New Approaches to Engineering Higher Education – Policy Roundtable

Increasing the supply of engineers, the importance of work-related learning and improving the relationship between education and industry were among the key topics discussed at the IET and the Engineering Professors Council's (EPC) New Approaches to Engineering Higher Education Policy Roundtable at Portcullis House in Westminster on 24 October 2018.

Chaired by IET Chief Executive Nigel Fine and hosted by Stephen Metcalfe MP, Government Envoy for the Year of Engineering, the workshop was an opportunity for MPs, leading industry figures and academics to talk through some of the challenges that need to be addressed in order to create a successful engineering skills pipeline between schools, universities and industry that suits the needs of businesses, educators, students and the UK as a whole.

What follows is a summary of the main points raised as well as recommendations for policymakers, industry and academia to take on board that were put forward in the meeting.

The importance of diversity

The profession generally needs to be more inclusive and welcoming. It was agreed that making engineering accessible to everyone and focusing on increasing gender and ethnic diversity will expand the intake and attract not just a greater quantity but a wider variety of young people into engineering. It is essential that boys and girls are given equal opportunities at primary school, while more needs to be done to ensure that girls who show an interest in engineering at primary level are encouraged and supported to carry it on into secondary and beyond.

Many children miss the chance to do engineering at school because it is seen as expensive and not part of the English Baccalaureate (EBacc), which means it can be left off the curriculum. They would also benefit from further encouragement to be more creative and innovative, and those who do not live near to a large engineering business are in danger of missing out on placements and work experience, resulting in whole communities where young people have no access to these opportunities.

The right approach to subjects

Children in the UK are required to specialise earlier than in other countries. At A Level their choice of subjects is narrowed down to just three, but if Maths and/or Physics are not one of them, it can be difficult to find a route into engineering at a later stage.

The continuing decline in the number of children taking Design and Technology at GCSE is also a major concern and must be rectified.

Better support for teachers

A lot of teachers need extra help to run STEM projects and do not have the tools they need. It is common for them to lack confidence in teaching engineering. These teachers must have additional support and training, ensuring this is delivered in ways that fit with the curriculum and have been shown to work.

One way to give teachers in England more confidence when covering engineering topics would be to introduce subject-specific CPD (Continuing Professional Development), which is commonplace in Scotland. It has been proven that good quality teaching leads to more students progressing in STEM subjects.

Giving industry the skills it needs

It is not just the quantity of engineers that needs addressing, as quality is also a concern. Businesses are in urgent need of more creative, motivated, driven employees with initiative, but the current education system is not satisfying the demand. There are too many constraints and technology is evolving at a rate far higher than the pipeline is able to maintain.

Stronger links between industry and education

There needs to be an increase in the number of SMEs engaging with schools in their local area. Some businesses could do more to help boost the number of engineers, for example by putting their funding into initiatives that have been proven to work. Better careers discussions in schools, where students are shown the opportunities that currently exist in the jobs market, should also be considered.

Engineering education needs to be redefined as one continuous path all the way from primary school to industry rather than the existing detached system where students transition from one stage to the next without proper crossover.

One way to incentivise schools to work more closely with industry would be to introduce league tables where schools are ranked in order of their success in building links with local businesses.

Furthermore, in the UK education system, students are often seen as customers, but this has to change. The needs of businesses and wider society need to be given higher priority.

The value of placements and apprenticeships

Placement years can help boost student motivation and improve overall grades and work-readiness, but a year in industry is still not an option for many engineering students. As well as striving to increase this number, a possible next step could be to provide students with an accredited year in industry, similar to an apprenticeship. This could help with the perception that by taking on a placement year, students are taking a year out of their education, which can be off-putting. An extra year will not suit all students though, as it can mean more debt and an even longer wait before starting full employment. However, every placement has to be right for each student, as a bad experience can be worse than no work experience at all.

There was a discussion about the feasibility of the apprenticeship levy funding being used to fund a year in industry for students and university placements, while another idea raised was an option for students to switch between academic and vocational training routes. These must be paid opportunities, to ensure the inclusion of young people who might otherwise struggle to self-fund this stage of their education.

There were also calls for methods to get more students in placements at SMEs rather than just the larger companies, focusing primarily on a local level.

With apprenticeships, creating a programme similar to the university clearing system would encourage those who have applied for an apprenticeship at a large corporate to consider SMEs further down the supply chain. Big companies have tended to be over-subscribed whereas SMEs are under-subscribed, so there must be a way of tackling this imbalance. Delivering this through the existing 'Find an apprenticeship' online platform could be an option.

Keeping up with rapid technological change

In an era where Industry 4.0 is starting to come to fruition, degree courses can become obsolete long before the student graduates, especially in areas such as software engineering. Students must be trained alongside the development of the technology; otherwise once it is adopted there will be a shortage of people with the skills to use it. This could be an opportunity to get university departments out of their silos as there are some topics, such as digital, that most degree courses should be covering.

In sectors where trends such as Industry 4.0 and AI are starting to take hold, the skill sets will begin to evolve rapidly. It is in these areas particularly where creative skills will become highly important.

However, there must also be a balance between focusing on a specific new technology, which might only have a short lifespan, and being too all-encompassing and not targeted enough.

More flexible methods

The problems do not just concern young people coming out of schools and universities. There needs to be more flexibility to move between work and education throughout a career and make learning a continuous part of it. One example would be allowing an employee to upskill in a new technology through a 3-month course. This would, however, require a change to the education infrastructure, particularly in universities.

There must be ways to bring people into engineering later in their careers, along with more routes for people with a non-STEM educational background to get into engineering.

Universities could be more flexible in what they offer, but it is complicated. Many are constrained because they are known for specialising in one area and gain a reputation for being good at it, and therefore struggle to branch out when there are benefits to doing so. They have to cater for the demand, which means it can be difficult to implement significant change.

Continued collaboration

Those at the roundtable acknowledged the need to set their own goals, including a pledge for the whole sector to continue working together after the Year of Engineering comes to an end in 2019. More joint initiatives are required, with a good example being STEM Learning, Engineering UK and the Royal Academy of Engineering collaborating on how they go into schools.

Finally, although there is a lot that could be done to improve the skills pipeline, it is also important to consider the high numbers of initiatives that already exist in this space. Therefore, where possible, solutions should focus on improving what is in place rather than increasing the quantity of schemes further still.