

	TEMPORARY EXCLUSION RATE			PERMANENT EXCLUSION RATE		
ETHNIC GROUP	2016/17	2017/18	2018/19	2016/17	2017 /18	2018/19
Black Caribbean	10.2	10.46	10.37	0.28	0.28	0.25
White and Black Caribbean	9.69	10.13	10.69	0.24	0.27	0.24
Black African	4.21	4.08	4.13	0.09	0.08	0.07
White and Black African	5.53	5.78	6.22	0.11	0.14	0.12
Traveller of Irish heritage	16.72	17.42	14.63	0.45	0.29	0.27
Gypsy / Roma	17.29	16.52	21.26	0.36	0.36	0.39
White British	5.23	5.7	6.01	0.1	0.1	0.1

[99] Lacoe, J.R. (2015) Unequally Safe: The Race Gap in School Safety. Youth Violence and Juvenile Justice, 13(2), 143-168.

[100] https://www.birminghammail.co.uk/news/midlands-news/mums-fury-daughter-13-put-20854346

[101] Skiba, R. J. (2000). Zero tolerance, zero evidence. An analysis of school disciplinary practice, Indiana: Indiana Education Policy Centre.

[102] https://nopoliceinschools.co.uk/resources/Decriminalise%20the%20Classroom%20-%20A%20Community%20Response%20to%20Police%20in%20Greater%20Manchester%27s%20Schools.pdf

[103] https://nopoliceinschools.co.uk/resources/Decriminalise%20the%20Classroom%20-%20A%20Community%20Response%20to%20Police%20in%20Greater%20Manchester%27s%20Schools.pdf

[104] https://explore-education-statistics.service.gov.uk/find-statistics/permanent-and-fixed-period-exclusions-in-england

[105] https://explore-education-statistics.service.gov.uk/data-tables/fast-track/9b03beb4-f8e0-45d1-aed3-d2a8e0f2d19d

An independent review of exclusions undertaken by Edward Timpson MP[106] acknowledged that in the 2016 to 2017 school year in England (the latest data available at the time of the report) Mixed White and Black Caribbean students and Black Caribbean students had among the highest rates of temporary and permanent exclusion in schools out of all ethnic groups after students from Traveller and Gypsy/Roma backgrounds. Table 3.2 shows that this trend continued over the subsequent two years.

Findings from the Timpson review also showed higher rates of exclusion among looked after children[107] (11.83%), students with a statement of special educational need (6.44%) and deprivation as indicated by eligibility for free school meals (5.27%). Research undertaken by the University of Oxford highlights that Black Caribbean and Mixed White and Black Caribbean students are twice as likely to be identified with Social, Emotional and Mental Health needs as White British students[108].

Given these additional complex factors, the Timpson review applied a statistical methodology to examine which factors are most strongly associated with exclusion in secondary schools. Applying logistic regression methodology, the analysis found that, even accounting for these additional variables:

Black Caribbean students were around **1.7 times** more likely to be **permanently excluded** compared with White British students.

Black Caribbean and Mixed White and Black Caribbean students, Black African boys and Mixed White and Black African students, **as well as other ethnic groups also had a higher chance of fixed-period exclusion** compared with White British students.

[106] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807862/Timpson_review.pdf94 https://www.edp24.co.uk/news/student-punished-for-short-haircut-lynn-grove-yarmouth-8073528

[107] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807862/Timpson_review.pdf

[108] http://www.education.ox.ac.uk/wp-content/uploads/2018/12/Combined-Report_2018-12-20.pdf

Schools have a statutory duty not to discriminate against pupils on the basis of protected characteristics, such as disability or race[109]. While the factors surrounding exclusions are complex, the Timpson review clearly showed a disproportionate level of temporary and permanent exclusions among specific groups of Black and Mixed heritage Black students in 2017, regardless of other factors such as deprivation or special educational needs.

The most common reason for exclusions of Black students is physical assault against another pupil, while for students of Mixed heritage, persistent disruptive behaviour is recorded[110]. However, the organisation Just for Kids Law highlighted, in its recent study into exclusions in London[111], that the official recorded reasons for exclusion hide a complex set of contributing factors including students' individual needs (such as special educational needs, social, emotional and mental health needs, trauma, bullying and the sense belonging at school), home circumstances (deprivation, domestic violence and abuse), zero-tolerance school behaviour policies, lack of teacher training, the ability to identify student's needs (or lack thereof) in addition to other factors. The report goes on to say that:

> **"It is a legal requirement that schools investigate the possibility that disruptive behaviour is the result of unmet need, and act to reduce the risk of permanent exclusion. However, Just for Kids Law finds that schools have often failed to address the additional needs that are the context of a child's behaviour, leading to an escalation."**[112]

[109] https://www.gov.uk/government/publications/school-exclusion

[110] https://www.ethnicity-facts-figures.service.gov.uk/education-skills-and-training/absence-and-exclusions/pupil-exclusions/latest#temporary-exclusions-by-ethnicity

[111] https://justforkidslaw.org/sites/default/files/fields/download/Race%2C%20poverty%20and%20school%20exclusions%20in%20London.pdf

[112] https://justforkidslaw.org/sites/default/files/fields/download/Race%2C%20poverty%20and%20school%20exclusions%20in%20London.pdf

For students who are excluded from school on a temporary basis for more than five days, or are excluded on a permanent basis, there is a duty on schools to provide alternative education. This is delivered through institutions such as pupil referral units (PRU) and other alternative provision providers. Schools census data for 2018/19 shows the selected population of pupil referral units. In this year:

Black Caribbean students represented 1.0% of the student population across all years but **3.0% of the PRU population**

Mixed White and Black Caribbean represented 1.5% of the student population across all years but **3.8% of the PRU population**

Black African students made up 3.9% of student population across all years and **2.2% of the PRU population**

White students represented 65.4% of the total student population and 70.7% of the PRU population.

Another area of increasing concern is the practice of off-rolling: removing a student from the school roll informally without using a permanent exclusion. This includes pressuring parents to remove their children from the school, so as to avoid the need for the school to undertake a formal permanent exclusion process. However, off-rolling also means that the parents have no form of appeal[113]. As off-rolling is an informal process there is little or no recorded data. In its report, Unexplained Pupil Exits, the Education Policy Institute identified that over 55,000 students left the state school system for unknown reasons in 2017, representing 8% of the GCSE student cohort for that year. Students from Black ethnic backgrounds were among the groups (12.5%) most likely to experience an unexplained school exit[114].

[113] https://educationinspection.blog.gov.uk/2019/05/10/what-is-off-rolling-and-how-does-ofsted-look-at-it-on-inspection/

[114] https://epi.org.uk/wp-content/uploads/2019/04/EPI_Unexplained-pupil-exits_2019.pdf

CASE STUDY

THE BLACK CHILD AGENDA

The Black Child Agenda is an Independent Advocacy organisation set up in 2011 by Cheryl Phoenix to challenge the exclusions of Black children from education. The organisation was set up in response to what Cheryl felt was the direct discrimination her own children faced in school. Her sons were regularly placed in isolation for minor infractions that she felt their White and Asian peers would simply be told off for. They were never formally excluded from school but were told they could not attend and were unofficially 'off-rolled'.

Cheryl witnessed a further 16 young Black boys permanently excluded from local schools and saw an increasing link within her community between those who were excluded and those who became involved in gangs, crime, county lines and ultimately prison, in what she calls the 'schools to prison pipeline'.

"I saw one school in the community unlawfully exclude 16 young Black boys in one go for minor infractions a white student would have gotten away with. There was no regard for what that would mean for those boys, their families, and the wider community. These boys go from exclusion to gangs, knife crime and criminality, to county lines and ultimately prison or death. The system has no answer for this. The schools to prison pipeline seem to be designed for Black boys."

As a result, Cheryl took it upon herself to study Education and Family Law so that she would be able to advocate on behalf of children and families across the UK who have been unlawfully excluded, or are facing discrimination because of their disability, natural hair or skin colour.

PROVIDING SUPPORT

Cheryl highlights that Black parents do not know their legal rights or the policies and procedures set out by central government that protect their children.

Since starting in 2011, Cheryl has represented over 3,000 families in exclusion hearings, and seen 2,168 cases of unlawful exclusions and unofficial off rolling incidents. She believes targeting of Black students in this way is endemic within the UK education system.

"Parents leave their children in the care of adults, however far too often Black children are treated much more harshly and have no one in their corner. I faced racism in school in the 1970s. It's now the 21st century, and children as young as four are still facing racism within schools."

There are various organisations providing support for young people that have had to leave mainstream education. One such body, providing support through motorsport, is the Blair Project. Based in Manchester, the Blair Project support students who have struggled with mainstream schooling, giving them an alternative approach to STEM education through electric vehicle motorsport activities.

CASE STUDY

THE BLAIR PROJECT

CHALLENGING ELITISM

Founded in 2014, The Blair Project is the story of two Black teenagers Nile and Blair Henry, who set out to challenge what they saw as the elitism of motorsport. They wanted to provide opportunities for marginalised youth, at risk of exclusion from school or falling into criminality to progress into well-paid careers in STEM subjects using the draw and appeal of karting. The brothers had to overcome various barriers along the way and have felt the current willingness to address ethnic inequality was not always there.

"We were told by the director of an engineering firm that we should stop giving false hope to disadvantaged young people that they could make it to the highest echelons in motorsport, and instead 'help them to accept their position in life'."

Despite this, the brothers have remained resilient and persevered and in 2016 were rewarded and recognised by HRH Prince Harry.

"We've learnt that you have to be persistent, determined and resilient. When we set out seven years ago, the industry didn't want to know about equality, diversity and inclusion. There was a willingness to embrace women and girls in motorsport, but tackling racial inequalities was a no-no."

IMPACT OF THE PROTOEV STEM CHALLENGE

The ProtoEV STEM challenge gives young people hands-on experience in green technologies through the retrofitting of petrol go-karts into fully electric e-karts that they get to test and race to see which is the fastest and most energy efficient. The challenge gives participants transferable, practical skills in motors and powertrain, battery technologies, data analytics, cyber security and more. These skills are essential in creating and empowering the next generation of innovators, technicians and engineers to drive the green industrial revolution.

The programme has trained over 560 young people since it launched in 2014. Since then, 95% of young people who take part in the ProtoEV challenge have gone on to careers, apprenticeships or Further Education, with current alumni undertaking work in engineering, running their own business or enjoying Higher Education.

WHAT'S NEXT?

In 2022, Nile and Blair plan to launch a new urban street racing championship in Manchester, rolling out into other major cities in the UK, where teams retrofit and build fully electric e-karts, applying hydrogen fuel cells and other green technologies to beat the competition.

The Blair Project is also a partner in the Manchester Innovation Activities Hub, dedicated to the rapid upskilling, reskilling and training of more than 5,000 Greater Manchester residents over the next five years.

"Sir Lewis Hamilton has been a major inspiration for myself and my brother Blair. He is living proof that, with the right help and support, diverse talent can shine through and become world beaters in motorsport. The combination of people, machines and innovation under competition is a great leveller. That's why we do what we do at The Blair Project."

SUPPORT AND EMPOWERMENT

RECOMMENDATION 2

We recommend that a new exclusions innovation fund be established, developing programmes that address the factors that contribute to the high proportion of students from Black backgrounds being excluded from schools.

The fund will drive collaboration between key bodies in education: schools, local authorities, alternative provision institutions and other agencies. The programmes will be shaped by young people who have been, or are at risk of being, excluded from education, focusing on systemic issues such as school behaviour management policies, teacher attitudes, inclusive classroom management and teaching. In addition, the fund will provide programmatic support for young people at risk of exclusions across a number of activity areas but including the development of STEM and motorsport related activities as a way to engage these young people.

TEACHER ROLE MODELS

A growing body of literature underscores the importance of adult relationships in a secondary school setting with the strongest factor impacting on students' feeling of belonging in school being teacher support[115]. Students who believe that they have positive relationships with their teachers and that their teachers are caring, empathic and fair and help resolve personal problems, are more likely to feel a greater sense of belonging in their education environment than those students who perceive a negative relationship with their teachers[116].

There is also evidence that minority ethnic students benefit from coming into contact with teachers from the same ethnic background, who can act as role models, cultural brokers and cultural experts[117,118]. They also fulfil the role of advocate for minority students acting as 'translators' and forming a 'bridge' between minority and dominant cultures[119].

> "You don't really hear about the things Black people invented so you don't think it's for you. You always think it's the White people who developed all this technology. It was during one of the Black History Months that our teacher actually raised awareness of some of the technologies Black people invented but was not really talked about. It wasn't until then that I realised 'wait, we could also do something'. That gave me confidence that I could pursue something in science as well."
>
> **BLACK MALE ENGINEERING STUDENT, 21**

[115] Visible Learning: A Synthesis of Over 800 Meta-Analyses relating to Achievement. Hattie 2009. London: Routledge

[116] Quiocho, A. & Rios, F. (2000). The power of their presence: minority group teachers and schooling. Review of Educational Research 70(4) 485-528.

[117] Ross, A. (2001). Towards a representative profession: teachers from the ethnic minorities – conference paper. London Metropolitan University.

[118] Basit, T. & Santoro, N. (2012). Playing the role of 'cultural expert': teachers of ethnic difference in Britain and Australia. Oxford Review of Education 37(1) 37-52.

[119] Irvine, J. (1989). Beyond role models: An examination of cultural influences on the pedagogical perspectives of Black teachers. Peabody Journal of Education, 66(4) 51-63

The presence of teachers from the same ethnic backgrounds may reduce 'stereotype threats' and boost minority students' confidence, esteem and enthusiasm. However, in England, there are very few teachers from Black ethnic backgrounds. Across a total teaching population of around 500,000, just over 2% of teachers are from Black ethnic groups - 10,300 of which only 6,200 are in secondary schools, 800 have deputy or assistant head roles and just 200 are head teachers[120].

Research undertaken by University College London using the 2018 school workforce census for England highlighted that 86% of teachers are White British while only 65% of students are from a White British background. Moreover, almost half of schools in England (46%) have no Black, Asian or minority ethnic teachers at all and only 16% employ over a fifth of their teachers from Black, Asian or minority ethnic groups[121]. The research went on to show higher levels of attrition of minority ethnic teachers with overt and covert racism taking a toll on their wellbeing, progression and job satisfaction.

FIGURE 3.5: Number of Black teachers and pupils in schools in England

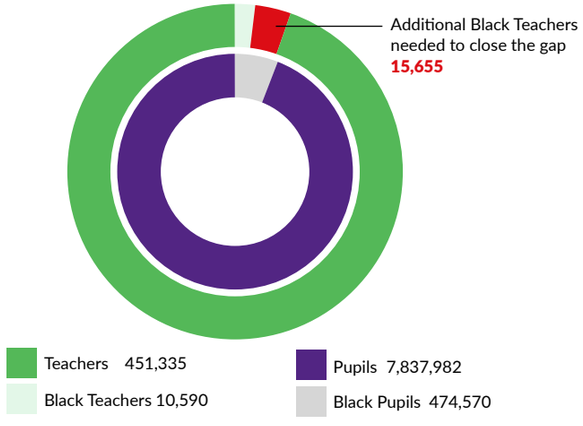


Figure 3.5 shows that in order to have a proportion of Black teachers that reflects the number of Black pupils within schools in England, a further 15,655 Black teachers are required[122].

This underrepresentation of Black teachers is likely to impact on young Black people; there is a need to increase the numbers of Black teachers, particularly in STEM subjects that lead to engineering[123].

SUPPORT AND EMPOWERMENT

RECOMMENDATION 3

We support the piloting of new approaches to increase the number of Black teachers in STEM subjects that lead to careers in engineering, namely mathematics, physics, design and technology, and computing.

These approaches should encourage more Black students from engineering, physical sciences, mathematics, and computing studies subjects in Higher Education, and existing Black engineers and scientists, to become teachers in UK secondary schools. This would increase the number of Black role models in STEM subjects that lead to engineering and motorsport careers. The pilots should be evidence based and fully evaluated, with lessons disseminated to influence a wide range of teacher recruitment organisations.

[119] School teacher workforce 2020. Department for Education. https://www.ethnicity-facts-figures.service.gov.uk/workforce-and-business/workforce-diversity/school-teacher-workforce-latest#by-ethnicity (accessed November 2020)

[120] https://discovery.ucl.ac.uk/id/eprint/10117331/1/IOE_Report_BAME_Teachers.pdf

[121] https://www.gov.uk/government/collections/statistics-school-workforce

[122] Data request for no of minority ethnic teacher across STEM subjects with DfE – still awaiting response

[123] Maylor, U. et al (2010) The impact of supplementary schools on pupils' attainment: An investigation into what factors contribute to educational improvements. Nottingham: Department for Children, Schools and Families. https://core.ac.uk/download/pdf/4150856.pdf

NON-FORMAL EDUCATION SUPPORT

Alongside the formal school education system, the Commission has learned much about the value and impact of non-formal education support mechanisms such as supplementary schools or Saturday schools, which provide community-led educational opportunities, often targeted at children and young people from Black and minority ethnic communities. These schools often complement and support formal school learning, with a strong emphasis on core subjects of English and mathematics, as well as offering additional lessons on culture, history and language particular to the community group. While there is limited data and research on supplementary schools, attendance is believed to be relatively high among Black, Asian and minority ethnic groups.

One report commissioned by the Department for Children, Schools and Families in 2010[124], surveyed 1,136 supplementary schools in England and found that between 18% and 28% of all children from non-White British backgrounds had contact with a supplementary school at any one time. The report found that the students who did attend the school had prolonged engagement, often remaining with a school for several years.

The report also found there to be several benefits and added value for both pupils and parents. For pupils, the benefits included developing positive relationships with education, positive identity reinforcement, increased confidence in asking questions and better understanding of their cultural background. For parents it led to increased engagement with their children's education and improved parent-teacher relationships in formal school environments. In a separate study for the Paul Hamlyn Foundation[125] analysis of student attainment found that, overall, students that attended supplementary school students did well in comparison to their peers, in seven local authority areas where the research was carried out. The percentage of students achieving 5 A-C grades at GCSE, including English and mathematics, who had attended supplementary schools exceeded the overall local authority results in all seven local authorities studied. This benefit was demonstrated to be even clearer for students who were eligible for free school meals.

BLACK SUPPLEMENTARY SCHOOLS

Black community groups have established supplementary schools in the UK predominantly to cater for what parents considered to be lacking in the mainstream education system but also because of what have been described as "vicious racial inequalities" faced by the African Caribbean community since their arrival in Britain[126]. While the focus is predominantly on supporting learning around the core subjects of English and mathematics, schools also offer pupils a strong sense of self to counteract predominant narratives[127].

[123] Data request for no of minority ethnic teacher across STEM subjects with DfE – still awaiting response

[124] Maylor, U. et al (2010) The impact of supplementary schools on pupils' attainment: An investigation into what factors contribute to educational improvements. Nottingham: Department for Children, Schools and Families. https://core.ac.uk/download/pdf/4150856.pdf

[125] David Evans and Kirsty Gillan-Tomas, Supplementary schools research report: Descriptive analysis of supplementary school pupils' characteristics and attainment in seven local authorities in England, 2007/08—2011/12 https://www.phf.org.uk/publications/supplementary-schools-research-report/ Accessed 26 May 2020

[126] Resisting racism. Race, inequality and the Black supplementary school movement. Kehinde Andrews. IOE Press. 2013

[127] Maylor, U. et al (2010) The impact of supplementary schools on pupils' attainment: An investigation into what factors contribute to educational improvements. Nottingham: Department for Children, Schools and Families. https://core.ac.uk/download/pdf/4150856.pdf

[128] Mirza, Heidi Safia, and Diane Reay. "Spaces and Places of Black Educational Desire: Rethinking Black Supplementary Schools as a New Social Movement." Sociology, vol. 34, no. 3, 2000, pp. 521–544. JSTOR, www.jstor.org/stable/42856200. Accessed 25 May 2021 or https://www.researchgate.net/publication/249825642_Spaces_and_Places_of_Black_Educational_Desire_Rethinking_Black_Supplementary_Schools_as_a_New_Social_Movement

> ***I think one of the things we really succeed in is giving the children a positive sense of self. We help them feel comfortable with their Blackness when out there they are bound to come up against situations in which they are made to feel uncomfortable about being Black."*** [128]
>
> **BLACK SUPPLEMENTARY SCHOOL TEACHER**

CASE STUDY

KAYODE

BLACK MALE · 33 · AEROSPACE ENGINEER

SCHOOL AND FORMAL ENGAGEMENT

Kayode was inspired by science and engineering at an early age when he saw the Concorde flying over his Peckham estate. His early memories of school were unpleasant, and he remembers casual racial discrimination. There was no support for talented Black students - the teachers tended to view passing with minimum grades as good enough. Despite this, Kayode passed the 11+ entry exam for a private school. He secured a 50% scholarship, but his parents could not afford it. At secondary school, Kayode recalls class sizes of over 35 students that the teacher was unable to control. There was a feeling of inherent low pupil expectations.

SUPPLEMENTARY SCHOOL

His parents saw this and decided to act, setting up a supplementary school. The school offered extra lessons for Black students struggling with attainment. Kayode felt the cards were always stacked against him at school until his parents set up this programme. He recalls his teachers' underestimation of his academic abilities. For him, they thought that "Cs were good, Bs were excellent". He went on to achieve five A*s and four As.

Kayode received an offer from Cambridge, despite his chemistry teacher writing on his reference that he was "not good enough" for Oxbridge. His confidence was knocked when he failed to get the grades he wanted and lost his chance to get to Cambridge. Instead, Kayode attended university in London and enjoyed it. He was able to work well in its diverse environment and found the support required to graduate.

Kayode feels if the motorsport and wider engineering industry were serious about increasing the numbers of Black people involved, they would be partnering with Black-led organisations based in the community.

> "The obvious solution is to work with Black-led organisations and empower more Black community leaders. My parents ran a Saturday school but could only run it as long as they received funding. Leaders like this need to be supported. . . organisations have become very adept and politically savvy in turning things on their head, talking about diversity in general as a way of avoiding conversations about Black people.

Black supplementary schools are mostly based in major cities including London, Birmingham, Manchester, Bristol, Leeds, Glasgow and Edinburgh. The schools are generally organic, grassroots organisations, with a history that reaches back into the 1950s, ever since the first wave of post-war migrants arrived and settled in Britain. They are small organisations, usually run by volunteers, who are often women, with parents typically paying a small fee for their children to attend.

The National Association of Black Supplementary Schools, a charity set up to encourage more parents to take advantage of supplementary schooling, as well as aiding such schools in becoming officially registered, has a directory of 29 supplementary schools with which they work. Beyond this, there are potentially many hundreds of unregistered, volunteer-based supplementary schools across the UK whose contributions are unknown at a national level[129].

While these schools appear to be a valuable additional education resource to young Black people, they have been historically unrecognised and overlooked as a tool for increasing the educational attainment of Black students. There are general concerns about the long-term financial viability of these schools. Those that are registered may receive grants from local authorities, but many school organisers are unsure of whether they would be able to continue beyond their grant[130]. In addition, as many schools are delivered by volunteers, the limited time spent on them is focused on delivering educational activities as opposed to the complex administrative procedures to register and apply for funding[131]. As such, many schools rely on charitable donations from local businesses or undertake fundraising activities to support the education of children from low-income families[132].

The curriculum in supplementary schools varies, based on the interest and abilities of the volunteer teachers. But in general, students receive support for the core subjects of English and mathematics as well as accessing education about their own cultures and history which is missing from the national curriculum in England. In addition, the schools might arrange visits to universities and museums, provide careers education and arrange sports activities, as well as providing role models and pastoral support to the students.

During interviews with supplementary school leaders, the Commission found that while many were enthusiastic in promoting sciences and STEM, often aiming to inspire pupils with the history of Black scientists and inventors, there was limited understanding of the science curriculum in schools and even less knowledge of how to go about contextualising the curriculum with hands-on practical engineering activities. With many of these schools positioned in the heart of their communities and with high rates of parental engagement, an increase in engineering/STEM engagement of both students and parents could help to empower more young Black people to consider and access careers in these sectors. There is clearly an opportunity to provide additional support to supplementary schools with STEM subjects to enrich the teaching and learning and inspire future generations of young Black children towards engineering careers.

[129] Hamilton Commission Interview with Nia Imara, Founder of the National Association for Black Supplementary Schools

[130] Maylor, U. et al (2010) The impact of supplementary schools on pupils' attainment: An investigation into what factors contribute to educational improvements. Nottingham: Department for Children, Schools and Families. https://core.ac.uk/download/pdf/4150856.pdf

[131] Hamilton Commission Interview with Marcia Gordan, Co-founder of Wilde International (Women, Into, Leadership Development and Empowerment)

[132] Hamilton Commission Interview with Nia Imara, Founder of the National Association for Black Supplementary Schools


© NATIONAL GRID

INSPIRATION AND ENGAGEMENT

RECOMMENDATION 2

We recommend that additional STEM activity support be provided to supplementary schools that are led by Black community groups across the UK.

Non-formal supplementary schools are powerful community-led vehicles for promoting STEM and engineering careers to young Black children. New support materials should be developed and co-created that enable students to have exciting, hands-on practical activities and learn about Black scientists and engineers and their contribution to the field. Training should be provided to school leaders and teachers along with careers support materials for young Black people. A STEM education enrichment fund should be established to provide supplementary schools with small grants to undertake STEM projects.

ACHIEVING GREATER RACE EQUALITY IN SCHOOLS

The data gathered as part of this Commission, and substantial evidence accumulated over many years by experts in education, highlight inequalities experienced by young Black people in schools – particularly with respect to Black Caribbean students: from disproportionately high levels of exclusions to underrepresentation in top-set streams and subsequently low entries and attainment in STEM subjects. For over fifty years it has been reported that Black Caribbean students have been failed by the education system in the UK:

> “
>
> …widely-held belief that Black children were somehow educationally subnormal.”
>
> Bernard Coard (1971)[133]

[133] How the West Indian Child is made educationally sub-normal in the British School System (5th Edition), Bernard Coard. Original publication 1971. 5th edition, independent publisher. 2021

> “West Indian Children as a group are underachieving in our Education System.”
>
> The Rampton Report 1981[134]

> “…there is no doubt that Black Caribbean children, as a group, and on average, are underachieving, both by comparison with their school fellows in the White majority, as well as in terms of their potential. Notwithstanding that, some are doing well.”
>
> (Swann 1985: 81)[135]

> “We are now seeing the third and in some cases the fourth generation of Black Caribbean pupils in schools in England. Their grandparents came from the Caribbean from the late 1940s, recruited to work in Britain after the Second World War. Like other Black settlers before them, they hoped for a prosperous future for themselves and enhanced educational opportunities for their children. It would be natural to expect those hopes to have been realised by now and to assume that the majority of Black Caribbean children in schools in England are sharing the higher educational standards attained by the most successful pupils in our schools. This is not the case.”
>
> (Ofsted 2002:1)[136]

[134] http://www.educationengland.org.uk/documents/rampton/rampton1981.html

[135] http://www.educationengland.org.uk/documents/swann/swann1985.html

[136] OFSTED. (2002). Achievement of Black Caribbean Pupils: Good Practice in Secondary Schools, OFSTED Publications HMI 448, April.

The National Education Union framework for developing an anti-racist approach in schools and colleges states that concepts and language around race and racism are not well understood[137]. The more often racism is talked about responsibly, the more comfortable staff will become in having these sensitive discussions and reflecting on the biases to which all human beings are susceptible. Racism is real, and is a daily lived experience for many young people, from assumptions and stereotyping to overt racist remarks and behaviours[138]. Black teachers and staff face a wide range of potential discriminations, including in recruitment, career and pay progression rates and also in relation to other HR matters such as performance reviews and role evaluations and levelling[139].

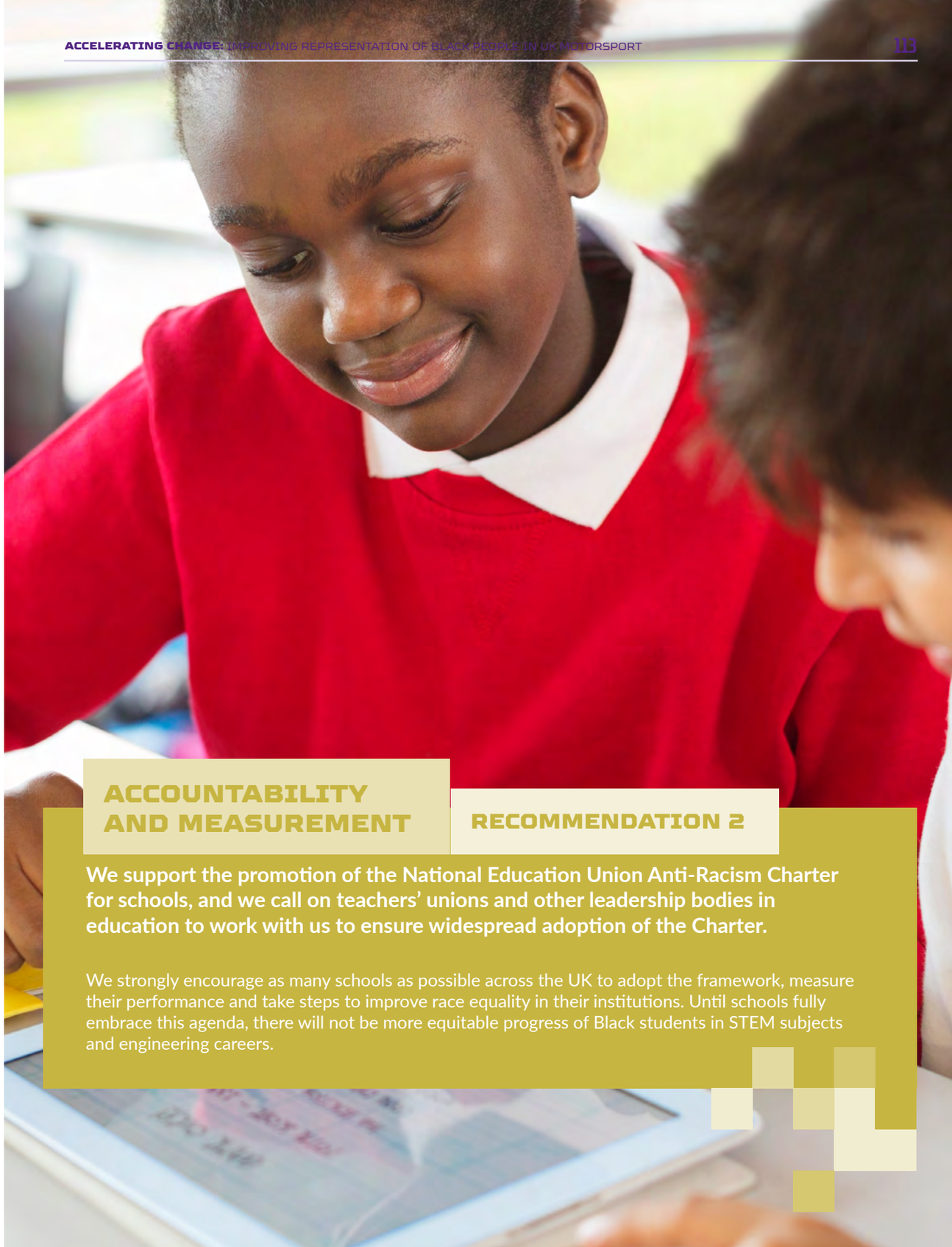
The current national curriculum fails to reflect important aspects of young Black students' histories and cultures. For example, in the science and mathematics curricula for England there is little or no reference to the contribution of non-White civilisations to the subjects[140]. More generally, the Commission believes that Black children should be entitled to an education which acknowledges their cultural heritage and that all children, from all ethnic groups, are entitled to a broad and balanced education which equips them for life and work in diverse, modern Britain.

Many young people from minority ethnic groups experience poverty[141]. These intersectionalities increase the likelihood of a range of detrimental educational outcomes for those young people, from increased levels of exclusions[142] to lower attainment in sciences and mathematics as shown in figures 3.2 to 3.4.

Despite the hard work of teacher and school leaders, more focused effort is needed to ensure that students from minority ethnic groups and lower socio-economic backgrounds are supported as much as possible in their education. The Commission acknowledges inequities impacting on White working-class students in England, as highlighted in the recent report by the House of Commons Education Select Committee[143]. This report also highlights the additional educational barriers faced by young Black people in schools and reinforces the importance of tackling underlying factors that affect the performance of students from disadvantaged groups.

To address the various inequalities across education, the National Education Union has developed a detailed Anti-Racism Charter for schools to adopt[144]. The charter provides a useful framework for schools to assess and make changes across the whole school approach: leadership, teaching and learning, curriculum, wellbeing and belonging, power and voice, and community. While relatively new, the Charter provides an excellent opportunity for school and college leaders to proactively address the various factors that are leading to inequitable education outcomes for young people from Black communities and the Commission strongly encourages school leadership organisations, teaching unions, local authorities, head teachers and others in leadership positions in schools to work together to increase adoption of the framework.

[137] https://neu.org.uk/media/11236/view
[138] https://www.ymca.org.uk/wp-content/uploads/2020/10/ymca-young-and-black.pdf
[139] https://www.theguardian.com/education/2021/mar/24/systemic-racism-teachers-speak-out-about-discrimination-in-uk-schools
[140] https://www.gov.uk/national-curriculum
[141] https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/poverty-ethnicity-evidence-summary.pdf
[142] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807862/Timpson_review.pdf
[143] https://committees.parliament.uk/publications/6364/documents/69838/default/
[144] https://neu.org.uk/anti-racism-charter



ACCOUNTABILITY AND MEASUREMENT

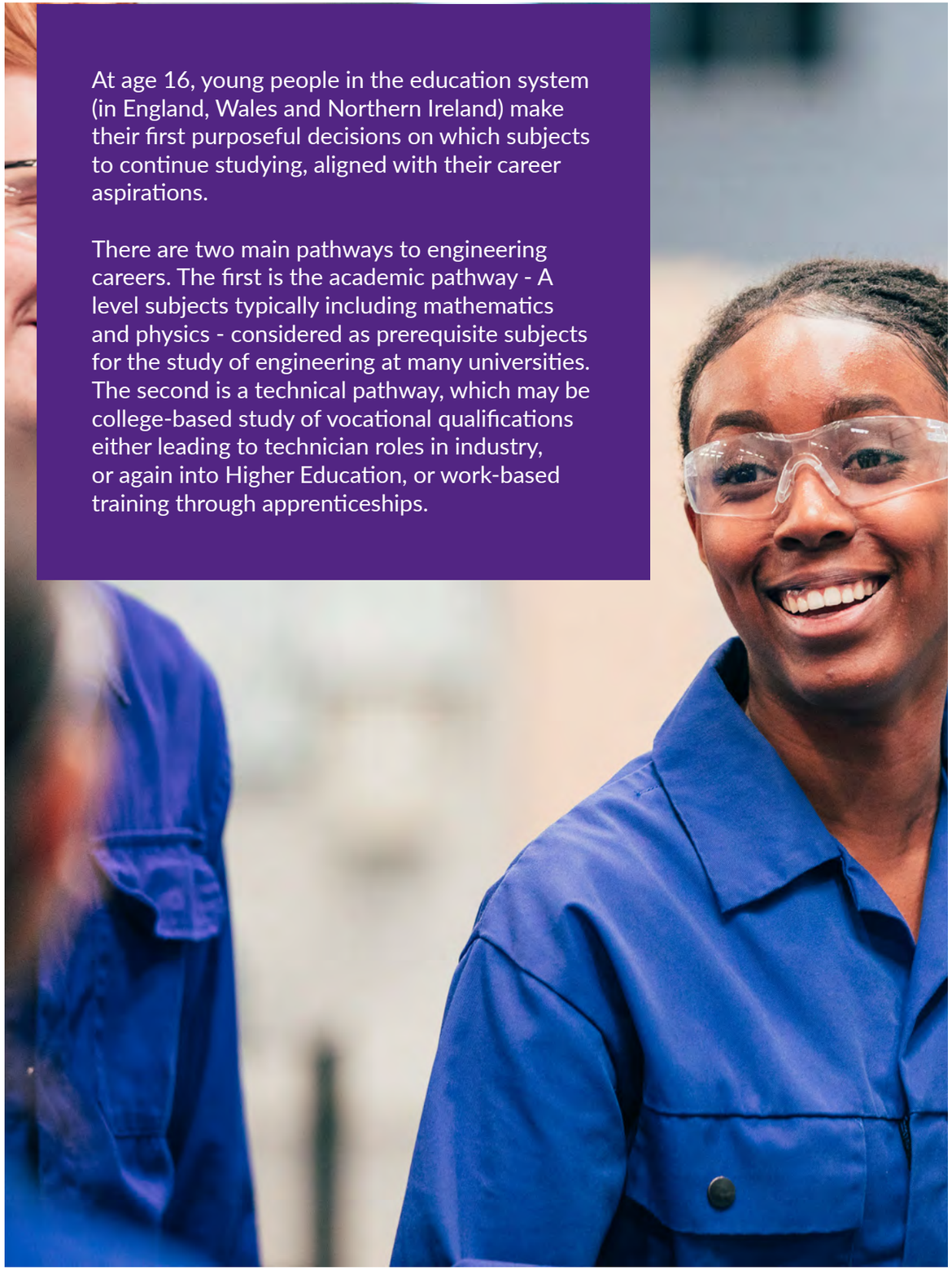
RECOMMENDATION 2

We support the promotion of the National Education Union Anti-Racism Charter for schools, and we call on teachers' unions and other leadership bodies in education to work with us to ensure widespread adoption of the Charter.

We strongly encourage as many schools as possible across the UK to adopt the framework, measure their performance and take steps to improve race equality in their institutions. Until schools fully embrace this agenda, there will not be more equitable progress of Black students in STEM subjects and engineering careers.

CHAPTER 4:

POST-16 EDUCATION



At age 16, young people in the education system (in England, Wales and Northern Ireland) make their first purposeful decisions on which subjects to continue studying, aligned with their career aspirations.

There are two main pathways to engineering careers. The first is the academic pathway - A level subjects typically including mathematics and physics - considered as prerequisite subjects for the study of engineering at many universities. The second is a technical pathway, which may be college-based study of vocational qualifications either leading to technician roles in industry, or again into Higher Education, or work-based training through apprenticeships.

STEM A LEVELS – THE ACADEMIC PATHWAY

Students who wish to continue on a path towards engineering will take A levels or vocational qualifications in engineering and related subjects. Figure 4.1 shows the entries to A levels in mathematics and physics by various Black ethnic groups and for White British students.

The graphs show a positive story for Black African students in terms of entries to mathematics and physics A levels compared with other ethnic groups, with some 34% of Black African students taking mathematics at A level and 11% taking physics at A level. Black Caribbean students however have a low representation of their cohort, with only 5% of the cohort taking mathematics and just 2% taking physics at A level.

FIGURE 4.1: Proportion of students from selected ethnic groups entered for A levels in Mathematics and Physics, 2019. (Based on their student population taking GCSEs two years previously)

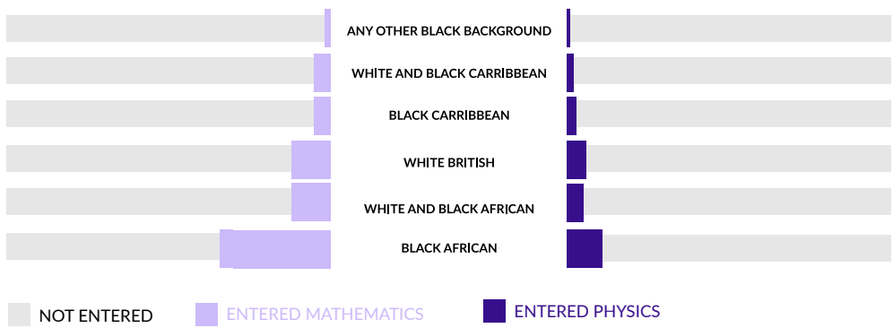


Figure 4.2 and 4.3 provide the attainment data for A Level Mathematics and A Level Physics. Further data on computer science and further mathematics A levels can be found in the Annex.

FIGURE 4.2: A Level Mathematics attainment by ethnic groups, 2019

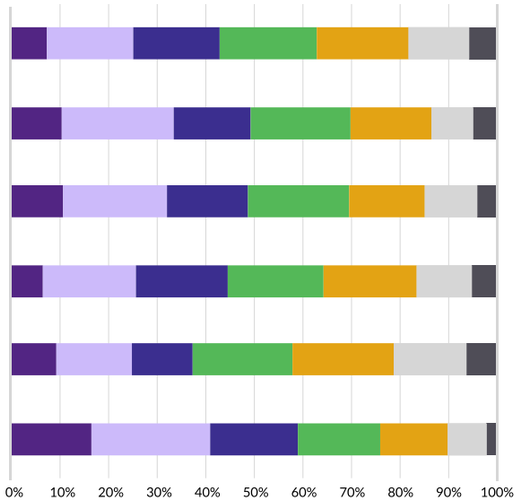
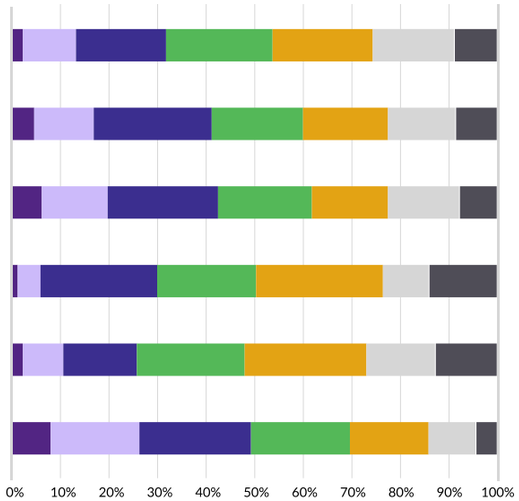


FIGURE 4.3: A Level Physics results



Mathematics attainment

- Across the whole Black student cohort (not including Mixed heritage), 7% achieved an A* grade, compared with 17% of the White British cohort. This equates to 249 Black students.
- 18% of the Black student cohort achieved an A grade compared with 25% of the White British cohort. This equates to 600 Black students.
- Mixed White and Black African heritage students achieved the highest proportion of A* grade among Black and Mixed White and Black ethnicity students, but overall Mixed White and Black Caribbean students had the highest proportion of achievements at A* and A grade.

Physics attainment

- Just 2% of the Black student cohort achieved an A* in physics. This equates to 21 students who were Black African and just 2 students who were Black Caribbean.
- 5% of Mixed White and Black ethnicity students achieved an A*, totalling 17 students
- This compares with 8% of White British students who achieved an A* grade.
- A further 10% of the Black student cohort achieved an A grade, which equates to 109 Black students.

With many of the UK's leading engineering universities (particularly the research-intensive Russell Group universities) requiring A* and A grades for students to study engineering and associated disciplines, this meant in 2019 just 135 Black students achieved the necessary grades typically required for entry.

Academic attainment at A level in subjects that lead to engineering therefore appears to be a major barrier to increasing the number of young Black students who could go on to study engineering at the UK's high-ranking universities. This, in turn, is likely to limit opportunities for Black students to access careers in motorsport, especially Formula 1, where it has been shown that many of the teams preferentially recruit from a select number of universities.

There is a clear need to improve the academic attainment of young Black students in mathematics and science A levels, along with raising aspirations, addressing concerns and building their confidence to apply for engineering degree programmes at a wide range of universities.

A Department for Education consultation on university admissions highlights evidence that students from lower socio-economic groups 'undermatch' their university applications in relation to the grades they actually achieve. Undermatching is the phenomenon whereby students from lower socio-economic backgrounds end up studying at institutions that have lower grade requirements than ones they could have studied at, based on their final grades[145].

There are various programmes and initiatives that provide opportunities for young people to explore opportunities in Higher Education and build confidence in students to encourage applications to universities. *The Amos Bursary*[146] is a highly regarded programme for talented young Black men who aspire to Higher Education study. Successful applicants on to the programme receive a small bursary, but the real value comes in the mentoring provided by the strong alumni cohort that has developed over the years. Former beneficiaries support existing Post-16 students on the scheme with university applications, careers advice and guidance and networking opportunities.

Other programmes include *Generating Genius*[147], which has been running for over 15 years, supporting young Black people to study STEM subjects at university, through a range of work experience opportunities, skills workshops, university applications and student mentoring. In2Science[148] and *Nuffield Research Placements*[149] offer STEM placement programmes to students from underrepresented and lower socio-economic backgrounds, enabling them to undertake real university research activity during summer holidays, building their confidence around university environments and developing their knowledge and skills while providing opportunities to take part in real, cutting-edge research.

A new programme, *Levelling Up: STEM*, sets out to address challenges of academic attainment of young people from low-income families alongside offering mentoring and support around university applications. As with other schemes, the programme provides pastoral support and peer mentoring from students with university applications through universities 'widening participation' programmes. However, what make *Levelling UP: STEM* stand out is the academic tutoring that is put in place specifically designed to improve grades in science and mathematics A levels.

[145] https://consult.education.gov.uk/he-access-and-admissions/higher-education-admissions-reform/
[146] https://www.amosbursary.org.uk/
[147] https://generatinggenius.org.uk/
[148] https://in2scienceuk.org/
[149] https://www.nuffieldresearchplacements.org/

CASE STUDY

EMMANUEL

BLACK MALE • 25 • AEROSPACE ENGINEERING STUDENT

SCHOOL AND FORMAL ENGAGEMENT

Emmanuel enjoyed maths, science and English at a young age and knew he wanted to make things but was not entirely sure what engineering was. He watched motorsport as his dad was a fan and they followed Michael Schumacher. Emmanuel was most interested in the pit stops.

> "How are they making a car that works – that can be broken down so quickly?"

Despite going to a majority Black school, by the time Emmanuel took his GCSEs there were only two Black students studying D&T and only nine Black students out of 30 in his physics class. Emmanuel feels this is to do with scientific racism and the idea Black people were not scientifically minded. Emmanuel studied maths, chemistry, physics and further maths at A level with an aim of getting into engineering. He had very few Black people on any of his courses and many Black students dropped out in the second year.

> "You can't just be Black and study maths. You have to be Black and exceptional to study maths."

UNIVERSITY EXPERIENCE

Emmanuel was one of three Black students on his course and found his own culture and practice of working to be at odds with his peers. When Emmanuel tried to get involved in group work meetings, he was ignored, and his group would meet without him.

> "I like engineering, I don't like the engineering community."

Emmanuel tried to join the Formula Student team but was unable to fit in as he was made to feel unwelcome.

> "There is a stigma and association of engineering being a White dominated area, which puts people off... motorsport coupled with the aerospace community are the peak of it... it's a very middle-class kind of sport... it's not something typically a Black student would know in the first place, because no one's really going to tell them."

POST-16 TECHNICAL EDUCATION PATHWAYS

Post-16 technical education is an important pathway for young people who do not want, or do not have the opportunity, to pursue an academic route to engineering jobs. It comprises two main approaches: full time learning in a Further Education or sixth form college environment or a work-based-learning route through an apprenticeship. Technical education plays a key role in ensuring engineering businesses have the technical, practical workforce they need for manufacturing and fabrication, maintenance and repair, IT support and many other aspects of technical functions required in their operations.

In motorsport, technicians and mechanics are pivotal members of the team and are highly regarded, working side-by-side with design engineers to consider manufacturing and assembly constraints, machining and fabricating components to extraordinarily high levels of precision; finely tuning and adjusting systems and assemblies to optimise car performance; and repairing and re-building elements of the cars, or indeed entire cars, in a matter of hours during race weekends.

The post-16 technical education sector is therefore a critical element in the supply of people for motorsport.

COLLEGE-BASED TECHNICAL EDUCATION

The Further Education sector in the UK is complex, with many different provider types and qualifications on offer and a range of provision targeted at meeting the needs of a wide demographic of learners, including under-16s, 16-19s, adult learners and others. In 2019, there were about 1,900 Further Education and skills providers, the majority of which were independent learning providers, which mostly provide apprenticeship training[150]. Around 280 colleges and sixth forms train and educate over 2.2 million people, with the majority (1.4 million) being adult learners over 25. The average age of a college student is 29[151].

Further Education covers a wide range of provision and, within this student population, there will be students who have not succeeded at school receiving basic/entry level education, as well as students taking A levels, advanced vocational qualifications and Higher Education degrees. In addition, there will be adults up-skilling or re-skilling to support their professional development and people taking courses just for the enjoyment of the subject.

[150] https://educationinspection.blog.gov.uk/2020/02/07/apprenticeships-and-the-skills-gap-post-brexit/

[151] https://www.aoc.co.uk/about-colleges/research-and-stats/key-further-education-statistics

CASE STUDY

KEVIN

BLACK MALE · 48 · AEROSPACE ENGINEER

SCHOOL AND FORMAL ENGAGEMENT

Kevin grew up in a predominantly White part of Birmingham on a council estate. Racism was common during his adolescence. Motorsport was never really an option, there was no exposure to the careers motorsport offered, even for young people with a passion. There was never really an opportunity for Kevin to say "that's for me," there was no one in a prominent position within F1, regularly on television or otherwise, who looked like him.

THE APPRENTICESHIP OPPORTUNITY

After GCSEs, the career advisors steered certain pupils to the job roles at local factories - the low-skilled, limited-career-prospect jobs. Kevin went on to do some work as an electrical contractor. He discovered the apprenticeship routes at a large car manufacturer and started a four-year training scheme. The apprenticeship was especially important to Kevin because he was at an age where he felt he needed to be paid as he was from a low-income family. He also understood the importance of a good education. The apprenticeship gave him an opportunity to do both.

He was able to gain a National Certificate, HNC, and then studied part time for a BSc, all while working and earning a wage. During this time, he achieved the Apprentice of the Year accolade.

He enjoyed his apprenticeship and feels it is a fantastic and underused route into engineering for young people. He feels more Black people would use the route if it was structured correctly and offered real opportunities.

He acknowledges that during his apprenticeship there were only a few people from minority ethnic backgrounds and a small number of young women. Such lack of diversity remains an issue in engineering and FE today. For Kevin, the issues of diversity start and end with the types of people seen in leadership.

"The course directors, the lecturers, the managers, the CEOs, the business owners, the policymakers.

The leadership tends to be all White and predominantly male. There is little encouragement for Black people to have significant roles in many industries."

ENGINEERING STUDENTS IN FULL-TIME POST-16 EDUCATION

Figures 4.4 – 4.6 show the enrolment rates for students studying engineering courses, motor vehicle courses and motorsport courses respectively.

FIGURE 4.4: Number of students enrolled on engineering qualifications in the Further Education sector by ethnic group (2019/20)

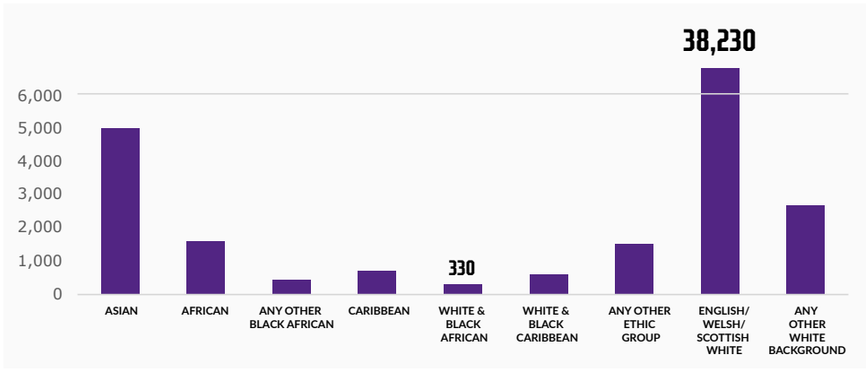


FIGURE 4.5: Number of students enrolled on Motor Vehicle engineering qualifications in the Further Education sector by ethnic group (2019/20)

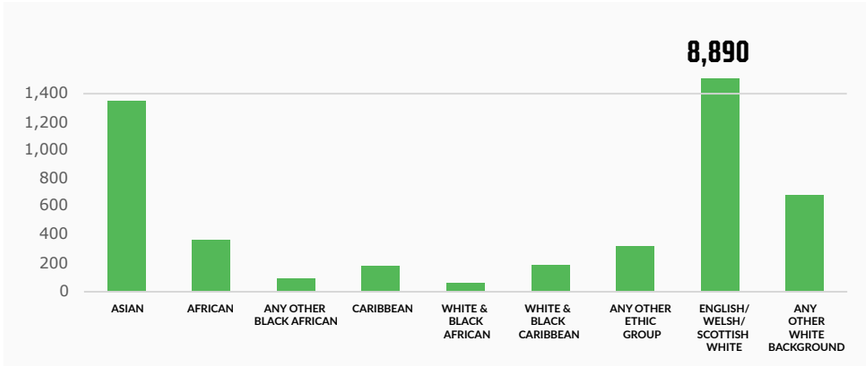
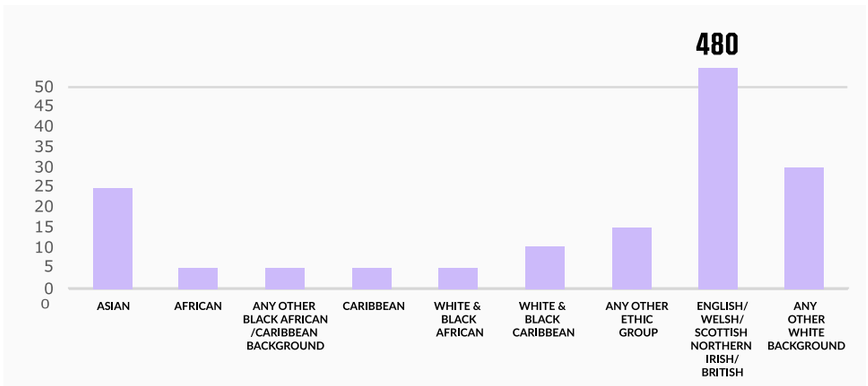


FIGURE 4.6: Number of students enrolled on motorsport engineering qualifications in the Further Education sector by ethnic group (2019/20)



Enrolments on motor vehicle courses represent around 20% of all engineering students but motorsport students represent only 1% of the engineering cohort. This is likely due to the limited number of colleges offering this specialist course.

There are just under 3,700 Black and Mixed White and Black ethnicity students enrolled on engineering courses in Further Education. These represent around 7% of the cohort.

For motor vehicle courses, there are 730 Black and Mixed White and Black ethnicity students representing 6% of the cohort, and in motorsport there are fewer than 30 students representing around 5% of the student cohort[152].

The representation of Black students in Further Education is generally similar to the school cohort representation, and there is a similar representation for engineering courses compared to schools which have 5.7% Black student cohort and a further 2.3% Mixed White and Black ethnicity students.

Figure 4.7 shows the attainment or pass rate of students on engineering programmes by ethnic group for the 2018/19 cohort. Pass rates are generally high, with over 80% pass rate across all engineering courses, and slightly lower pass rates for motor vehicle courses, with Black Caribbean students among the lowest percentages passing the courses. Interestingly, pass rates for motorsport courses are higher than engineering as a whole, with the exception of one or two ethnic groups. However, it should be noted that the number of learners for motorsport are very low which can affect the average.

FIGURE 4.7: Pass rate for engineering qualifications by ethnic group, 2019/20.

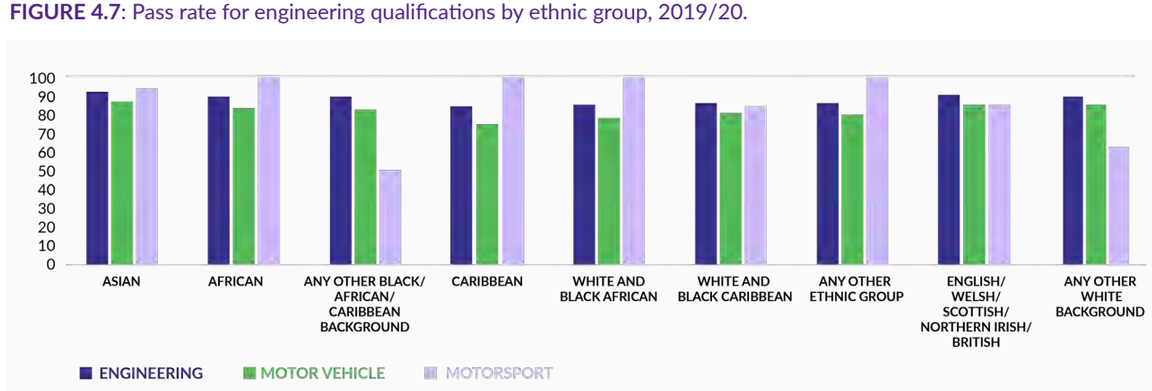
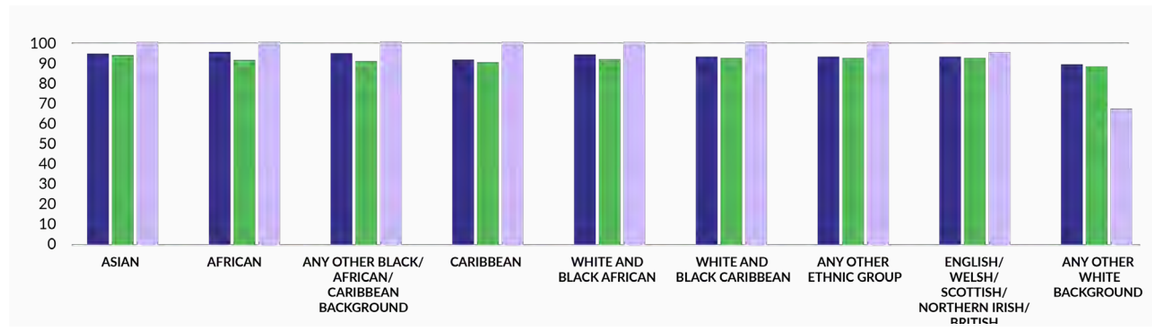


FIGURE 4.8: Percentage retention rates of students enrolled on engineering qualifications 2019/20



[152] Numbers of students below 5 are supressed in the data and so the data records 5 as a maximum.

Figure 4.8 shows the retention rate for motorsport, which is 100% for most ethnic groups, again higher than the engineering average. Given the low overall numbers, this is very positive as one drop-out can skew the retention rate significantly. This suggests a high level of interest and deep engagement with the subject. It may also highlight positive learning environments where Black students feel a sense of belonging and supported.

Among those Black students who are keen to pursue a career in motorsport, additional support to build experience, knowledge and skills would be of substantial benefit. Further, providing collective support to a group of young Black students would enable students to provide peer support to each other as they begin their journey into motorsport careers.

APPRENTICESHIPS

Apprenticeships are jobs with substantial elements of training, including 20% (one day) off-the-job training where students will typically go to a Further Education college or apprenticeship training provider for classroom-based education and training.

The Department for Education has been championing apprenticeships since 2010 and a great deal of effort has been invested in transforming apprenticeship standards, provision and funding. All companies with annual wage bills greater than £3M now pay into the Apprenticeship Levy. To recoup these funds, they must take on and train apprentices.

There are many apprenticeship opportunities in engineering and in 2019, there were just under 60,000 engineering apprenticeship 'starts' at all levels. Table 4.1 provides information on the number and percentage of apprentices by ethnic group at different apprenticeship skill levels[153].

TABLE 4.1: Number of apprentices in engineering and manufacturing at each level, split by ethnic group 2019/20

Ethnicity	Level 2		Level 3		Level 4+		Total	
Asian/Asian British	960	4%	900	3%	120	6%	1,980	3%
Black/African/Caribbean/ Black British	580	2%	500	2%	40	2%	1,120	2%
Mixed/Multiple Ethnic Group	500	2%	730	2%	60	3%	1,290	2%
Not App/Known	180	1%	210	1%	130	6%	520	1%
Other Ethnic Group	210	1%	130	0%	10	0%	350	1%
White	21,120	90%	30,710	93%	1,800	83%	53,630	91%
Total	**23,550**		**33,180**		**2,160**		**58,890**	

[153] Note: intermediate (level 2) is equivalent to GCSE, advanced (level 3) equivalent to A level, higher (level 4+) equivalent to HNC

It is clear that people from minority ethnic backgrounds are seriously underrepresented in engineering apprenticeships, representing just 9% of apprentices across all skill levels. This compares very poorly with the school population, where some 34% of students are from minority ethnic groups.

In 2019, Black people accounted for just 2% of apprentices.

To address the low number of apprenticeships undertaken by minority ethnic groups, the government launched the Apprenticeship Diversity Champions Network in 2017 with targets to increase representation. Targets for Black, Asian and minority ethnic apprentices were set at 11.9% of all apprenticeships starts by 2020[154]. These targets have not been met. Across all sector areas, the representation of minority ethnic apprentice starts in the first three quarters of 2019/20 was just 7.7% compared with around 25% for full time Further Education courses[155].

FACTORS AFFECTING LOW PARTICIPATION OF BLACK PEOPLE IN APPRENTICESHIPS

There are various reasons as to the causes of low participation rates of young Black people in apprenticeships. A key factor is the lack of parity of esteem of apprenticeships compared with more academic routes, with young people from minority ethnic groups aspiring and being encouraged by their families towards high academic attainment and university[156]. Indeed, there are instances when businesses have reported trying to reach out to minority ethnic communities, but that take-up has been poor, although this reporting was anecdotal[157].

The general availability of apprenticeships is another key factor. For example, London has the second lowest number of apprenticeship places of any region but 60% of all young Black people in the UK live in London and will face more competition for apprenticeship places than in other regions[158].

The declining availability of engineering apprentices at lower levels, which tend to have a higher representation of students from lower socio-economic backgrounds, who in turn come disproportionately from minority ethnic backgrounds, will reduce the opportunities for many young people to start an apprenticeship[159].

Despite all this, analysis by the Black Training and Enterprise Group (BTEG) suggests the problem of underrepresentation of minority ethnic groups in apprenticeships appears to lie more in recruitment than in attracting candidates. Their research shows that while 25% of the applications for apprenticeships were from individuals not classed as 'White British', they made up just 10% of the apprentices taken on for the same year[160]. Ultimately, apprenticeships are jobs with training and decisions regarding who to employ lie with businesses. **We strongly encourage engineering companies, in motorsport and beyond, to follow good practice in inclusive recruitment to ensure that all young people are given a fair opportunity for employment in the organisation.**

[154] Note: intermediate (level 2) is equivalent to GCSE, advanced (level 3) equivalent to A level, higher (level 4+) equivalent to HNC

[155] https://feweek.co.uk/2020/10/23/anger-and-dismay-as-bame-apprenticeship-figures-fall/

[156] https://www.greatermanchester-ca.gov.uk/media/1921/removing-barriers-for-bame-people-accessing-apprenticeships.pdf

[157] https://feweek.co.uk/2020/11/08/fe-colleges-have-been-too-reluctant-to-challenge-bias-against-black-and-asian-apprentices/

[158] BTEG briefing paper, ethnic minority young people and apprenticeships in England, 2021, (not yet published)

[159] 16% of FE college students were eligible for Free School Meals in 2018/19 compared with 8% in maintained schools and Academy 6th forms. AOC data https://feweek.co.uk/2020/10/25/after-black-lives-matter-its-time-fe-led-the-way-on-inclusion/

[160] Data taken from 2015/16 (the latest publicly available data) https://feweek.co.uk/2020/11/08/fe-colleges-have-been-too-reluctant-to-challenge-bias-against-black-and-asian-apprentices.

IMMEDIATE OPPORTUNITY

There are a number of things that companies can do quickly and easily to start being more inclusive in recruitment practices. For example, checking careers marketing materials to ensure that they are inclusive and feature diverse images of candidates from Black and other minority backgrounds. Another immediate opportunity that can help with removing bias from the recruitment process is to use diverse interviewers, wherever possible, and providing unconscious bias training to those involved in the recruitment process.[161]

In addition, the chances of young Black students accessing apprenticeships and technician careers following their post-16 education, or indeed applying for university study, will also be influenced by the availability and quality of careers support.

The Careers and Enterprise Company, the body established by the government to support careers education in schools and colleges in England, identifies the characteristics of good and effective careers provision as: use of appropriately qualified professionals, face-to-face interactions, industry speakers, visits to universities and employers, and careers fairs.

The quality standards that colleges have historically used, such as the *Matrix* standard and the *Quality in Careers* standard have been joined by an updated version of the *Gatsby Benchmarks* for college settings and new guidance from the Department for Education. Employer engagement is a key aspect of college careers provision and can include amongst other things: mentoring activities, enterprise competitions, work experience, job shadowing, workplace tasters, and employers setting briefs for project work[162].

For young Black people, careers support is particularly important, given the high rate of unemployment of young Black people, compared with their White British counterparts, following the pandemic[163]. Yet research from BTEG suggests that young Black men in particular are less likely to take up 'passive' career services, where they have to proactively seek out careers information, advice and guidance[164]. As such, there is a need for an additional careers support programme for young Black people to maximise their chances of employment in engineering and motorsport more specifically.

[161] The Royal Academy of Engineering has guidance for employers on inclusive recruitment, https://www.raeng.org.uk/diversity-in-engineering/resources/inclusive-recruitment

[162] https://www.careersandenterprise.co.uk/sites/default/files/uploaded/1140_what_works_for_colleges_digital2.pdf

[163] https://www.theguardian.com/society/2021/apr/11/black-youth-unemployment-rate-brixton-riots-covid

[164] Interview with Jeremy Crook, BTEG and Commissioner

SUPPORT AND EMPOWERMENT

RECOMMENDATION 4

We recommend the creation of targeted support programmes for Black students in post-16 education to enable greater progression into Higher Education courses and work-based training opportunities linked to the motorsport sector.

These programmes, co-created with young Black students, Black community groups, and STEM subject bodies, will aim to improve academic attainment for STEM A Levels, provide careers advice and guidance, pastoral support and peer-mentoring, and signpost to traineeship and apprenticeship opportunities. Programmes should also explore new motorsport engagement and education activities, including summer schools, to support Black students to develop their knowledge of the motorsport industry.

RACE EQUALITY IN FURTHER EDUCATION

Despite the high proportion of minority ethnic students in Further Education (FE), there are clear issues of race equality in the sector. An open letter from a group of senior Black, Asian and minority ethnic leaders and allies in FE was sent to the Prime Minister and the Secretary of State for Education in 2020, highlighting their concerns regarding racism in FE[165].

> “The FE sector has gone backwards over the last few years in terms of the numbers of Black Principals, leaders, middle tier managers, teaching staff and governors. There is no longer any systematic monitoring, training or positive action in place to address this. Critically, there remain significant attainment gaps for black students when compared with their peers.
>
> Alongside this, the lack of a structured approach to measuring the extent of the issues faced by Black, Asian and minority ethnic communities inhibits progress. There is no baseline data on ethnicity profiles across all levels of sectoral leadership. There is no analysis of student and staff referrals to disciplinary processes. There is no evaluation of the extent of the barriers faced by black students and staff in accessing job and career progression opportunities.”
>
> **Open Letter from the Black Further Education Leadership Group**

[165] https://www.tes.com/news/racism-undermines-fe-government-told

The letter to the Prime Minister and Education Secretary called for a ten-point plan to be adopted to address systemic racism in the sector. The plan covers a wide range of challenges in FE, from curricula and qualifications to leadership culture, professional development opportunities for lecturers to engage in issues of race equality, to reporting of workforce data including leadership and governor ethnicity data[166]. **The Commission supports the ten-point plan and calls on the Department for Education to work with the sector to take it forward.**

The Times Education Supplement reported that, in a survey of 140 colleges, just 8.7% of senior leaders in English colleges identified as being from Black, Asian or minority ethnic background with only 2% identifying as from Black ethnic groups[167].

Most of the FE sector’s national representative and regulatory organisations’ leadership teams are predominantly White. For instance, the Association of Colleges (AoC), Education & Training Foundation and Society for Education and Training have always had 100% White leadership teams, and historically near non-existent Board level representation, with the exception of AoC’s current (and laudable 7%). AoC has never had a minority ethnic President. The FE Commissioner’s senior team also has no Black, Asian or minority ethnic representation. Ofsted, which is responsible for inspecting colleges, reported that only 5% of all its inspectors were from Black, Asian and minority ethnic backgrounds in 2018[168].

In 2019, the Education and Training Foundation, a workforce development body for the FE sector, launched a Diversity in Leadership Programme in a bid to challenge bias, remove obstacles to attaining leadership roles and to use tools to build confidence in aspiring leaders[169]. However, in an interview with the Times Education Supplement in July 2020, Mark Wright, the Director of design and development at the Foundation, said that due to financial challenges with the sector, the issue of diversity has fallen off the agenda[170].

It is clear that the FE sector is facing many of the same challenges as schools in terms of race equality and we encourage College leaders to adopt the NEU framework as discussed in Chapter 3.

DATA CHALLENGES

Of all the data analysis undertaken by the research team for the Commission, it has been very challenging finding suitable publicly available government data on student attainment by ethnic groups in the FE sector. On student data more generally, while there have been clear improvements in transparency of data over recent years, the Commission has found the level of detail required for analysis of student participation and attainment by ethnic groups in specific subject areas difficult to obtain. We would encourage the Department for Education, the governments of the Devolved Nations of the UK, and other bodies holding substantial education data (such as UCAS and HESA) to do more to enable independent analysis of student attainment and progression by subject and diversity characteristics and make this available.

[166] https://www.fenews.co.uk/fevoices/52439-addressing-systemic-racism-in-further-education
[167] https://www.tes.com/news/revealed-fes-lack-diversity-leadership
[168] https://www.fenews.co.uk/fevoices/52439-addressing-systemic-racism-in-further-education
[169] https://www.et-foundation.co.uk/news/etf-launches-diversity-in-leadership-programme/
[170] https://www.tes.com/news/revealed-fes-lack-diversity-leadership

CASE STUDY

SADE

BLACK FEMALE - 27 - ELECTRICAL ENGINEERING STUDENT

SCHOOL AND FORMAL ENGAGEMENT

Sade came from a family with a strong belief in education, with her parents tutoring her in preparation for 11+ exams. Despite being one of only four Black girls at her primary school, Sade felt no prejudice. When her teacher saw her potential, she encouraged her immensely.

Without having a particular career in mind, she chose A levels in maths, further maths, PE and physics. Her parents encouraged her to become a doctor, lawyer or an engineer. At her specialist maths and science school, there was little advice on engineering and work experience was not great. Undeterred by this, she became one of three girls that chose engineering from the 120 in her school.

UNIVERSITY EDUCATION

In Year 12, Sade inquired about engineering through career advisors in sixth form. She was more concerned about being a woman in engineering than about being from a minority ethnic background. Through an Engineering Development Trust (EDT) course, she became exposed to a variety of engineering disciplines, which helped her pick electrical engineering.

Sade went on to study a Master's at a Russell Group University. As part of her end of year project, she worked with Jaguar Land Rover (following a prior one-year placement with them) and returned on a graduate scheme upon completion of the project.

MOTORSPORT CAREERS

Sade believes that motorsport engineering is not a field that is well known enough to attract Black candidates. This could be due to an underrepresentation of motorsport companies at job fairs and open days.

Sade believes that the field of motorsport and engineering is highly dominated by men. She feels that Black women lack the confidence to pursue engineering and require assistance in maintaining resilience in the field. A further lack of guidance with CVs, interview training and clear concise information about available opportunities in motorsport add to the underrepresentation of Black people in motorsport careers.

ACCOUNTABILITY AND MEASUREMENT

RECOMMENDATION 3

We call on the Department for Education, and other bodies holding education data, to enable easier public access to disaggregated data on student and staff characteristics, at subject level.

Specifically to the Department for Education:

- Student participation and attainment - subject level by student diversity characteristics at GCSE
- Student participation and attainment - subject level by student diversity characteristics at A level
- Student participation and attainment - subject level by student diversity characteristics at Vocational Related Qualifications and applied general (all levels)
- College workforce data – lecturer diversity characteristics by subject

CHAPTER 5:

HIGHER EDUCATION

For young people wishing to follow a career path into professional motorsport roles, studying engineering or an associated discipline in Higher Education is a key route for entry.

There are a wide variety of disciplines within engineering and those of most interest to the motorsport sector will be mechanical engineering, aerospace engineering and electronic engineering disciplines. Additional, more specialised roles would include materials science and chemical engineering. Other associated STEM subjects will also be of interest to motorsport teams including computer science, physics and, in some cases, mathematics.

CURRENT UNDERGRADUATE POPULATION IN ENGINEERING HIGHER EDUCATION

Across all the UK's Higher Education institutions in 2019/20 (latest data available at the time of writing), there were just under 2 million UK domiciled students of which 73% were White British. Black students were 7.7% of the cohort and the remaining 17.5% were from Asian and other minority ethnic groups[171]. Black students are proportionally more likely to study at a Higher Education institution than their White British counterparts[172]. However, the representation is not equally distributed across all university groups. There is a clear disparity between Black students and White British students with regards to university group attended, with 6% of Black school leavers attending a Russell group university, compared with 11% of White school leavers[173].

Figure 5.1 shows the representation of students by STEM subject area relating to engineering and associated disciplines across all years of study. Engineering has the highest proportion of Black and more broadly minority ethnic students of all mathematical and physical science-based subjects. Figure 5.1 also shows the diversity of the student cohort in engineering and technology subjects is slightly higher than the Higher Education average, with students from minority ethnic backgrounds representing 29.7% of entrants in 2019/20 as compared with 26.2% for the total population of minority ethnic students[174].

[171] https://www.hesa.ac.uk/data-and-analysis/students/whos-in-he/characteristics accessed June 2021
[172] Educational Pathways into Engineering. EngineeringUK 2020. www.engineeringuk.com
[173] https://www.equalityhumanrights.com/en/race-report-statistics
[174] https://www.hesa.ac.uk/data-and-analysis/students/what-study/characteristics accessed June 2021

Black students have lower representation in engineering and technology at 7.2%, compared with Higher Education as a whole at 8%. However, this is still higher than their representation in the school population, which in the same year is 5.7%[175].

This is largely due to a high proportion of Black African students studying engineering (6%) compared with their school representation (3.9%) while Black Caribbean students are slightly underrepresented in engineering degrees (0.8%) compared with their school population (1%) and Black students from any other ethnic background are also underrepresented in engineering (0.3%) compared with the school population (0.8%).

In terms of absolute numbers, in the 2019/20 academic year, this representation equated to 7,045 Black students studying undergraduate engineering degrees across all years[176].

©THIS IS ENGINEERING

[175] Note: this is not a direct comparison because of annual changes in school and HIgher Education populations and delay between the two phases but it does provide a good indication of representation

[176] https://www.hesa.ac.uk/data-and-analysis/students/what-study/characteristics accessed June 2021

Figure 5.2 shows the representation of students by ethnic group across all years of study for selected engineering disciplines relating to motorsport for the previous year, 2018/19. Chemical and process engineering is the most popular engineering discipline for Black students and for other minority ethnic groups. Aerospace engineering and electronic and electrical engineering also have slightly higher representation of Black students compared with other disciplines.

FIGURE 5.1 Representation of UK domiciled students by ethnic group across all years of undergraduate study for engineering and associated subjects, 2019/20

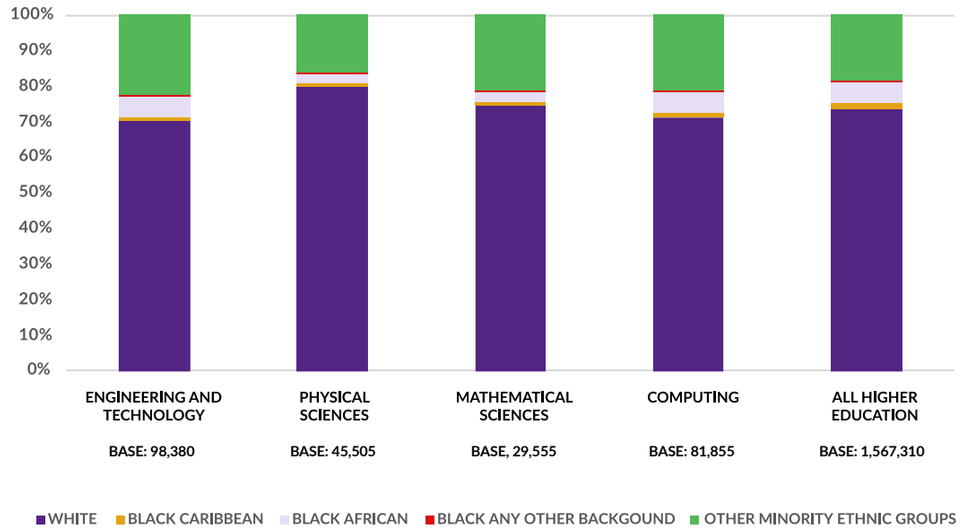


FIGURE 5.2: Representation of UK domiciled students by ethnic group selected engineering disciplines, 2018/19.

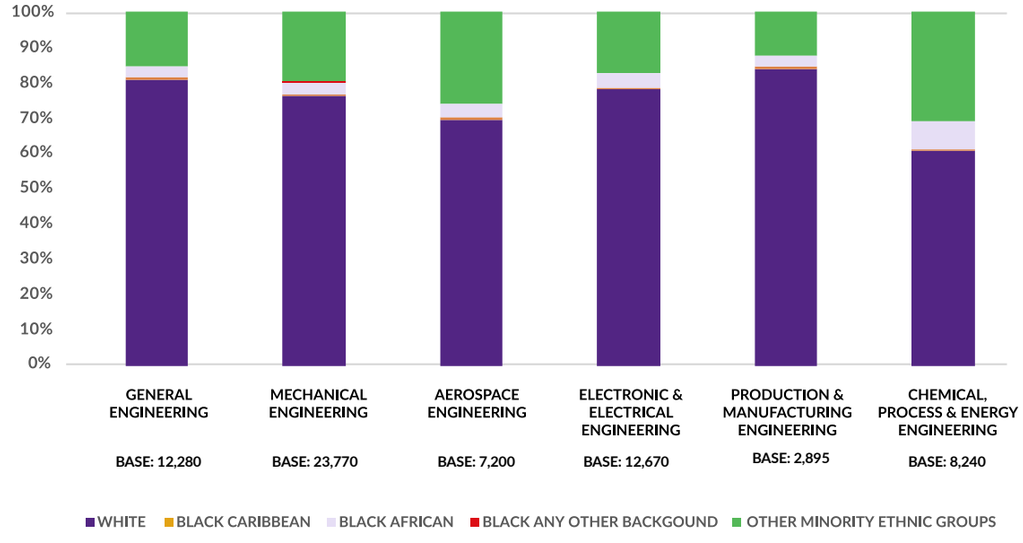


Figure 5.3 shows the representation of Black students at different university groups. Post-1992 universities have the largest proportion of students for all ethnic groups, with around half of each studying engineering degrees in this university group.

Black African students have good representation in the Russell Group (28%), which is similar to White students (29.8%).

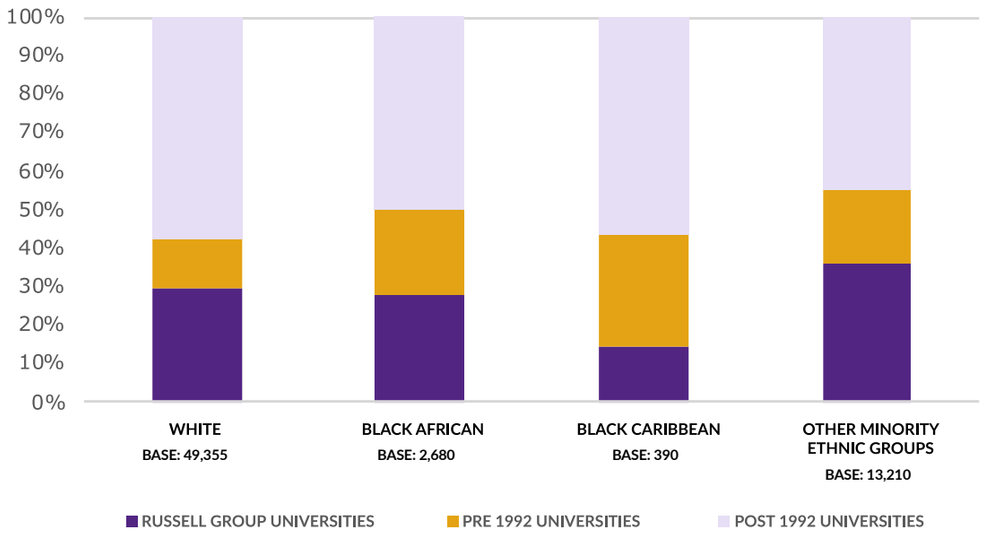
However, **only around 14% of Black Caribbean students attend Russell Group** universities.

In terms of absolute numbers, **just over 800 Black students are studying engineering** subjects of interest to motorsport organisations at Russell Group universities in all years of study, resulting in around **just 200 graduates per year** from Russell Group universities.

Further detailed analysis of students from Black ethnic backgrounds taking engineering degrees by university and engineering discipline relating to motorsport are presented in the Annex.

It is important to note once again that there is excellent engineering Higher Education provision and there are high calibre engineering students outside the Russell Group universities, and it is welcome that the Formula 1 teams are broadening their recruitment to include students from outside the Russell Group. However, it is apparent from interviews with Formula 1 teams that recruiting managers within teams still give additional weight to applications from graduates that have attended Russell Group universities. As such, it is important to understand the comparatively low levels of attendance of Black students at Russell Group universities and higher rates of attendance at Post-1992 universities.

FIGURE 5.3: Representation of students by ethnic group studying engineering across different Higher Education university groups, 2018/19.



The entry criteria for engineering undergraduate study at many of the UK's highest-ranking universities is typically three A grades or higher at A level, with mathematics and physics required. As has been shown, this limits opportunities for all but a few of the highest attaining Black students. However, barriers to access arise before students even sit exams.

A recent government consultation on reform of university admissions towards a post-qualification admissions system highlights the growing concern that the current admissions process is substantially disadvantaging some students and preventing them from reaching their full potential in Higher Education and future careers[177]. University admissions require the use of predicted grades, and chapter 3 highlighted how teachers can have low expectation of Black students' academic abilities. The government consultation also highlights that teachers also tend to under-predict the grades of high-achieving students from disadvantaged backgrounds compared with high-achieving students from more affluent backgrounds.

Offers are made to students by universities ahead of the students receiving their A level or equivalent grades, leading them to make uninformed decisions. Other aspects of university admissions such as the requirement for personal statements also disadvantages students from lower socio-economic backgrounds who do not have the parental, professional or network capital to support with writing. Students from independent schools are also more likely to have support and guidance with drafting personal statements compared with those from state-maintained schools.

The Higher Education sector has undertaken significant effort in recent years aimed at widening participation and enabling fair access for underrepresented groups. Since 2020, the Office for Students has required all universities to publish Access and Participation Plans (APPs) to clearly lay out the measures they will undertake to address low participation among particular groups[178] . A review of APPs as part of this Commission (including 10 Russell Group universities) has found that all the plans have specific targets and mechanisms to increase the proportion of students from minority ethnic groups.

Increasing numbers of universities are now adopting contextualised admissions processes, whereby a wider set of data about the student, such as their socio-economic circumstance, educational background and other information, is used to provide a more complete picture of the characteristics of the student. Taking into account further information such as deprivation indices enables admissions tutors to offer lower entry grades in recognition of the additional challenges the student has faced but also the resilience and determination that they have shown in applying to university.

[177] file://raeng.local/shares/home/rhys.morgan/Desktop/CCS207_CCS1220794288-001_PQA_Consultation.pdf

[178] For Higher Education institutions in England only

Students' choice of university is not solely based on required or expected grades. Other factors include:

Student mobility – often, but not always, driven by costs. For example, there is a tendency for Black Caribbean students in particular to move out of their parental home but stay nearby to attend a local university[179].

Concerns of a lack of belonging, self-identity and social capital play an important part[180].

The ethnic diversity within the academic staff and student population are factors that students consider.

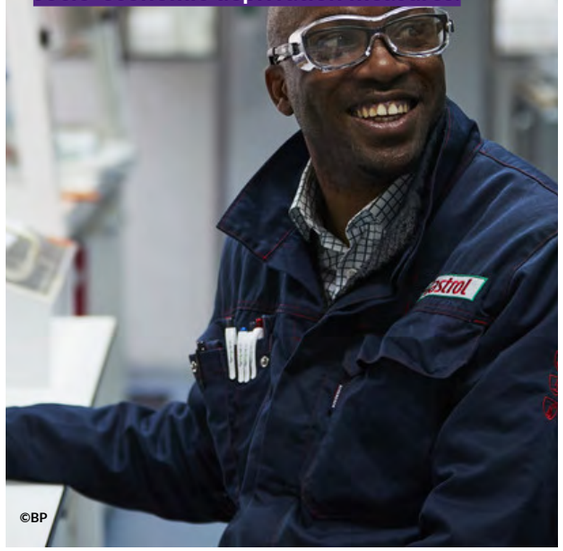
Many universities are working hard to encourage students on to their campuses from an early age, to make young people feel welcome and familiar with the surroundings and build their sense of belonging and comfort in the academic environment. In addition, many universities have outreach activities to support their widening participation programmes – both inviting young people on to campus and visiting schools in the local area.

Through discussions with a number of universities during this Commission, it is apparent that the development of APPs has resulted in a more coordinated approach to STEM outreach in many Higher Education institutions. However, there does still appear to be a disconnect within some universities between the central coordinating function supporting the widening participation work of the university and the activities of the individual engineering departments, with many school engagements based on ad hoc relationships between academic staff and schools. This is, of course, partly to be expected, as individuals will have personal relationships with schools, through their children and so on.

However, there appears to be little consideration of impact or outcome measures for outreach activities and, as such, it will be difficult for universities to measure the effectiveness of interventions, particularly on underrepresented groups identified in APPs.

IMMEDIATE OPPORTUNITY

A more structured approach is needed to ensure that engineering departments' plans for widening participation and promoting fair access align with the universities' plans and that there is specific focus on addressing underrepresentation of ethnic groups along with underrepresentation of students by socio-economic deprivation measures.



©BP

[179] Home and Award, Sutton Trust report 2018; www.suttontrust.com/wp-content/uploads/2019/12/Home_and_away_FINAL.pdf

[180] https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2019/bame-student-attainment-uk-universities-closing-the-gap.pdf

CASE STUDY

ADAM

BLACK MALE · 22 · MECHANICAL ENGINEERING STUDENT

SCHOOL AND FORMAL ENGAGEMENT

Adam had a lot of support from his dad and had a lot of tutors at a young age. His grandfather was a respected engineer in Ghana, but his parents were not particularly scientific. They pushed education in general and got him to take the 11+ exams. He went to a grammar school with a predominantly Asian student population and majority White teachers. Adam was one of only four Black students and recalls that racism was normalised from year 7 to year 9, from both students and teachers. He says the teaching staff displayed racism ranging from microaggression to outright racism.

"An Asian student's phone rang in class and the teacher took it and threw it across the classroom. He said he thought it was a bomb."

He had a difficult relationship with one teacher who he felt "was always on [his] back" but with hindsight recognises that she pushed him reach his full potential. He was predicted A*s in his science and maths A levels and applied to Russell Group universities as a result. This was encouraged by his mother and the school; everyone at the school applied for similar universities.

HIGHER EDUCATION

Upon entering university Adam felt out of place. Adam chose mechanical engineering as a degree to widen his career prospects. He feels that while his White counterparts were able to pursue their interests, he had to pursue a career that would pay well due to financial concerns. He was one of six Black students out of over 200. All his lecturers were White middle-aged men who he struggled to relate to. There was a culture among the lecturers and staff that he did not understand.

"That passion that – I don't want to single out the White demographic – but that passion for engineering that White students have when they come to university, that passion is scarce for Black engineers. Honestly, I think it is because they have the lineage of their parents being engineers, and their grandparents being engineers, and just growing up around that. They can cultivate that interest in engineering from an early age."

DEGREE ATTAINMENT OF BLACK STUDENTS

While the representation of Black students studying engineering within Higher Education appears to be largely proportional to their representation in school education, there are specific challenges around their progression and attainment compared to their White British counterparts.

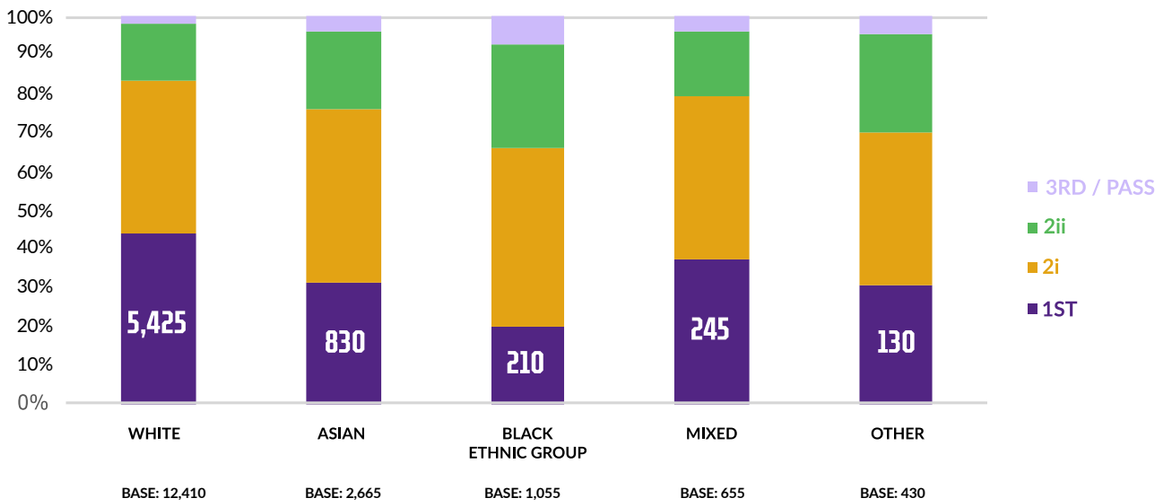
Of all the disparities that exist within Higher Education, the awarding gap for Black students is among the most stark. There is a clear correlation between a student's ethnicity and their degree outcome. The gap between the likelihood of White British students and minority ethnic students achieving a 1st or 2i degree in 2017/18 is 13%[181] and Black engineering undergraduates are much less likely to achieve a good degree (1st class or 2i) compared to their White British counterparts.

- For engineering and technology subject areas, 73.8% of the minority ethnic cohort will achieve a first class or 2i degree, compared with 83.6% of White British students[182].

- For Black students the proportion achieving a 1st class honours degree in engineering is 20% - less than half that of their White British counterparts, at 43%[183].

Figure 5.4 presents the data in terms of absolute numbers. In 2018/19 only 210 Black students graduated with a 1st class degree in 2018/19 across all engineering disciplines.

FIGURE 5.4: Degree attainment of engineering students by ethnic group, 2018/19.



[181] Black, Asian and minority ethnic student attainment at UK universities. #Closingthegap. Universities UK and NUS. May 2019. https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2019/bame-student-attainment-uk-universities-closing-the-gap.pdf (accessed November 2020)

[182] Educational Pathways into Engineering. EngineeringUK 2020. www.engineeringuk.com

[183] Educational Pathways into Engineering. EngineeringUK 2020. www.engineeringuk.com

There is concern among key Higher Education sector organisations[184] that, despite good progression to Higher Education, students from minority ethnic backgrounds are not receiving adequate support and as a consequence there are clear differences in outcomes compared to the White British student cohort.

IMMEDIATE OPPORTUNITY

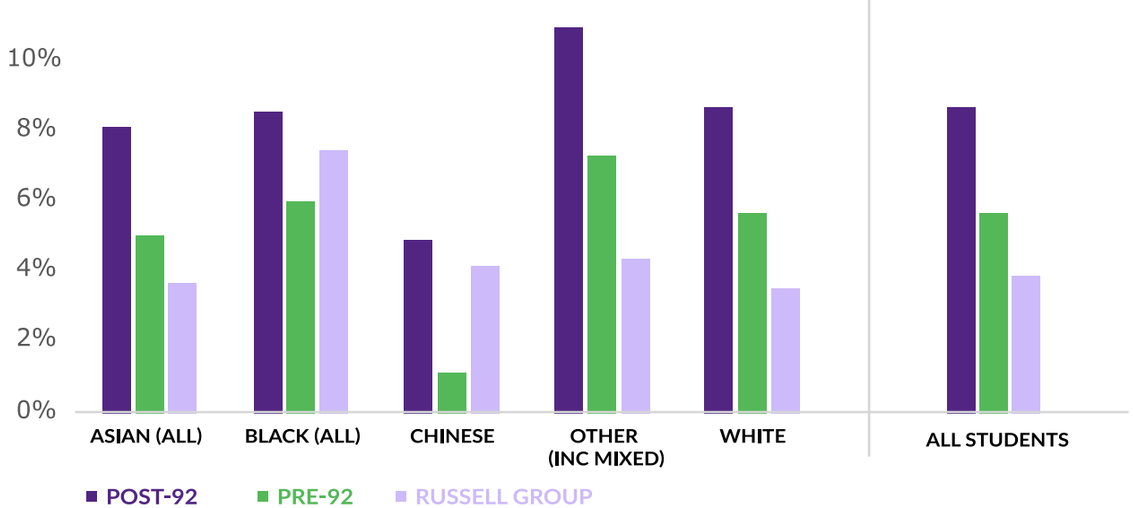
The Royal Academy of Engineering will annually publish diversity data on engineering departments in Higher Education, presenting participation data for first year students and attainment of students by different characteristics, including ethnic group.

NON-CONTINUATION

Non-continuation rates across Higher Education also vary substantially by ethnicity. A report by the Social Market Foundation found that Black students are almost one and a half times more likely to drop out than White British or Asian students[185].

Figure 5.5 shows the non-continuation rates for engineering across different university groups. Black students have a similar rate of non-continuation compared to the overall student cohort in Post-1992 universities and in Pre-1992 universities. However, across Russell Group universities, non-continuation of Black students is almost double the average for the whole student population and more than twice that of White students.

FIGURE 5.5: Non continuation of UK domiciled engineering students by ethnic group across different university groups[186].



A number of universities are addressing this issue with additional support for students who are at risk of non-continuation. This support includes informal mathematics cafes, peer mentoring and additional tutoring[187].

[184] https://www.officeforstudents.org.uk/about/measures-of-our-success/participation-performance-measures/gap-in-degree-outcomes-1sts-or-21s-between-white-students-and-black-students/

[185] Petrie, K, Keohane N, (2017) On course for success? Student retention at university. London: Social Market Foundation.

[186] Royal Academy of Engineering HESA / HEIDI data analysis 2020

[187] Educational Pathways into Engineering. EngineeringUK 2020. www.engineeringuk.com

OPPORTUNITIES TO ENGAGE WITH MOTORSPORT IN HIGHER EDUCATION

There are several initiatives aimed at engaging students in motorsport and related fields in Higher Education. The most notable of these are Formula Student, Shell Eco Marathon and Greenpower IET Formula 24+ racing.

These competitions encourage students to apply their learning to real-world engineering problems and develop a wide range of practical engineering and transferable skills. University engagement with these competitions is now commonplace and most graduates wishing to progress to motorsport careers will have engaged with these activities. However, there is limited robust evaluation data on how effective these initiatives are in supporting transition into motorsport occupations.

CASE STUDY

FORMULA STUDENT

Formula Student is one of Europe's most established and longest running educational engineering competitions. It is run by the Institution of Mechanical Engineers (IMechE) and is backed by various engineering companies and high-profile engineers including Formula 1's managing director of motorsport, Ross Brawn. The competition aims to develop enterprising and innovative young engineers and encourage more young people to take up a career in engineering by challenging university teams to design, build and run a single-seater race car.

THE COMPETITION

From just seven teams at the inaugural event in 1999, the annual competition now draws more than 100 teams (around 3,000 students) representing more than 30 countries around the world each year, with well over 40,000 engineering students to date having participated and benefitted from the learning opportunity. Each year culminates in a live event at the Silverstone race circuit, where teams compete in a range of different performance aspects of the car.

In 2019, the organising committee added a new event for Autonomous vehicle development (FS-AI), where students develop and run their own autonomous vehicles or use the purpose-built Autonomous Driving System Drone Vehicle platform provided by the IMechE. In 2020, due to the coronavirus pandemic two virtual tests were introduced: Lap Time Simulation and Driver In The Loop, to test the student teams' abilities to simulate and model vehicle dynamics in a virtual environment.

Formula Student is highly valued by industry and has become a recognised proxy standard for real-world engineering experience. The competition combines practical engineering with soft skills development, including business planning, teamwork and project management. The hands-on nature of Formula Student prepares students for the transition from university to the workplace, and former competitors have gone on to work across all areas of motorsport.

In some universities, participation in these competitions is directly linked to students' engineering degrees, as part of final year 'capstone' projects. In others, the activities are entirely voluntary. Where these activities are voluntary, students are often expected to pay or undertake fundraising to participate. This disproportionately impacts students from lower socio-economic groups. However, there are initiatives to broaden participation. For example, Shell Eco-marathon seeks to lower barriers of entry to students all over the world by hosting the competition with no entry fees, offering travel stipends, introducing virtual activities and identifying partners that can provide additional support for participating teams.

> "There was a motorsport society, but the joiner's fees were ridiculously high – so I decided not to join."
>
> **BLACK STUDENT ENGINEER**

The ethnicity of participants in these competitions is not routinely captured and shared, with organisers typically collecting limited diversity data – most commonly gender. Another issue is that the high proportion of male students participating in motorsport activities can have a negative effect on universities diversity and widening participation data, and efforts to address underrepresentation. This means that there is a risk that universities will choose other activities such as those related to sustainability, which tend to attract more women, in preference to motorsport activities.

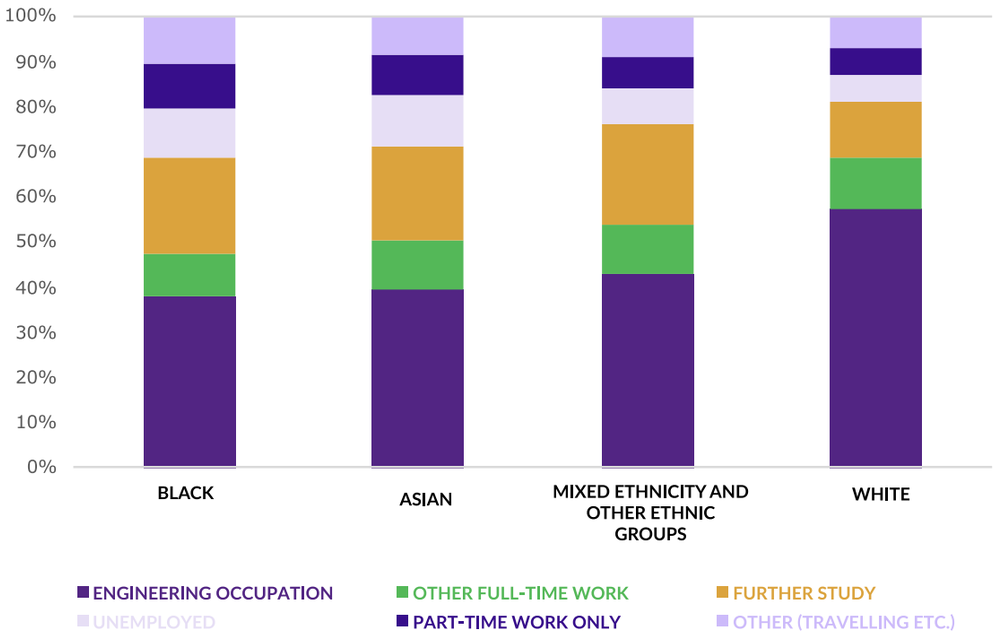
IMMEDIATE OPPORTUNITY

We encourage the organisers of motorsport competitions in universities to improve their focus on the diversity of the participants competing in their programmes. This would include diversity monitoring of participants and positive action activities to improve participation of underrepresented groups.

EMPLOYABILITY AND EMPLOYMENT SUPPORT OF ENGINEERING STUDENTS

One of the key issues identified through this Commission is the stark difference in the employment outcomes between engineering graduates of White backgrounds and those of minority ethnic backgrounds, with particular concern for the employment outcomes of Black engineering graduates. Figure 5.6 shows the different employment and progression outcomes of students from engineering degrees by ethnic group, based on HESA destinations of leavers' data for 2016/17.

FIGURE 5.6: Graduate employment destinations from engineering degrees 2016/17



Six months after graduating, Black engineering graduates are less likely to have progressed into engineering roles (at 35%) than their White engineering graduate counterparts (at 57%). Black engineering graduates are also almost twice as likely to be unemployed (11.1%) compared to their White counterparts (5.8%) six months after graduation and have the lowest proportion in full time work, compared with all ethnic groups, at 45%[188]. These differentials between ethnic groups persist even when taking into account the type of university attended, degree classification and other factors, highlighting that a graduate's ethnicity is a strong determiner of their future employment outcomes.

[188] Royal of Academy of Engineering research using 2016/17 Destinations of Leavers from Higher Education (DLHE) survey data.

Figure 5.6 also shows that Black students (and minority ethnic students more generally) are more likely to go on to further university study compared with White students. However this tends to be more taught postgraduate study than postgraduate research.

CAREERS EDUCATION AND GUIDANCE IN HIGHER EDUCATION

There has been increased emphasis on careers support in universities since the introduction of the *Teaching Excellence Framework*[189] and measures of employment outcomes of graduates from universities. But there is clearly still work to be done to address disparities in employment outcomes for Black, Asian and minority ethnic groups. With strong intersectionality between ethnicity and socio-economic status, many Black students do not have the same social capital, access to professional networks and informal careers support as White students[190]. It is welcome that a large proportion of university careers services have developed or are developing targeted initiatives to support their Black, Asian and minority ethnic students[191].

However, there is concern that, due to the Covid 19 pandemic and budget constraints across Higher Education, careers and employability services are experiencing reductions in budgets and staff and the majority expect further significant decreases in budgets during the 2020/21 academic year. Without more support, the economic downturn caused by Covid-19 is likely to further entrench existing inequalities between Black and White graduates[192].

INDUSTRIAL PLACEMENTS

Placements are an important component of engineering education. For many years, 'sandwich courses', which feature a full-year industrial placement, were seen as an excellent preparation for the world of work. For the past 20 years, this form of undergraduate degree fell out of favour with only a small number of universities continuing the practice. However, with increased government focus on employment outcomes of graduates, more universities have returned to offering placement opportunities as part of their degrees.

As well as enabling students to apply subject knowledge and technical skills in a professional environment, placements also provide a helpful insight into organisational cultures, professional socialisation, applied skills and working relationships. Perhaps more importantly, placements are valuable for increasing self-confidence and encouraging reflective practice, while providing students with the skills that employers seek in graduates. Placements and other work-based learning opportunities provide tangible benefits to students in terms of real, industrial work experience and have been shown to improve student motivation and grades[193].

With the increasing popularity of placements, competition has become significant. One university estimated that students will have to submit on average around 15 applications to find a placement, with some students applying for 25 or more placement opportunities. This requires a high level of resilience and universities have reported that certain students, including some from minority ethnic groups and from lower socio-economic groups, struggle with the rejections.

[189] Royal of Academy of Engineering research using 2016/17 Destinations of Leavers from Higher Education (DLHE) survey data.
[190] https://www.officeforstudents.org.uk/advice-and-guidance/teaching/about-the-tef/
[191] https://www.agcas.org.uk/Knowledge-Centre/b671b272-c0fe-40b4-85dd-1c19b529ddd6
[192] https://www.agcas.org.uk/Knowledge-Centre/7707ace4-a1d2-4b74-a7a7-d3deefac2191
[193] https://www.tandfonline.com/doi/full/10.1080/03075079.2015.1073249

A further challenge of placements is the additional year of study required. Students from low-income households and from minority ethnic backgrounds may be more likely to opt out of placement years to complete their studies in shortest possible time, minimise debt and enter employment[194].

The lack of social and professional capital, lower degree outcomes and limited opportunities for work experience among Black engineering students are challenges that contribute to low employment outcomes. It is clear that further interventions need to be undertaken to increase the opportunity for Black students to gain employment in the motorsport sector. To this end, the Commission recommends the creation of a new programme to support Black students who want to pursue careers in motorsport.

SUPPORT AND EMPOWERMENT

RECOMMENDATION 5

We support the creation of scholarship programmes to enable Black graduates from degrees in engineering and allied subjects to progress into specialist motorsport roles.

We support all scholarship programmes aimed at improving diversity and inclusion. Our recommendation is that a programme is set up to provide scholarships for Black students to undertake specialist MSc study in subject areas that are of relevance to Formula 1 teams and the wider motorsport sector. The programmes should also provide additional careers support activity including professional networking opportunities with motorsport employers, training for CV writing, interviews and assessment centre testing and a range of experiences of motorsport activity across different disciplines of the sport.

[194] Interview with Careers support and industrial placement team, Loughborough University

CASE STUDY

YEWANDE

BLACK FEMALE • 19 • MECHANICAL ENGINEERING STUDENT

SCHOOL YEARS

Yewande spent most of her primary school education in Nigeria. Her strongest subject was maths, and she was surprised that the level of maths in the UK was not as high as her home country. Coming to the UK was a culture shock for Yewande as she came from a majority Black environment to a school where she was one of only three Black students in her year. There were no cases of overt racism but she did experience microaggressions from teachers and students.

"I had microaggressions from teachers and students, but that's a common thing. Nothing major... My group of friends and I were routinely told to split up as we were seen as being intimidating."

Yewande went to an all-girls school where STEM was strongly encouraged and she was taken on many science-themed trips. Despite the science focus, she did not know about engineering until her GCSE year when she researched online what she could do with maths and physics.

Yewande went to a much more diverse grammar school for her A levels, where she felt more comfortable.

HIGHER EDUCATION

When Yewande began to seriously look at universities, she was aware of Russell Group universities but wanted to go to a university with a good engineering department and with higher representation of Black and female engineers.

"I picked my university because it was diverse. At the open day I saw Black and female engineers. I wanted a top university but I wanted to have Black people around me. I had made it this far because I had always had Black people around me."

During her time studying, Yewande remembers one or two Black professors. She feels as though a lot of Black students are affected by not seeing Black people within higher education and they begin to feel it is not for them. The Black students at the university tended to stay within the African Caribbean Society bubble and the university has had some serious issues with race. For example, campus security targeted Black students a lot.

MOTORSPORT CAREERS

Yewande was aware of motorsport as a career destination for engineers from seeing races on the news and the engineers working on the car as well as from going to university open days and seeing the Formula Student teams. She was aware of various motorsport and automotive student societies but did not feel she was up to it at that stage and did not want to be the only woman.

"Motorsport reminds me of sports like golf, or ice skating. You don't see many Black people in those careers as they are expensive to get into, and Black people tend not to have the finances for that. There is not much of a difference between what Black people and White people are interested in, it is just about exposure."

She would be interested in a role in motorsport engineering if the opportunity presented itself, but her focus is on getting a career where she can learn and develop. Pay is important, but not her priority.

ADDRESSING RACE EQUALITY IN HIGHER EDUCATION

While the public focus on the Black Lives Matter movement over the past year has helped to shine a light on race inequality in universities, this is not a new concern. In 2019, the Equality and Human Rights Commission (EHRC) published *Tackling racial harassment: Universities challenged*[195] which revealed that one in four students from minority ethnic backgrounds had experienced racial harassment since starting their course. The harassment usually came from students, but many also reported abuse coming from academic staff. In response, Universities UK (UUK), which represents 140 institutions in England, Scotland, Wales and Northern Ireland, called on institutions to "acknowledge the institutional racism and systemic issues that pervade the entire Higher Education sector"[196]. Indeed, during this Commission, students highlighted concerns around racism they had experienced during their studies.

> "I was made to feel like I was not welcome on my university's motorsport team."
>
> **BLACK STUDENT ENGINEER**

Beyond harassment, other indicators of systematic inequalities include ethnicity pay gaps for academic staff and higher than average non-continuation rates and lower attainment outcomes for Black students[197].

ACADEMIC STAFF

There are few opportunities for Black students to see role models from similar backgrounds among the academic staff of UK universities. Just 2% of the almost quarter of a million academic staff at UK universities are from a Black ethnic background[198]. Less than 1% of the professors employed at UK universities are Black and few British universities employ more than one or two Black professors. Indeed, only 140 academic staff at professorial level identified as Black, equating to 0.7% out of a total of more than 21,000 professors[199].

The statistics suggest the vast majority of British universities employ between zero and two Black professors. Oxford, Sussex, Manchester and Warwick were among the few to employ enough senior Black academics to show up in the official statistics. A review of HESA staff data by HE groups[200] shows that on average Russell Group universities have 1.14% Black academic staff compared with 2.29% average for all universities[201].

[195] Equality and Human Rights Commission, Tackling racial harassment: Universities challenged, October 2019 https://www.equalityhumanrights.com/sites/default/files/tackling-racial-harassment-universities-challenged.pdf

[196] Tackling racial harassment in higher education, Universities UK, https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2020/tackling-racial-harassment-in-higher-education.pdf, November 2020

[197] Tackling racial harassment in higher education, Universities UK, https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2020/tackling-racial-harassment-in-higher-education.pdf, November 2020

[198] https://www.hesa.ac.uk/data-and-analysis/staff/table-4

[199] https://www.theguardian.com/education/2020/feb/27/fewer-than-1-of-uk-university-professors-are-black-figures-show

[200] Universities are often grouped into three sectors – Russell Group, Other Pre-1992 universities and Post-1992 universities – former polytechnics and other higher education institutions that have been given degree awarding powers since 1992.

[201] HESA staff data by mission group

A recent report by the Royal Society[202] highlights that the employment of minority ethnic staff more generally is higher in STEM subjects than for non-STEM subjects, but there is large variation in the subject areas that STEM minority ethnic group academic staff work in.

For example, in the 2018/19 academic year, 33.1% of academic staff working in engineering and technology were from minority ethnic groups compared with just 7.5% working in veterinary science.

While overall the proportion of minority ethnic staff within engineering is positive, there is an imbalance across ethnic groups with 20.2% of staff coming from Asian ethnic groups and just 3.8% coming from Black ethnic groups.

Unless this changes there will be unbalanced representation of STEM academic staff between ethnic groups working in Higher Education in comparison to the ethnic breakdown of the general population.

RACE EQUALITY CHARTER

The Race Equality Charter (REC), run by AdvanceHE[203] was established in 2016 with the aim of improving the representation, progression and success of Black, Asian and minority ethnic staff and students within Higher Education.

The REC provides a framework through which Higher Education Institutions (HEIs) work to identify and self-reflect on institutional and cultural barriers to race equality. Member institutions develop initiatives and solutions for action and can apply for a Bronze or Silver REC award, depending on their level of progress.

To date, a disappointing number of HEIs have signed up to the Race Equality Charter, with only 80 members out of over 165 HEIs[204] and only 17 awarded a Bronze award at the time of writing. Members start by agreeing to five guiding Charter principles and have three years from becoming a member to apply for a Bronze award. If a member institution fails to apply for a Bronze award within three years, Charter membership is withdrawn.

[202] https://royalsociety.org/-/media/policy/Publications/2021/trends-ethnic-minorities-stem/Ethnicity-STEM-data-for-students-and-academic-staff-in-higher-education.pdf

[203] AdvanceHE is an organisations that supports universities and lecturers to promote excellence in higher education

[204] https://www.universitiesuk.ac.uk/facts-and-stats/Pages/higher-education-data.aspx#:~:text=Higher%20education%20institutions%20(2018%E2%80%9319,plus%20the%20University%20of%20Buckingham.

An independent impact evaluation of the Athena Swan charter[205] - a charter first established in 2005 that recognises the advancement of gender equality in Higher Education – found strong evidence that the charter processes and methodologies supported cultural and behavioural change and had a positive impact on gender equality in those institutions that engaged with it. The decision of the National Institute of Health Research to require funding applicants to hold a silver award for Athena Swan was seen a key driver to encouraging and sustaining engagement on gender equality and embedding diversity and inclusion into standard practices of universities and departments.

It is clear that while steps are being taken by universities, funders and HEIs, the effort to date falls short of the systemic, sustained action needed to deliver race equality for students and staff.

An independent review of the Race Equality Charter is currently underway and has highlighted the disappointing uptake by HEIs[206]. The Commission would strongly encourage all institutions to sign up to the Race Equality Charter and develop solutions to address race inequality. Engineering departments should encourage their universities to become a member of, and apply for awards under, the Race Equality Charter. Engineering departments should also take a lead by developing their own action plans with key performance indicators and targets to improve participation and address differential attainment of students from underrepresented backgrounds in engineering.

[205] https://www.ecu.ac.uk/wp-content/uploads/2019/08/Athena-SWAN-Impact-Evaluation-2019.pdf

[206] https://www.advance-he.ac.uk/knowledge-hub/race-equality-charter-review-phase-1-summary

CONCLUSIONS

THE MOTORSPORT SECTOR

This report has highlighted the low number of Black people in Formula 1 and the wider motorsport sector, focusing specifically on the engineering roles in the sport. Through the course of this work, the Commission has found a general lack of data collection on the diversity characteristics of the workforce in Formula 1 teams and the wider motorsport sector, but anecdotal evidence based on interviews suggested that fewer than one in a hundred people working in motorsport are Black.

Formula 1 is a no-compromise sport. Teams are fiercely competitive, and they only want to recruit the best. But this notion of what they consider to be the best is challenged in this report. Recruitment of engineering graduates from a small cluster of the UK's highest ranked universities will no doubt result in highly mathematically able engineers, but these graduates exist elsewhere in the university sector. It is likely that graduates from Black, lower socio-economic backgrounds will have demonstrated substantially higher levels of grit, resilience, and determination to achieve what they have achieved, compared to many of their more affluent White counterparts.

This work has also examined the challenges around recruitment of apprentices and technicians. Technical pathways in education tend to be taken by young people from lower-income backgrounds. Apprenticeships give great opportunities to develop new skills while working. But again, barriers exist that hamper the ability of young Black people to apply for and engage in these opportunities. In addition, there appear to be relatively few apprenticeship opportunities in Formula 1 teams, and this may well have decreased with the introduction of the new Formula 1 cost cap.

Motorsport teams, and the supply chain companies supporting them, have to be more inclusive in their recruitment practices, bringing in talent from a wider applicant base and being more active in encouraging young Black people to apply for apprenticeships, technician and graduate roles. In adopting more inclusive working practices generally, Formula 1 teams and motorsport organisations will support not only underrepresented groups but all people in the workforce. This, it has been shown, will lead to happier people who feel more supported, higher productivity levels and, with more diverse teams, greater levels of innovation. Moreover, young people are increasingly seeking out companies that provide these workplace cultures and top businesses around the world are recognising this and changing how they operate.

Making this change in motorsport starts at the top, with the leaders across key organisations committing to a new diversity and inclusion charter, proposed in this report. Without commitment and action to make genuine change to address the lack of diversity of Black people and all underrepresented groups in the sport, and the wider society in which it operates.

THE EDUCATION AND TALENT PIPELINE

Young people have little understanding or knowledge of careers in engineering and motorsport and therefore limited interest to pursue careers in the field. What little interest there is at a young age tends to fade as they get older. More needs to be done to address this lack of knowledge. The Commission believes that better targeted STEM engagement activity and support through grassroots organisations and community-led supplementary schools provide will lead to improved understanding and increased interest. However, increasing interest is only one challenge.

A number of barriers have been identified that impede the progress of young Black people towards engineering careers. These include the low expectation of teachers in schools resulting in streaming students into lower ability sets, school behaviour policies that apparently disproportionately affect young Black people and, with specific reference to Black Caribbean students, lower levels of attainment in science and mathematics GCSEs.

In post-16 education, the research has shown good representation of Black students in A levels that lead to engineering degree study, but lower attainment compared to their White counterparts. It is shocking for example, that just two Black Caribbean students in the whole of England achieved an A* grade in physics at A level in 2019. Poor careers support in Further Education also limits young Black students' opportunities to enter the sector and few apprenticeship opportunities seem to go to young Black people.

In Higher Education, while Black students are well represented in engineering, they tend to go to universities outside the select group from which Formula 1 teams typically recruit. Black students also typically have higher non-continuation rates and do not achieve as high grades. The lack of role models in Black academic staff also needs to be improved across the sector. While universities have been working to improve support over recent years, more needs to be done and at an accelerated rate.

RECOMMENDATIONS

The report has identified systemic barriers and developed practical recommendations that can be undertaken to improve the situation.

As the Commission developed these recommendations, Commissioners noted that they fell into the following three distinct groups:

SUPPORT AND EMPOWERMENT:
We call on those in leadership positions to support Black children to excel in STEM subjects, and to empower them to choose – and succeed – in fulfilling careers.

ACCOUNTABILITY AND MEASUREMENT:
We call on those in leadership positions to step up, to acknowledge the unfairness that exists and to commit to change – the first step being to collect data to form a benchmark from which to improve.

INSPIRATION AND ENGAGEMENT:
We call on those in leadership positions to work harder to show Black children that STEM subjects, engineering and motorsport ARE for them, and to excite them about the opportunities that they offer.

While this report has focused predominantly on the progression of Black people into engineering and motorsport, we hope that it will act as a stimulus for wider action. If our recommendations are applied, not only do we hope to see more Black people in motorsport, we hope to see more Black people in engineering more generally, and more Black children studying and achieving in STEM subjects, leading to exciting and fulfilling careers in a wide variety of industries. We also hope that the recommendations, and the actions that they engender, will provide important learning for addressing the inclusivity challenges faced not only by Black people in motorsport, but also by people from a wider set of minority ethnic backgrounds and other underrepresented groups in motorsport, engineering, education and employment more widely.

Lewis Hamilton has blazed a trail through motorsport. The young Black boy who was told he had no potential is now a Seven-Time World Champion. He set up The Hamilton Commission to help others have the opportunities to shine that all young people deserve.

"We always had the dream of helping to enact change in this industry. We always had the passion, the focus."

Thanks to the work of the Commission, we have the facts. **The time for change is now.**

© Your Future, Your Ambition

ANNEXES

ANNEX 1: SCHOOL POPULATION AND ATTAINMENT DATA

TABLE A1.1: Population of school students in England by ethnic group, 2020[36]

Ethnic Group	Number	Percentage
Asian or Asian British	**1,154,553**	13.9%
Black African, Black Caribbean or Black British. Of which:	**474,570**	5.7%
Black African	**323,874**	3.9%
Black Caribbean	**86,543**	1.0%
Other Black Background	**64,153**	0.8%
Mixed or multiple ethnic groups. Of which:	**515,061**	6.2%
White and Black African	**70,403**	0.8%
White and Black Caribbean	**128,774**	1.5%
Unclassified	**119,388**	1.4%
White. Of which:	**6,048,980**	72.8%
White British	**5,432,991**	65.4%
Total student population	**8,312,552**	

FIGURE A1.1: Percentage of pupils achieving grade 4/C or above in English and maths GCSEs

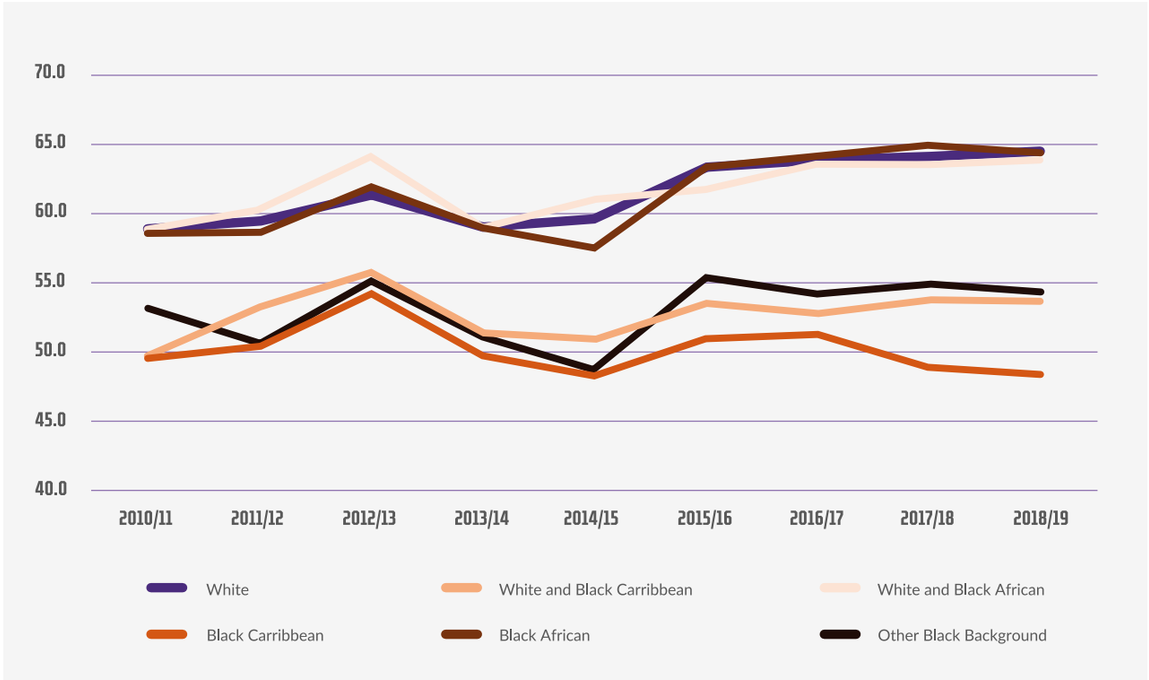


FIGURE A1.2: Participation and attainment of English Baccalaureate subjects

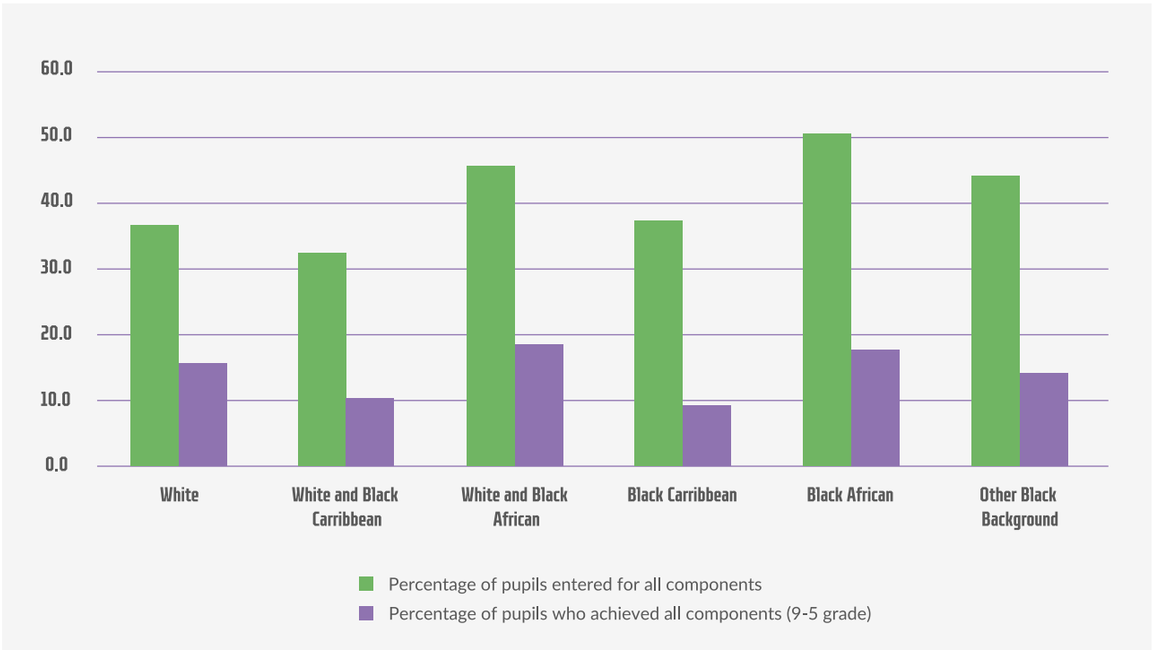


FIGURE A1.3: COMPUTER SCIENCE GCSE

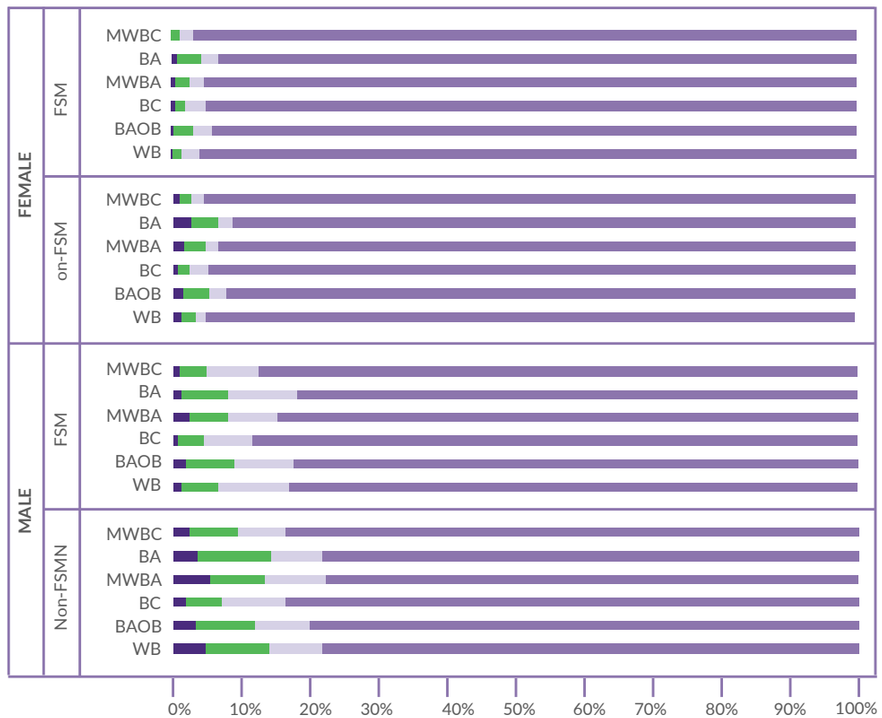


FIGURE A1.4: BIOLOGY GCSE

FIGURE A 1.5: Chemistry GCSE

ANNEX 2: POST-16 EDUCATION DATA

FIGURE A2.1: A Level Further Mathematics grades

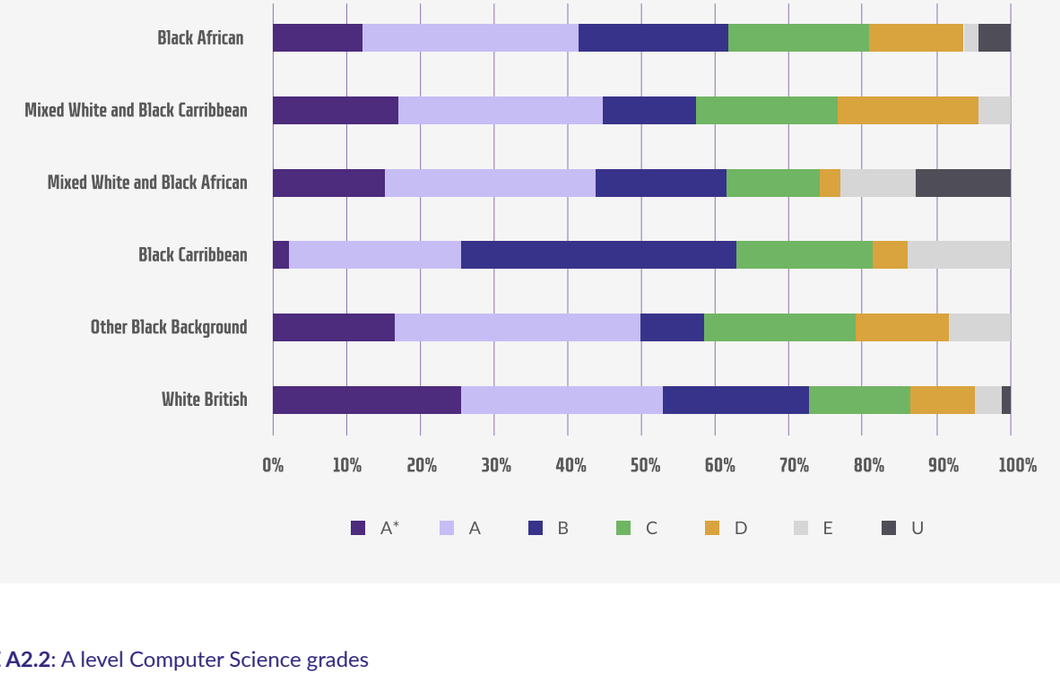
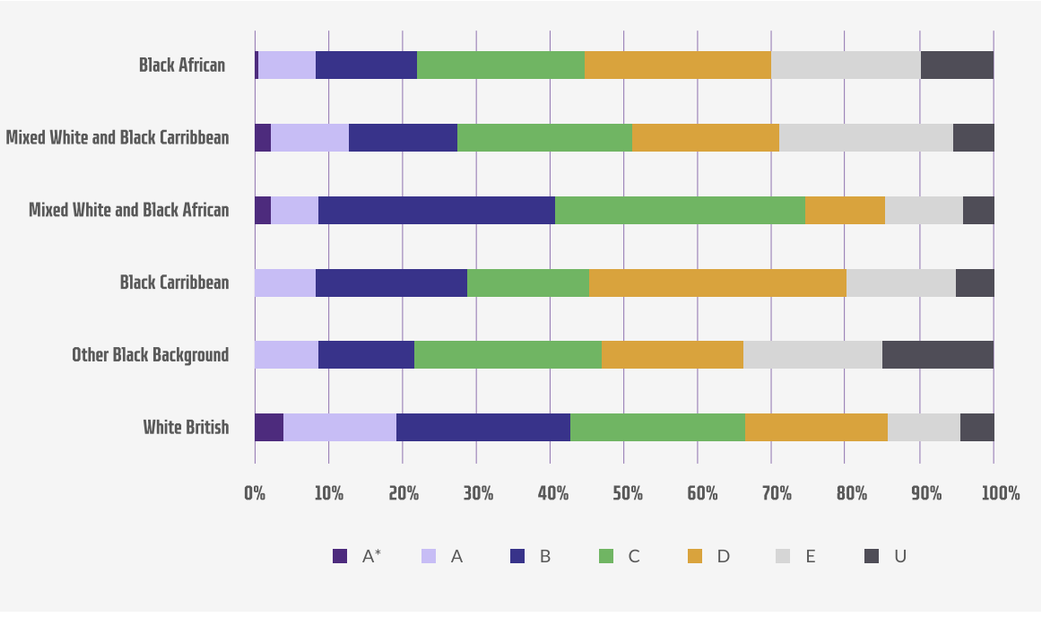


FIGURE A2.2: A level Computer Science grades



ANNEX 3: HIGHER EDUCATION DATA

FIGURE A3.1: Highest Black student populations by university for Mechanical Engineering, 2018/19

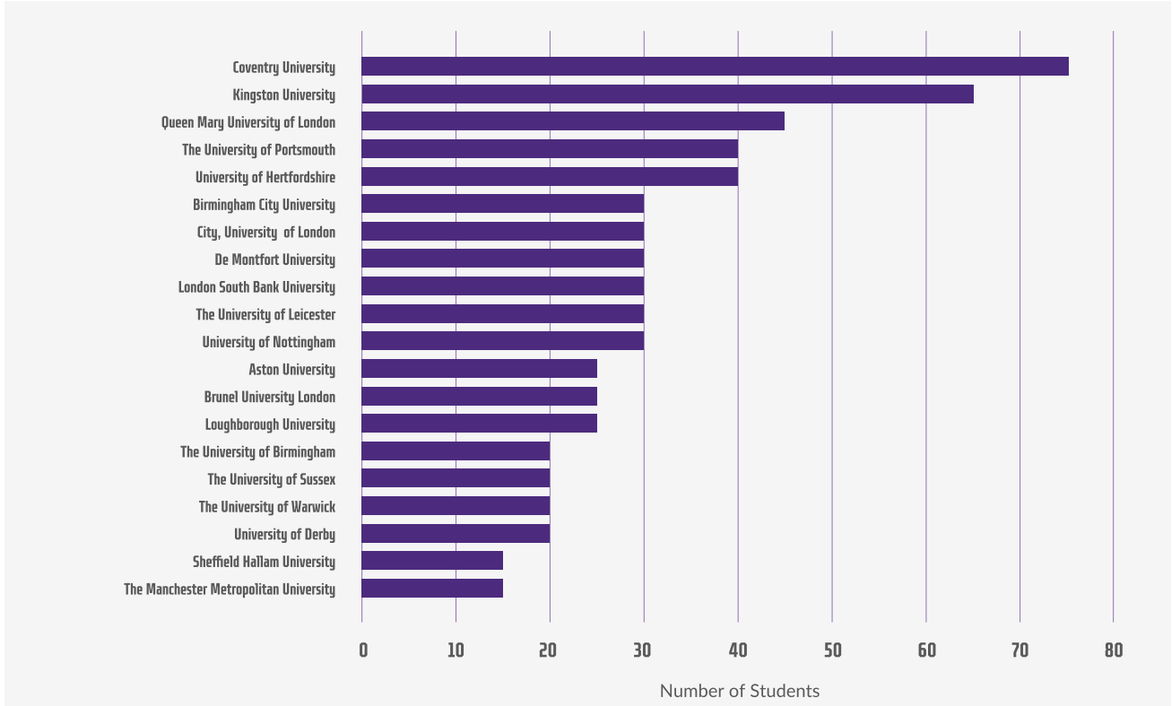


FIGURE A3.2: Highest Black student populations by university for Aerospace Engineering, 2018/19

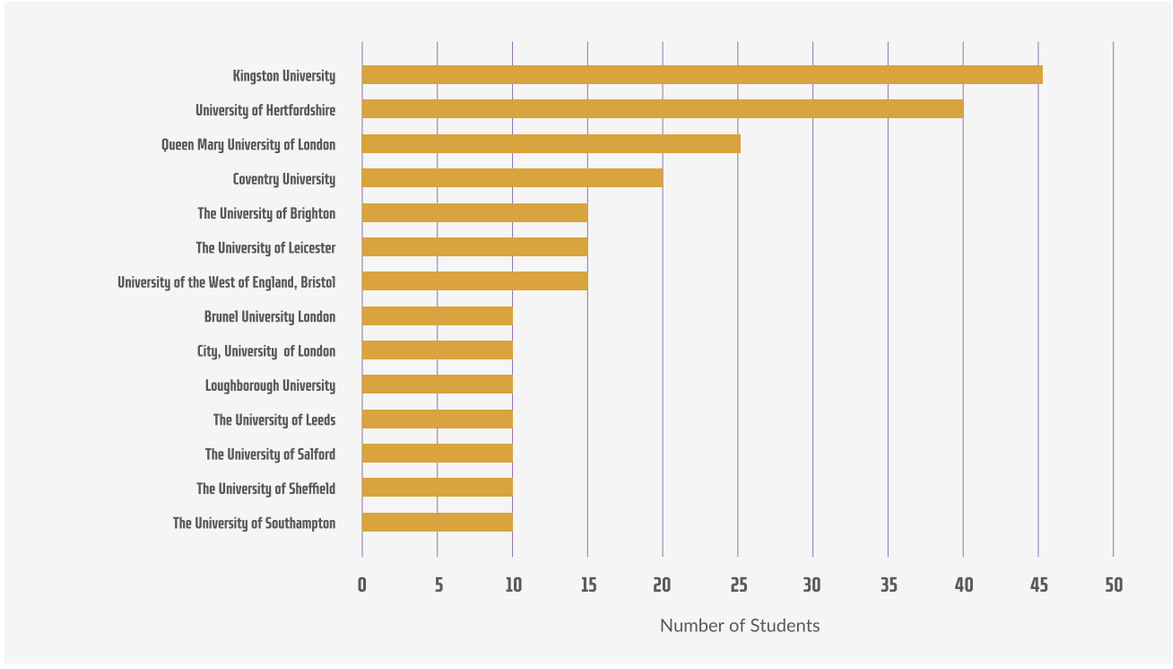


FIGURE A3.3: Highest Black student populations by university for General Engineering, 2018/19

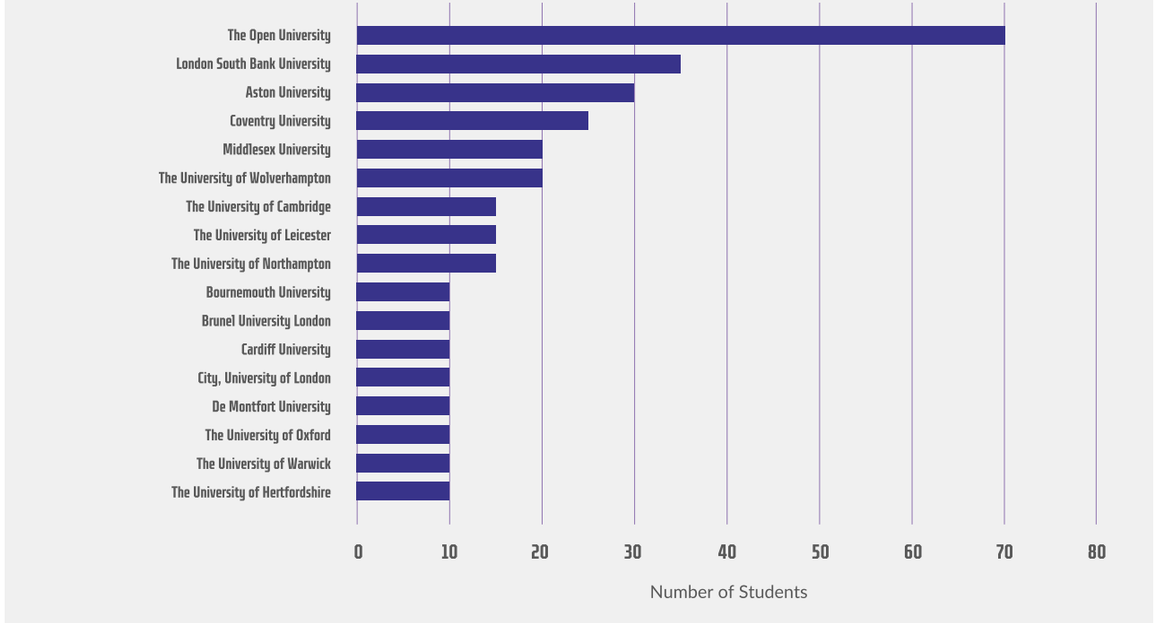


FIGURE A3.4: Highest Black student populations by university for Electronic Engineering, 2018/19

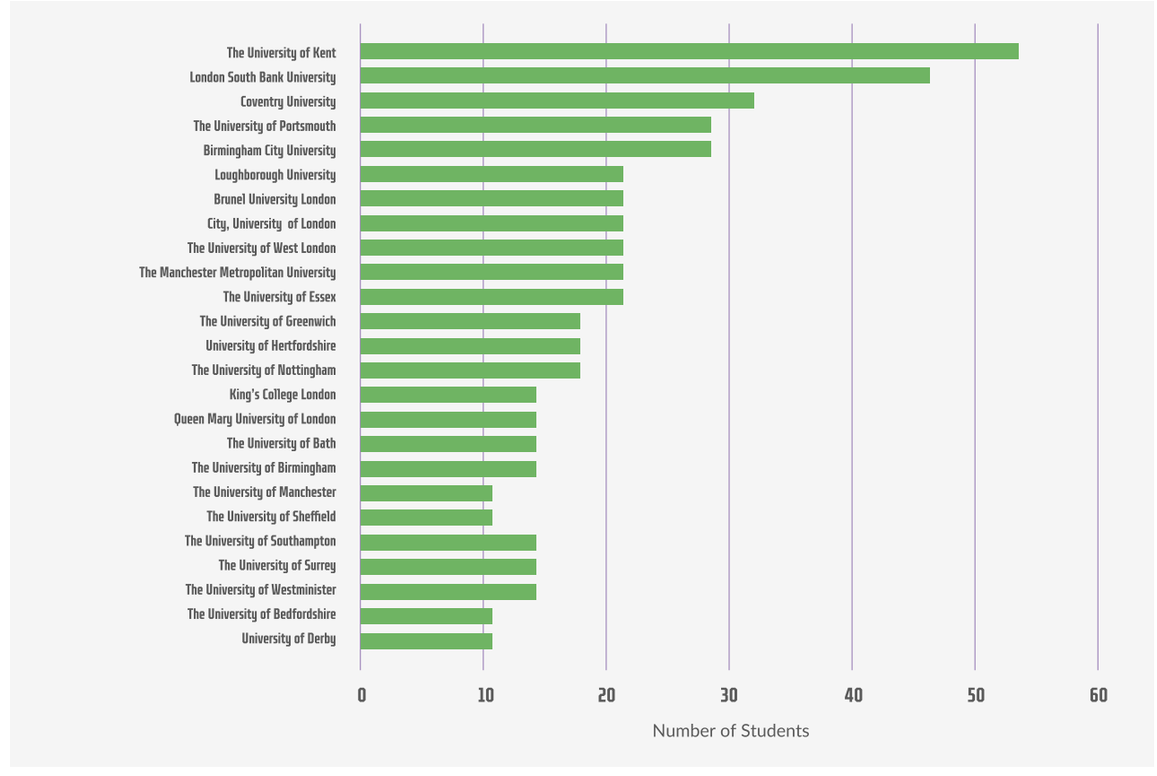
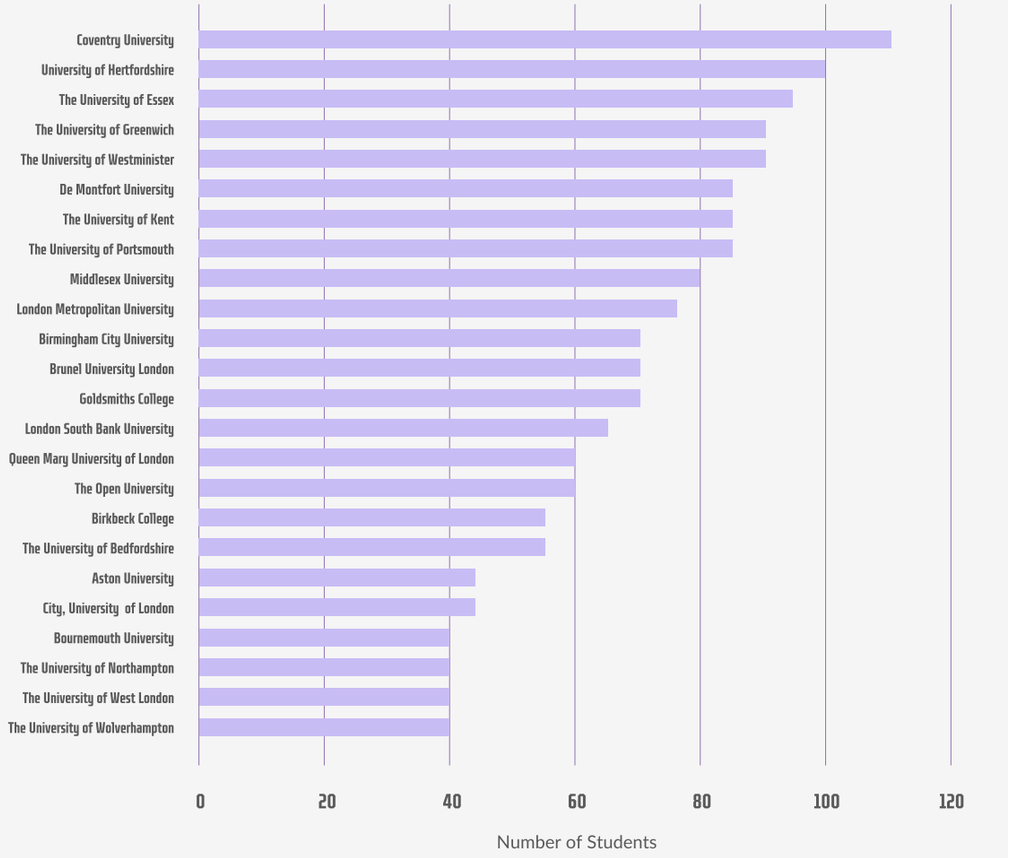


FIGURE A3.5: Highest Black student populations by university for Computer Science, 2018/19



ANNEX 4: TERMS OF REFERENCE

This annex contains the original purpose and scope of The Hamilton Commission, as set out in September 2020, when the Commission was formed. As such, the actual project may have been slightly different. For example, there were no youth focus groups but 100 young people were interviewed in one-on-one interviews, paired depths and quads instead *(see Research methodology, Annex 6)*.

Purpose and Scope

This Hamilton Commission will seek to improve the representation of Black people in UK motorsport.

For the purposes of this research the term Black people includes Black African, Black Caribbean, Black British and those with mixed heritage Black African or Black Caribbean backgrounds.

While it is recognised that there is a wide tradition in the UK of 'political blackness', an umbrella term used to refer to all people who are likely to experience racial discrimination based on skin colour, it was felt that a specific focus on the experiences and representation of Black people in motorsport will ensure a tight set of recommendations and actions. This research will endeavour to pull out data on Black communities where possible but recognise for some data this may not be possible. Where no data exists specifically on Black people, the Commission will make use of data on broader minority ethnic groups.

In addition, there may be recommendations related to engaging the wider demographic of young Black, Asian and other minority ethnic people as well as recommendations to support inclusive recruitment and progression practices, which will benefit diverse candidates more broadly.

As part of The Hamilton Commission, a range of activities will take place to help inform the research findings. These activities will include an initial data analysis, stakeholder mapping and engagement, a literature review in sport, education and employment, as well as in-depth surveying and analysis with youth focus groups and key stakeholders.

This work will only examine challenges around STEM and the motorsport industry specific to the UK, but we hope where possible, the recommendations and actions from the research will be replicable internationally.

Membership

The Hamilton Commission will be co-chaired by Sir Lewis Hamilton MBE and Dr Hayaatun Sillem CBE, Chief Executive of the Royal Academy of Engineering. The Board of Commissioners is an independent group that will bring their expertise, knowledge and experience from their respective fields to The Hamilton Commission, to oversee the research, discuss the findings and support on the development of the final actions and recommendations that will help improve the representation of Black people in UK motorsport.

The membership of The Board of Commissioners will aim to reflect the key groups with interest and influence in the study. These include representatives of motorsport, engineering, schools, colleges and universities, community/ youth organisations working with young Black people and representation from UK major political parties.

Responsibilities of the Board of Commissioners include:

- Review and inform the research methodology to ensure the outputs provide deep insight into the attitudes of young Black people towards engineering and more specifically, a career in motorsport engineering.
- Examine the research findings to help identify the key challenges and opportunities for recruitment and career progression for young Black people within STEM and various roles in UK motorsport.
- Advise on the final actions and recommendations that will come from the research findings, and that will be taken to key stakeholders as part of The Hamilton Commission.
- Apply personal influence to champion the issues around ethnic diversity in all stages of education and training relating to progression towards careers in motorsport.

Governance

The Hamilton Commission research project will run for ten-months, beginning September 2020. There will be four meetings of the Board of Commissioners throughout the process.

A further implementation period will then follow to embed the recommendations. The Board of Commissioners will be informed of progress during this period but will not be expected to engage unless they wish to do so.

Secretariat: Lewis Hamilton's communications consultancy, Freud Communications Ltd. will provide secretariat to The Hamilton Commission. The Royal Academy of Engineering will undertake research and analysis for The Hamilton Commission and produce the final report with support from Freud Communications Ltd.

ANNEX 5: LANGUAGE AND TERMINOLOGY

As stated in Annex 4, the Hamilton Commission ('the Commission) will seek to improve the representation of Black people in UK motorsport. For the purposes of the research undertaken by the Commission, the term Black people includes Black African, Black Caribbean, Black British and those with mixed heritage Black African or Black Caribbean backgrounds.

Writing about ethnicity

The Commission recognizes that both race and ethnicity are social constructs used to categorise and characterise groups of people. The language and terms around race and ethnicity are sensitive and complex so we have set out in this document the terms we will use and the rationale.

Ethnicity and race

The Commission will refer to ethnicity rather than race. This maintains consistency and comparability to public datasets as surveys most often ask people for their ethnicity as opposed to their race. In addition, research by the Office for National Statistics found that race was considered a less acceptable term by respondents.

Race

The Commission recognises that 'race' is a social construct historically used to categorise different groups of people based on perceived physical differences. It has been found that genetic differences within ethnic groups are actually greater than the genetic differences between different ethnic groups and there is no biological basis for defining differences by race.

Despite there being no biological merit in the concept of race, racism and race discrimination are still prevalent in UK society. The term race is still widely used in legal and policy contexts.

Race is a protected characteristic under the Equality Act 2010 , which makes it unlawful to discrimination against anyone because of their race. Race under the Act includes colour, nationality (including your citizenship), ethnic or national origin.

Ethnicity

Ethnicity is the ethnic group, or groups, that people identify with or feel they belong to. Membership of an ethnic group or ethnic groups is self-defined, can change over time, and is an important part of someone's identity. Aspects of ethnicity can include country of birth, nationality, identity, common language and shared culture, religion, and physical appearance.

In England and Wales, there are 18 ethnic groups recommended for use by the government when asking for someone's ethnicity.

It is important to remember that everyone has an ethnicity and people may want to identity with more than one ethnic group.

BAME and BME

The Commission understands that the acronyms 'BAME' (which stands for Black, Asian and minority ethnic) and 'BME' (which stands for Black and Minority ethnic) are terms widely used by public bodies, government departments and other organisations to refer to minority ethnic groups, largely non-White groups, living in the UK who are likely to experience racial discrimination based on skin colour or background.

However, aggregating ethnic groups together under one term (for example all Black, Asian and minority ethnic groups) can both conflate and hide the experiences of and barriers faced by different minority ethnic groups. For example, research shows that there are differences in educational attainment and employment outcomes between ethnic groups, for example, we see significant differences in GCSE results[208] between people from Black African and Black Caribbean backgrounds.

Therefore, wherever possible this research will look to disaggregate and examine the experiences of, and barriers faced by different ethnic groups, specifically Black ethnic groups. Where no data exists specifically on Black ethnic groups, we will make use of data on broader minority ethnic groups.

Mixed-heritage or mixed-race?

The Commission recognises the wide use of the term 'Mixed race', colloquially and in scholarship, however due to concerns that it focuses on 'race', a social construct (see above), the Commission has opted to use the terms Mixed heritage or Mixed ethnicity.

[208] https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/compendium/economicreview/february2020/childpovertyandeducationoutcomesbyethnicity

ANNEX 6: RESEARCH METHODOLOGY

The Commission has applied the following methodology to understand the key barriers faced by Black people to progress into motorsport at all stages across the talent pipeline.

The research has been divided into four thematic research areas:

- Schools and young people: the first theme concerns compulsory education through to post-16 education with a specific focus on A levels.
- Technical education pathways: focussing on apprenticeships and technician opportunities.
- Higher Education: entry and attainment and the transition from university to work.
- Diversity and inclusion in motorsport: recruitment and activity to improve diversity and inclusion and efforts to improve the representation of Black people in the sector.

Methods of Research

For each of these areas, key questions have been developed to help guide the research to detect where barriers may exist, and what interventions might help to increase the number of Black people within motorsport. The Hamilton Commission has carried out in depth data analyses of educational attainment and achievement of young people as well as a series of literature reviews relating to each identified research theme.

This has been supplemented by primary quantitative and qualitative research looking into the attitudes and aspirations of young people regarding Motorsport and engineering, and in-depth case study interviews with Black people currently studying engineering or working within Motorsport or closely related fields. The Commission has also carried out a series of semi-structured informal interviews with stakeholders and interested parties across motorsport disciplines, the motorsport supply chains, and key representatives from across education.

Primary research: quantitative survey

An online survey of 2444 young people aged 7-19, was conducted in November 2020, including a boost sample of 704 young Black people. The sample included 189 respondents from other ethnically diverse groups not classified as Black, who were not included in the data reported.

The sample was weighted to be nationally representative based on age, gender, region and social grade for each ethnic group.

The aim of the survey was to understand young people's awareness of and interest in STEM subjects and careers in engineering and motorsport, as well as the barriers to pursuing these careers, and the influences on young people regarding their careers. Some of the findings from this research can be found in Chapter 2 of this report.

Primary research: qualitative interviews with young people

Interviews with 100 young people, all with some level of interest in STEM subjects. The interviews were conducted online via videoconferencing, as one-on-one interviews, paired depths and quads, between January and February 2021. Paired depths or quads involve interviewing two or four young people together, a technique that is often used when interviewing younger people; it can be less intimidating for the participant than a one-on-one interview and the interaction between the participants can form a useful part of the research. The goal of the interviews was to understand attitudes of young Black people towards STEM subjects and careers in engineering and motorsport. Some of the results of this research, including verbatim quotes from participants, can be found in Chapter 2 of this report.

The sample comprised the following:

- Young people, both male and female from Black African, Black Caribbean, Black British and Mixed heritage Black African/Black Caribbean backgrounds.
- Young people from White backgrounds to act as a control group.
- People in school years 10 and 11 whose favourite subjects were maths, science, design & technology or computing, and who said they were open to career in engineering and science.
- People in school year 12, or aged 16+ or undergraduate students, who said they were open to a career in engineering and science, and 60% of whom to be studying science subjects.

Primary research: Stakeholder interviews

More than 80 interviews with a total of 96 stakeholders, conducted by members of the Royal Academy of Engineering team via videoconferencing, with Black and Mixed heritage engineering students and people working in academia, engineering and the motorsport sector. The aim of the research was to understand more about their experiences or about initiatives relating to diversity and inclusion or promoting careers in the sector. These interviews provided the source material for the case studies that are found throughout this report. Where individual students or motorsport and engineering employees are featured, their names have been changed.

Participants were contacted through relevant networks in motorsport and engineering, academia and education and through Black community organisations.

Secondary research: Literature review

The project team have drawn on more than 100 publications including peer reviewed papers, government publications, news articles and publications by industry bodies to support the evidence in this report. For the purpose of the research, the Commission has undertaken reviews of reports and literature on each theme of research. While there has been little written on the specific area of increasing diversity of the UK motorsport sector, the Commission acknowledges the masses of literature that already exists in related fields of Diversity in the Workplace, race and education from primary education through to Higher Education, and evaluation of the effectiveness of STEM engagement activities. Key findings drawn from the existing literature were used to inform other strands of the Commission's activity including the qualitative and quantitative research.

Secondary research: Data analysis

The Commission has carried out in-depth data analyses relating to student attainment by ethnic groups at GCSE, A Level, Level 3 engineering vocational qualifications, engineering and manufacturing apprenticeships and engineering disciplines in Higher Education.

Survey of F1 Teams

The Commission has surveyed F1 teams to come to an understanding of the levels of diversity within the teams, current recruitment practices and culture and what opportunities there are for apprentices and technicians. Data from the survey will be used to inform the semi-structured interviews with the heads of HR teams.

Research Questions by theme

Theme 1: Schools and informal engagement

This theme focuses on the opportunities and challenges faced by young Black students in the school system and outside education as they consider future career opportunities. It examines the evidence on attainment and progression in STEM subjects and also interest in engineering careers among different ethnic groups, including role models (both teachers and external). It examines current careers information and employer engagement in schools.

1. ***What is the current picture of attainment and progression in STEM subjects in the education system across ethnic groups?***

- What is the size of the cohort for Black and other minority ethnic groups?
- Where do these groups live?
- What is their attainment in STEM subjects at GCSE and what are their progression routes in Post-16 education?

In order to understand if Black students are facing any barriers in regard to attainment, the commission will undertake detailed data analyses

2. ***How much do young Black people know about engineering careers and careers in the motorsport sector?***

- Where might they find out about motorsport and develop the knowledge and skills in the curriculum?
- What type of careers information are they receiving in schools?
- What is the extent of extra-curricular activities that encourage further interest in motorsport careers? How effective is this?
- What employer engagement opportunities are provided to young people as part of their careers education?

3. ***What systemic barriers are preventing young people from progressing with STEM subjects into engineering careers***

- How are Black and BAME students differentiated in the classroom?
- What is the quality of education in the schools that young Black people are attending (e.g. Ofsted ratings)?
- What subject choices are Black students making and how are they informed?
- How does the intersectionality of high levels of deprivation play out?

- What are the causes of Black students having higher rates of exclusion?

4. ***How effective are informal motorsport engagement opportunities in encouraging young Black people into motorsport.***

- Where are the opportunities? Where are the race-tracks, clubs etc?
- What are the barriers to young people accessing these opportunities?

Theme 2: Further Education, Apprenticeships and technicians

This theme examines the issues in Further Education and technical education provision. Where data has allowed it has analysed demographics and personal characteristics of Post-16 cohorts studying engineering and related subjects. The theme has considered the personal challenges faced by young Black people in the FE system, particularly around socio-economic deprivation leading to non-continuation of studies.

5. ***What is the demographic make-up of students who take technical engineering subjects in Post-16 education?***

- What does this look like by personal characteristics, by region etc.?
- How does the demographic picture look by skills/qualification level?
- How does the data change depending on engineering specialism?

6. ***What are the barriers to young people completing Post-16 education?***

- How does socio-economic deprivation play a role?
- How does prior attainment in STEM subjects play a part?
- Does Post-16 funding play a role?

7. ***What opportunities are there in the curriculum to embed motorsport as a context to teach engineering?***

- How does the curriculum provide flexibility to include automotive training?
- What resources are required and to what extent are these provided?
- How does funding in FE impact ability to provide these resources?

8. ***What Apprenticeships opportunities are there in motorsport?***

- At what levels are motorsport Apprenticeships offered?
- Where are these opportunities? How do they reflect Black populations?
- What are the apprenticeship salaries? Do these differ by personal characteristics?
- Are different ethnic groups going into different roles with different salaries?
- How are higher apprenticeships and degree apprenticeships changing the recruitment activities of motorsport teams?

Theme 3: Higher Education

This theme investigates participation of Black people in Higher Education, in particular, examining recruitment practices of universities, with particular reference to Black/BAME students and students from lower socio-economic groups. In addition, the theme has examined rates of non-continuation in engineering Higher Education and considered the reasons for this. The theme has also examined popularity of degrees by ethnic group, interest around general engineering degrees compared with specific disciplines, and further, specialist post-graduate degrees that may lead to motorsport careers. The theme has also examined evidence of graduate employment destinations.

9. ***What is the current picture of recruitment of minority ethnic groups into Higher Education?***

- What universities are minority ethnic students applying and being accepted to for engineering undergraduate programmes?
- What are universities currently doing to widen participation? How effective are these interventions? How do they differ by mission group?
- What is the recruitment of students with non A-levels into engineering?
- What is the ethnic make-up of Foundation year students and how effective is Foundation year study this at improving retention?

10. ***How well are minority ethnic students doing in engineering Higher Education?***

- What is the rate of non-continuation by ethnic group in engineering?
- How does this differ by mission group?
- What mechanisms are being put in place to minimise non-continuation?
- What degree classifications are graduates from minority ethnic groups achieving?

11. ***What are the opportunities for students to engage in motorsport in Higher Education?***

- How effective are these at supporting transition into motorsport organisations?
- What placement opportunities are offered into motorsport organisations?
- What is the ethnic diversity of students that undertake these activities?

12. ***What are the graduate destinations of students from engineering?***

- How does this differ by personal characteristics, specialist discipline, university group?
- Do specialist motorsport degrees support transition into motorsport careers?
- Does increasing specialisation at Master's Degree level support improved transition into motorsport careers?

Theme 4: Motorsport careers and opportunities

This theme has examined the motorsport sector - starting with F1 and broadening out to other disciplines within motorsport. The theme has examined responses from motorsport teams with regards to skills needs, recruitment processes, diversity data, organisation culture and motorsport perspectives on challenges and opportunities. In addition, the theme has explored the informal opportunities to engage in motorsport that may lead to careers in the sector.

13. ***What are the skills needs and entry requirements in F1 and motorsport?***

- What engineering disciplines, skills, qualifications are F1 teams looking for?
- What are the knowledge, skills and behaviours for other motorsport organisations, if different?
- How do motorsport (F1 and other) teams recruit at professional, graduate and technician level?
- How do they advertise for positions in F1 teams?

14. ***What are the career opportunities in junior divisions and other motorsport disciplines?***

- How do engineers and technicians enter careers in the broader motorsport disciplines and junior categories?
- What does progression between and upward through motorsport organisations look like?
- How do pathways differ (if at all) for professional roles and technician roles?

15. ***How do people engage informally with opportunities within motorsport to support career progression?***

- What opportunities are there through clubs and other motorsport functions (e.g. officials, marshals etc.)
- What are the barriers to this (distance, cost etc.)

16. ***What are the existing EDI activities across F1 and the broader motorsport community?***

- Are there examples of good practice in motorsport teams?
- What do these look like? How effective have they been?
- How effective has the focus on gender representation been?
- What lessons can be learned from this?

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