UK & Ireland EERN (Engineering Education Research Network)

Annual Symposium 2025

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Navigating the future of higher education engineering: Exploring trends, challenges and opportunities in engineering education

1. **A comprehensive overview of HE engineering**

This presentation offers a broad brush on higher education engineering, emphasising its attractiveness and intake in the context of financial and other policy dynamics.

2. **Unique perspectives on data**

I present something of an umbrella view of the sector, drawing you away from the classroom environment and inviting you to look at the bigger picture. Sectoral quantitative datasets can help us project how the landscape might shift going forward - where good engineering education should always be based upon the composite cohort of individuals. A tour de force of the supply and demand journey from a policy/data perspective enables an informed discussion on engineering education. A macro-level analysis can expose how various factors influence student choices and institutional performance in engineering.

I use a couple of pre-publication resources:

- An important HESA data report for the UK government and engineering sector to understand the role of higher education in developing the future engineering talent to meet the country's needs over the next thirty years.
- An EPC UCAS admissions data study commissioned by the Royal Academy of Engineering to demystify the exclusivity of admissions to undergraduate engineering.

3. **Context**

The engineering skills challenge means we require an increase in both the number of engineering graduates and the knowledge and the skills they exhibit.

Initiatives and developments to respond to these calls include government policy (e.g. degree apprenticeships), provider start-ups (new institutions: NMITE, TEDI London and Dyson Institute) innovations within the established sector. Regional and place-base rhetoric is increasingly important alongside the Government missions, and links with local industry enable individual universities their own engineering specialisms reflecting the transformative role of the Higher Education institutions in their own individual setting. Universities play an important role in the new Industrial Strategy.

Meanwhile, the future of the Level 3 qualifications we use as the entry gateway is unresolved and we see conflicting perceptions around the requisite maths and physics needed to study engineering.

We also face a troublesome landscape of student funding. The financial outlook for most of UK higher education is bleak. Data from HESA[1] shows over a third of providers were already running a deficit for 2023-24[2], with up to three-quarters of institutions at risk of running deficits in 2025[3]. At least seventy institutions are making significant staff cuts.[4]

This means deep concern in the sector about the increasing financial pressure on institutions and the affordability of Engineering. The high-cost element of undergraduate Engineering education is inadequately funded thus providers widely subsidise Engineering tuition from classroom-based subjects and international recruitment. So, Engineering programmes are at risk from both real-terms funding cuts and a lack of resilience. Academic staff and physical labs take priority while essential specialist equipment, spaces and licences become unaffordable. Redundancies and course closures present a diminishing capacity to meet the UK's skills needs in key industries.

Falling (when adjusted for inflation) funding for UK students is matched by increasing reliance on international student numbers. The global recognition of engineering is a success story but also a risk.

4. Current trends in higher education intake

There are around 250 higher education providers in the UK. Almost half (**118)** deliver some form of taught engineering provision at undergraduate or postgraduate levels.

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[1] https://www.hesa.ac.uk/news/05-12-2024/he-provider-data-finance-release-1-202324

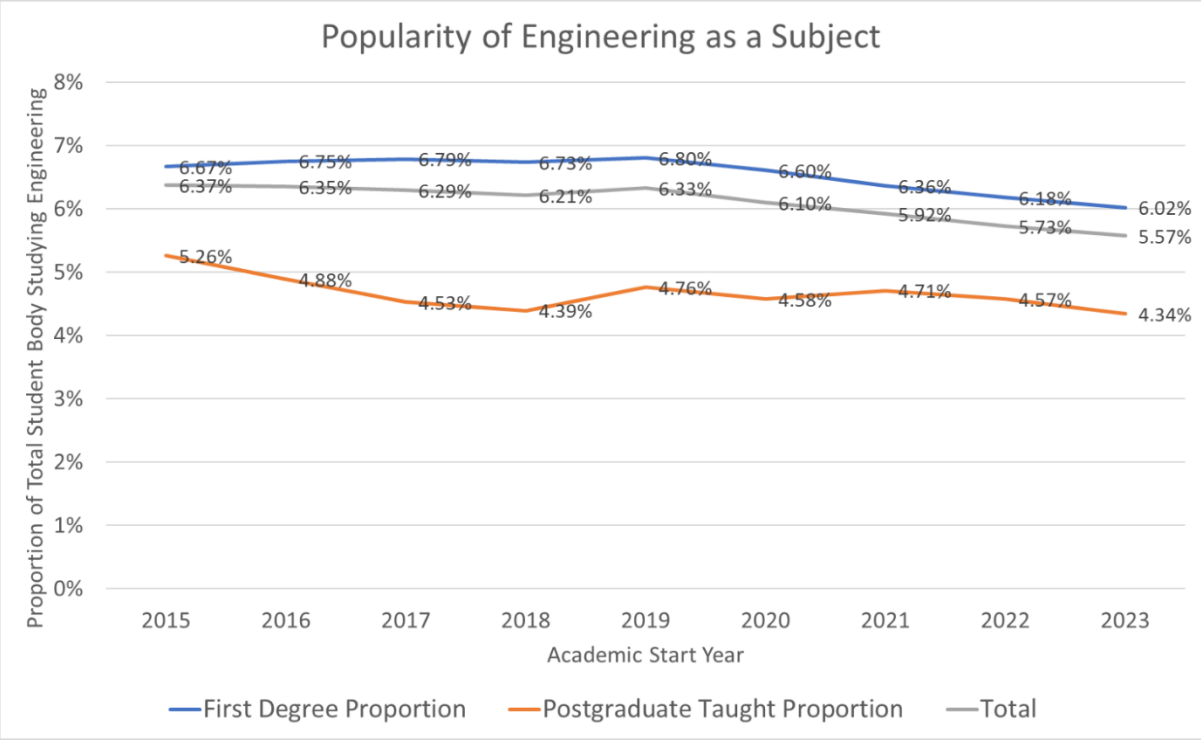
[2] https://wonkhe.com/wonk-corner/2023-24-financial-data-early-year-financial-year-end-version

[3] https://www.officeforstudents.org.uk/media/ly1buqlj/financial-sustainability-report2024.pdf

[4] https://www.bbc.co.uk/news/articles/cpd9mgk028lo#:~:text=It%20follows%20a%20call%20from,international%20students%20to%20this%20country%22

Around three-quarters are advertising at least one foundation year option. Nearly a quarter of universities enable students to study at level 4 or 5[5], plus some offer a 'top-up' year to complete a BEng degree. FE and HE is blurring with emerging visions for a tertiary sector. Currently, the vast majority of engineering provision in FE is at undergraduate level and in some cases, a university's foundation year will be taught at the local college. In total engineering students make up around 6% of the UK student HE population.

In 2023.24 there were circa 144 thousand students in engineering (UG and PGT, HECoS 10-03). The last decade has seen numbers climbing, but they are now dipping from a peak of around 150 thousand. The proportion of first-degree students enrolling in engineering has fallen for four consecutive years.



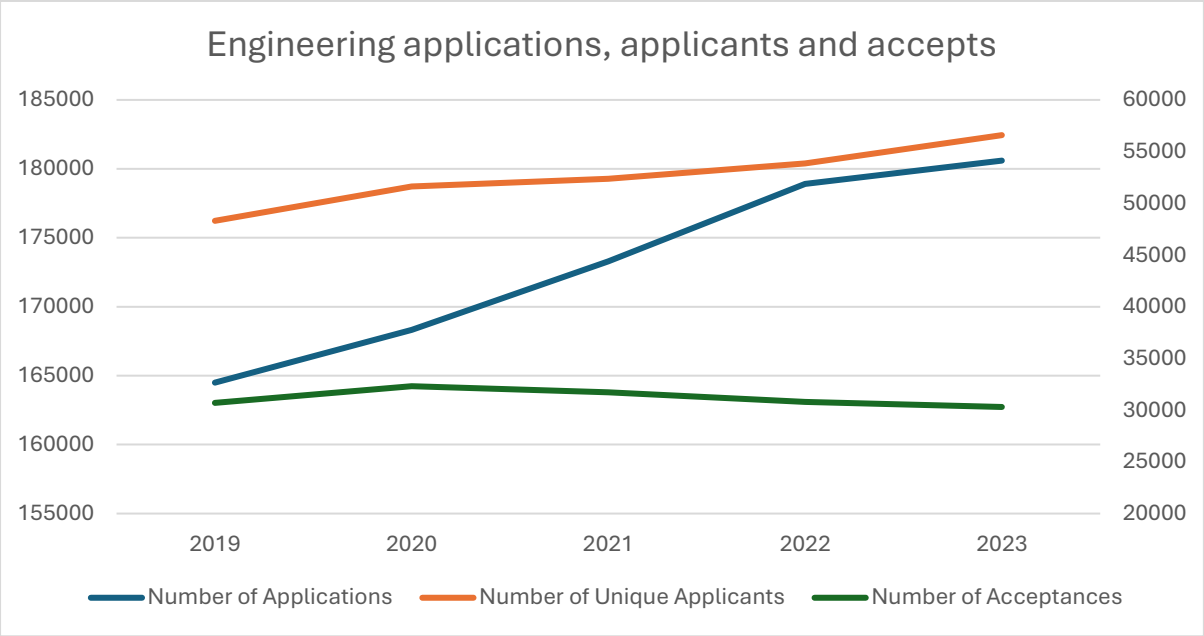
Meanwhile applications for undergraduate Engineering have been increasing - so the demand is there – while acceptances are falling.

Demand

A 10% increase in undergraduate applications since 2019 tells of a 17% increase in applicant headcount (56,000 undergraduate Engineering hopefuls making an average of three+/max 5 applications to Engineering). By the end of the 2023 UCAS cycle just over half of Engineering applicants had been accepted to Engineering, 1.3% fewer than in

[5] HNC (level 4), HND or Foundation Degree (level 5)

2019, following inflated recruitment in 2020 and 2021 (as you might expect in the era of centre-assessed grades during the pandemic).



At face value, a healthy net increase in applications versus a declining role suggests that demand is increasingly outstripping supply (there were an average of 1.6 hopefuls per acceptance in 2019 escalating to 1.9 in 2023, so, is it getting harder to get into Engineering.

But this could be an applicant phenomenon. Maybe fewer Engineering applications per capita suggests that engineering hopefuls are becoming more discerning, or less committed to Engineering? Deeper into the application process, the number of positive applicant-side responses has dropped since 2020, with the volume of (mainstream) applicants declining an offer increasing by 10% since 2019.

Deeper still, there are now 60% more passive declines than 5 years ago (Declines by Default, where ignored provider offers are automatically cleansed by UCAS on behalf of the applicant) - a change in applicant behaviour when an offer isn't credible (or disengagement where a course or provider is not the applicant's firm or insurance choice?) This hints at applicant decision making but is also important for providers, who now have a poorer understanding of their own pipeline until later in the cycle.

Let's think a bit more about commitment to study engineering. In the past five years, around 55 thousand Engineering hopefuls have gone on to study another subject, 40% of whom were women. These potential engineers are increasingly deferring to Computing (10.3% of accepted applicants who had applied to Engineering in 2023). According to HESA there has been a 62.2% increase in enrolments to Software engineering (Computing) since 2019/20. Other beneficiaries include Architecture, Building and Planning; Sport and Exercise Sciences; and Creative arts and design

courses (all between 2 and 5 %). Although one in three successful applicants with an interest in Engineering at application stage deferred to another subject in 2023, it was mostly to the subject of their firm choice. But the scale of these speculative engineers ultimately committing to another subject has grown from one in four in 2019. Despite offer-making in women's favour, women in the main scheme were more inclined than men to end up studying a non-Engineering subject; one in two did not go on to undergraduate Engineering (up from one in three in 2019).

So, we might conclude that applicants are driving the apparent ceiling. Not really. Providers are rejecting far more applications, with demand pressure being actively mitigated supply-side. The volume of provider course offers to applicants has increased since 2018, but by only around 4%, while the number of applicants rejected in the main scheme has increased much more sharply; by 29% to 2023 and, by the end of the cycle as post-results movement settles, by 20% (55,000 rejections in 2023 alone).

Attainment

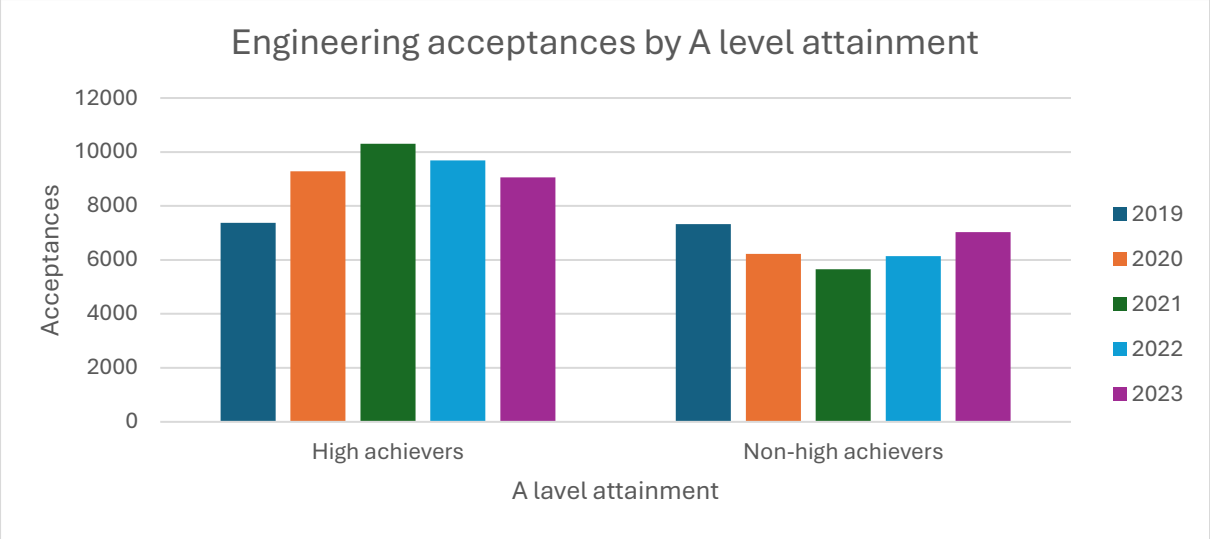
Are providers are constraining admissions in response to the capacity of the sector? If they are being more selective, it might suggest financial constraints on the number of Engineering students in the face of higher applicant demand, whereas if they are being less selective, it would suggest a drop in the 'quality' of applicants (or more accurately, their prior attainment).

Engineering educators across the sector are acutely aware that qualification and attainment at admission impact everything, from curriculum design to student support and strategic planning. OfS tell us that continuation for full-time first-degree students in Engineering has destabilised since 2019 and a gap has emerged with Engineering falling behind almost every other subject.[6] There is also larger than average decline in continuation rates for students with non-A level entry qualifications and lower A level grades. In 2023, nearly one in five accepted undergraduate engineering applicants with 3-A levels or higher presented with at least one D grade.

The EPC admissions study shows that three quarters of 18-year-olds accepted to undergraduate Engineering held A levels in 2023. Nearly one in ten accepted applicants with 3 A levels presented with A*A*A*; more than one in three held straight As or higher; and more than half were high achievers (ABB+).

See the relationship between high and low achievers over the past 5 years; think Centre Assessed Grades but note that weaker than expected A level performance latest UCAS data suggests that providers may have relaxed entry requirements further since.

[6] https://www.officeforstudents.org.uk/news-blog-and-events/blog/working-with-providers-to-promote-positive-outcomes-for-students/



Entry requirements

The 'entry requirements' section of university websites are increasingly complex, with numerous qualifications usually considered for first degree courses, plus information on contextual offers. The advertised requirements range from A*A*A* to CCD, with lower or no A levels required at Foundation Year.

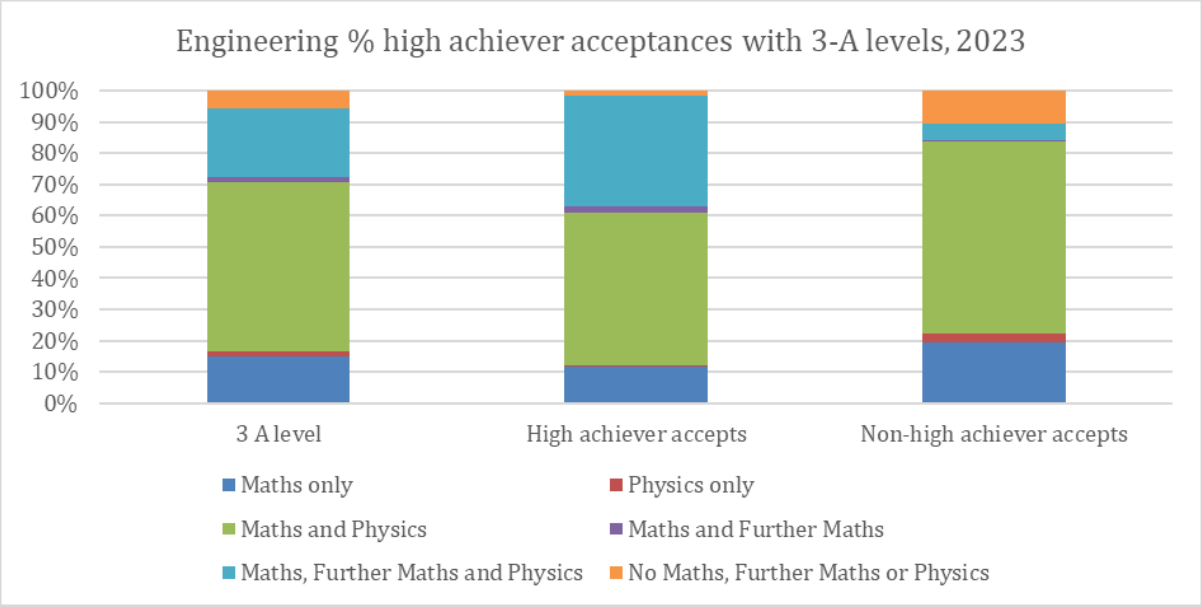
While A levels are the dominant admissions qualification in the UK, it is by no means the only route into engineering higher education. In 2023, one in five acceptances held no (or unidentified) qualifications and around one in eight accepted applicants were BTEC holders. But the predominance of applications from 18-year-olds with A levels, who are now more successful to acceptance than five years ago, appears to have contracted the undergraduate Engineering market for other qualifications.

The BTEC Extended Diploma acceptance route has contracted by nearly one-third; a decline most pronounced following the 2021 Government announcement that public funding would be removed from "low-quality" level 3 courses that overlap with A levels and T Levels.

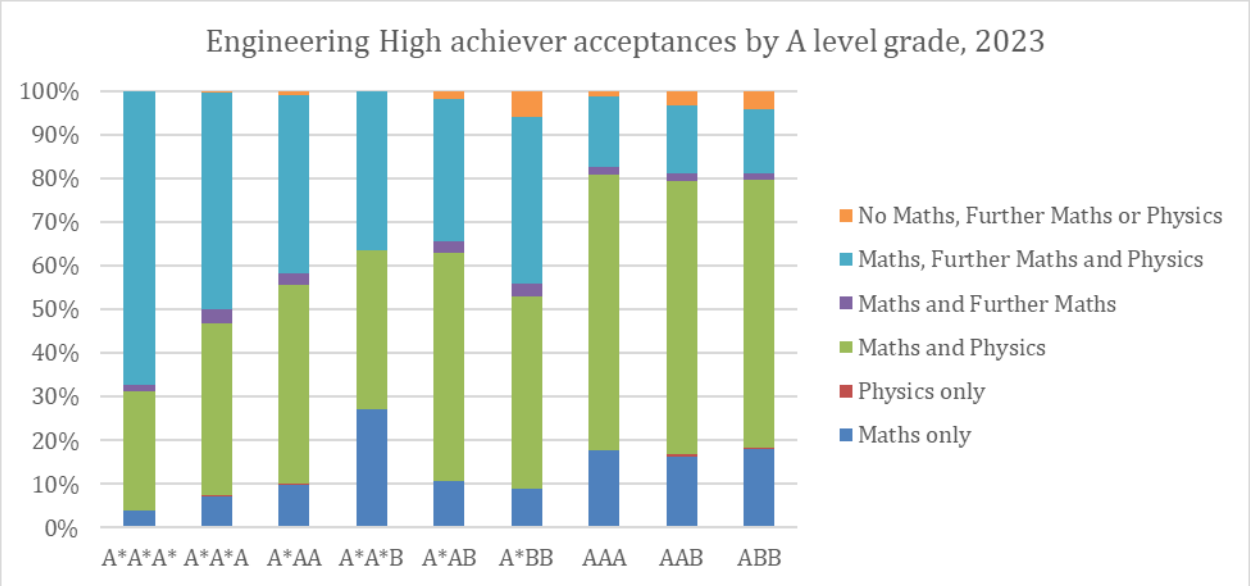
Although an A level (usually Maths) is an oft cited entry requirement in addition to the BTEC Extended Diploma (I found at least 400 entries for 2024 entry), just one in 20 BTEC Extended Diploma holders also presented with A level qualifications. Just 100 were accepted.

I often hear the narrative that admission, teaching and learning and success requires high A level attainment, particularly in Maths, Further maths, and Physics. But with access to Further maths and Physics A levels limited by geography and staffing, are these subjects genuine prerequisites?

In practice, most acceptances had at least one of Maths, Further maths, or Physics A level with Maths being the most common. High achievers were more likely to present with combinations of these.



Two in three of the highest achievers (those presenting with A*s) held Maths, Further maths and Physics combinations and this typically decreased by grade. Lose the A*s and fewer held Further maths, but near two thirds held Maths and Physics, the modal combination.



Application to acceptance ratios support the common narrative that Maths is a key facilitating subject for undergraduate Engineering. At a macro level, Physics is not. Even more favourable ratios for those with no qualifications warrants further research into the impact of Foundation Years, which are commonly cited as accommodating those making the “wrong” choices at level 3.

The overall dominance of Maths, Further maths and Physics is not an accepted applicant phenomenon but can be traced to applicant profiles on application, suggesting self-selection. This may be in response to entry requirements - nearly 90% of courses cite Maths within A level requirements and well over half cite Maths and Physics - or perhaps where undergraduate Engineering is uniquely attractive to these A level students (who may have opted for these subjects as a pathway to Engineering in the first place).

The highest proportion of applications from those applying with Maths, Further maths and Physics are to Higher tariff group (and from those who go on to achieve High achieving 3 A levels). Further maths combinations, in particular, are the preserve of High achieving applicants to High tariff providers.

Providers

Let's talk more about provider hierarchy. In the latest HESA data, the largest 30 engineering Schools accounted for over 60% of the total taught student population. London's share of the market is increasing, and place is again important as not all regions are equal in terms of the number of institutions or the types of institutions.

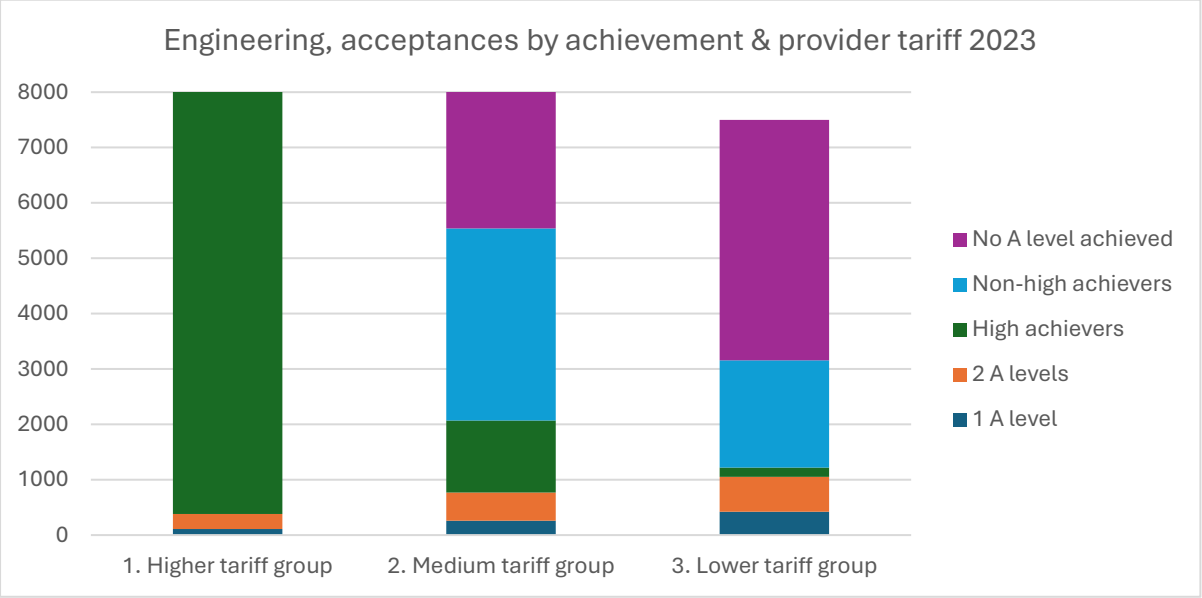
The largest 3 engineering providers in the UK (Sheffield, Imperial and the Open University) each have around 5,000 taught students. Next follows a dozen or so of the large established, mainly metropolitan institutions (Manchester, Loughborough, Glasgow (Strathclyde), Nottingham, UCL, Warwick, Leeds, Southampton, Bath, Birmingham, Bristol. At 15th, UWE Bristol is the largest post-92 provider.

The majority of those within the largest 30 by taught student number have maintained relatively static student numbers. However, UCL (+24.7%), the University of Warwick (+17.2%), the University of Southampton (+16.7%), The University of Liverpool (16.74%), UWE, Bristol (+16.1%) and Queen Mary, University of London (13.2%) have all seen more than 10% growth. However, Coventry (-51.4%), The Open University (-23.0%), Brunel University London (-22.56%), The University of Portsmouth (-22.5%), Swansea University (-21.6%) and Heriot-Watt University (-15.7%) have shown decreases in the overall number of taught engineering students between 2020/21 and 2023/24.

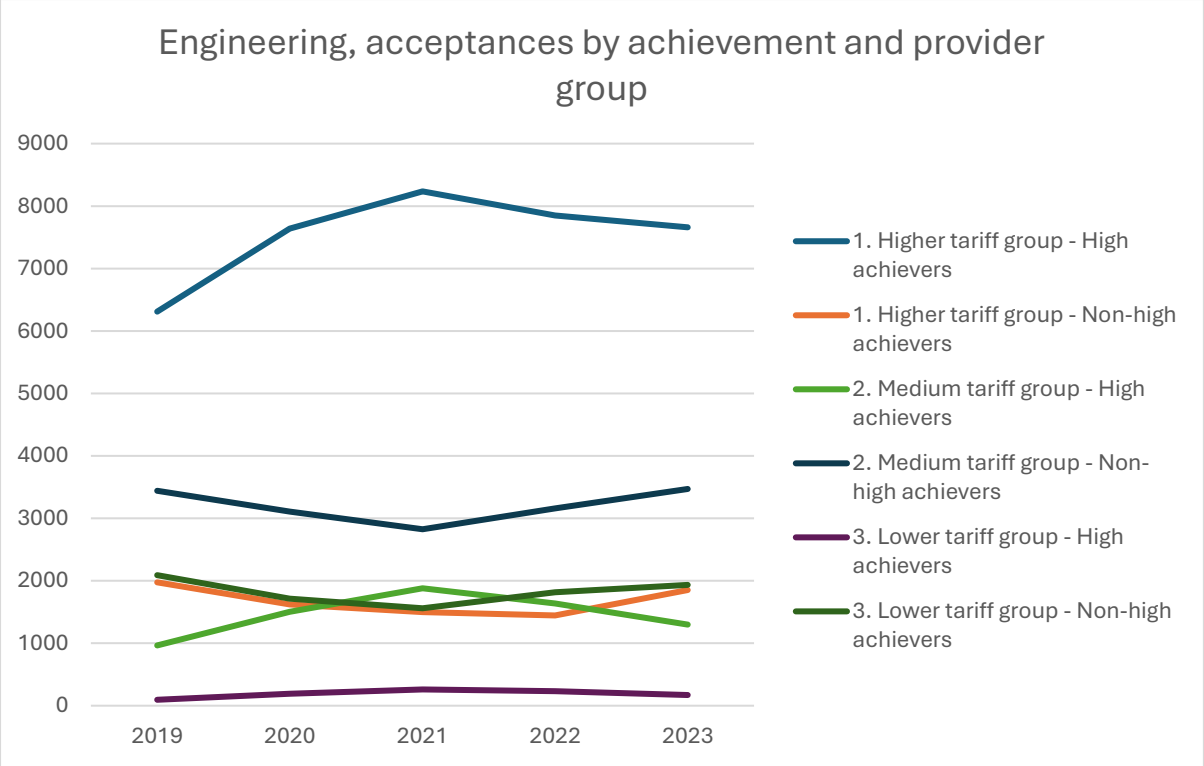
At undergraduate level, over half of Engineering applications were made to high-tariff providers in 2023, over a quarter made to medium-tariff and a fifth to low-tariff providers. Probably unsurprisingly, high achievers (with 3 A levels) dominated the acceptances to higher-tariff providers; non-high achievers (with 3 A levels) were the modal acceptance cohort among medium-tariff providers; and those where no A levels were achieved were the most common acceptances at the lower-tariff providers.

Offer rates confirm that it is easier to get into Lower tariff providers and harder to get into Higher tariff providers. In practice, High achievers receive a wealth of offers from

Lower tariff providers but are ultimately under-represented in their acceptance population. As Tariff bandings were an equal distribution when conceived) the gap in bar 3 represents a wholesale change in the scale of provision with the impact being felt almost exclusively by lower-tariff providers.



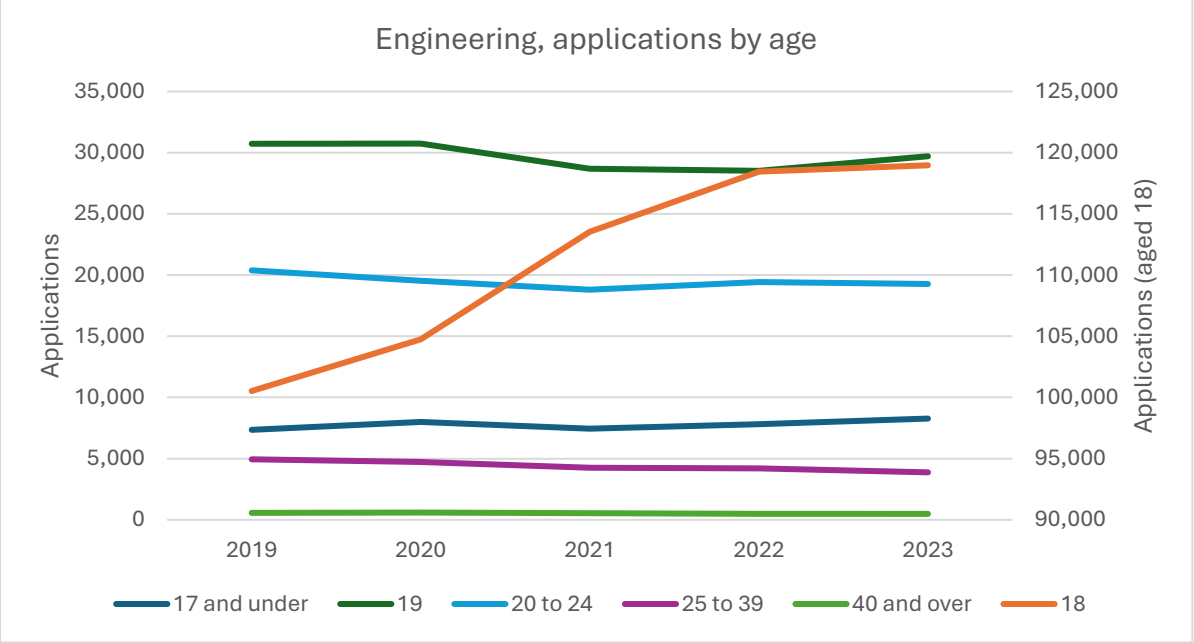
Meanwhile, the shape of provision is also changing, with the gap between high- and non-high-achieving A level Engineering recruits closing at high-tariff providers and increasing at medium- and low-tariff providers.



So, in addition to the most prestigious providers monopolising the highest, A level, achievers and those with access to Further Maths, high-tariff Engineering providers appearing to be "fishing in deeper" waters. Stronger than usual undergraduate recruitment among high-tariff universities, starting at the offer-making stage,[7] continues in the latest UCAS data, so we can expect this *divergence* to proliferate and for the middle tier to feel the pinch too.

Meanwhile, those providers with entry requirements less anchored to traditional Level 3 qualifications face an ongoing decline in mature student recruitment, particularly in those over 25. The number of Engineering applications from those aged 20+ has fallen by 9% since 2018, with just 13% of undergraduate applications to Engineering in 2023 from those aged 20 or over.

[7] https://wonkhe.cmail20.com/t/d-l-selhg-jljiuhiuc-j/



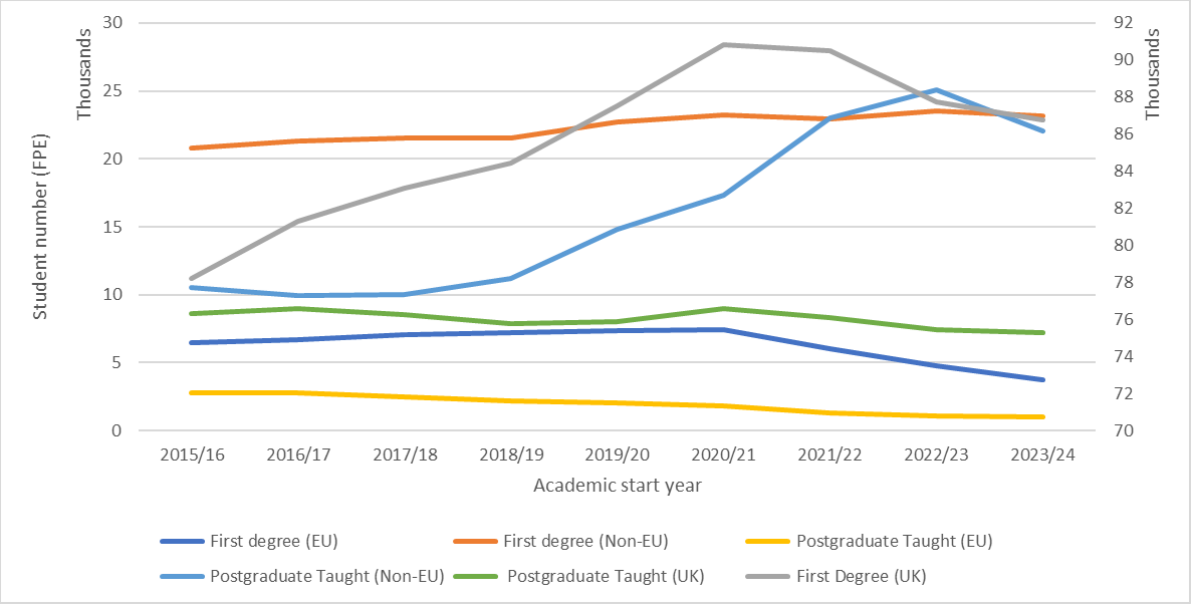
With the future of the Lifelong Learning Entitlement (LLE) eerily quiet, signs of growth from credit-based learning and wider access to student finance need to have an urgent impact on the prevalence of older learners within the sector to revise the current trajectory.

Meanwhile, the number of UK-resident 18-year-olds – who are driving the demand for Engineering – is forecast to decline dramatically from 2030[8]. All eyes on international recruitment.

International

At first degree level in engineering nearly one in four students are international, despite the numbers of EU students having halved since 2015/16. As you know, students from Asia dominate the international (non EU) student cohort (increasing substantially in recent years), with more than twice as many students coming from Asia as from the other continents combined. So, Engineering remains highly attractive to markets in Africa and the Middle East but there are others that despite being potentially huge only account for a relatively small number of students (America and Australasia).

[8] https://www.ucas.com/about-us/journey-million/what-journey-million



International student representation is higher in Engineering than almost all other subjects and widely attributed to the cost of higher education Engineering provision significantly outweighing the domestic fee income. The Department for Education's own figures measure Engineering at double the cost to run of many classroom-based courses, and the EPC estimate a tuition fee shortfall of £7,5 thousand per year per domestic Engineering student in the 2025/26 academic year.

This income stream similarly favours the top tier providers. 60% of overseas first-degree engineering students are at Russell Group universities (despite the RG only educating 41% of the total first degree engineering population) with 23% at Post-92 institutions (educating 30% of first-degree undergraduates). Pre-92, non Russell Group providers have a considerably larger emphasis on home students.

5. Future implications

- Demand outstripping supply with a healthy pipeline of engineering undergraduates met with a provider-led ceiling on admissions.

- Changes in student choices signalling a fall in commitment to engineering study.

- Projected changes in intake trends indicate tiered provider system in HE engineering differentiated by qualification and attainment.

  Signs of a wholesale change in the scale and shape of provision where, because High tariff providers are fishing in deeper waters, admissions are increasingly concentrated in a smaller number of providers.

- A lack of financial resilience in relation to international student recruitment.

- Financial constraints.
  These shifts may see a growing disparity in access and opportunities and, ultimately, course and department closures in parts of the sector.

  Government can address this diminishing capacity to meet the UK's skills needs in key industries to ensure the financial viability of strategically important Engineering subjects. In the absence of funds, this might reasonably take the form of student number controls in England but the resultant reduction in choice could be highly gendered and exacerbate fair access challenges.

- Meanwhile, the appetite for risk elsewhere is surely curtailed, working against the cross-provider type collaboration required to protect strategically important Engineering disciplines.

Thank you.