

APPRENTICESHIPS IN THE EDUCATION AND SKILLS LANDSCAPE OF ENGLAND.

Institution of
**MECHANICAL
ENGINEERS**

A young woman with dark hair in a bun and an older man with grey hair and glasses are working together on a mechanical component on a white workbench. The woman is holding a small metal part, and the man is using a tool to work on it. In the background, other people are visible working at similar workbenches in a well-lit workshop.

Improving the world through engineering

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Perceptions are as great a barrier as affordability for both the apprentice and the employer, especially for the SME sector.

Dr Colin Brown

Director of Engineering

Institution of Mechanical Engineers

This case study has been produced in the context of the Institution's strategic themes of education, energy, environment, healthcare, manufacturing, transport and its vision of 'Improving the world through engineering'.

Cover image

Engineer and apprentice checking component quality.

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Introduction

There have been a number of Government initiatives in the last four years that directly impact the engineering education and skills systems in England. Most recently these have been the Industrial Strategy Green Paper in January 2017 and the Budget supporting technical education in March 2017. This paper attempts to summarise the key features of each and draw out those instances where initiatives interact.

It has a specific emphasis on further education, technician skills and apprenticeships. The goal is to make recommendations based on an overview where interactions between initiatives could be improved. Attention is also drawn to opportunities that have so far been missed, to increase the availability of engineering talent to meet industry needs.



The Initiatives

There have been about 12 major pieces of legislation or guidance following the publication of the Richard Review of Apprenticeships in November 2012. The review drew out a number of themes that have been the basis of Government action since then. Its author, Doug Richard, summarised the proposed reforms as needing to provide a coherent set of interdependencies:

“The redefining of an apprenticeship, the role of the employer in setting the standard, the simplification of the system to one standard or qualification per occupation, the freeing up of the curricula and of teaching methods, the robust testing of the accomplishment, the funding of apprenticeship training and the generation of demand and supply – together form a whole vision of the future. One element makes sense only in light of the other elements – and each element will be deliverable only if the others are delivered as well. This is not a list of recommendations that can be taken in parts. If we want the system to make sense, if we want it to work on the ground for apprentices and employers, these recommendations must be taken as elements of a single system that is adopted as a whole.”

It is clear, therefore, that an analysis of the apprenticeship and further education landscape must draw on its interaction with schools, higher education and of course employment. There is a clear need to understand the systemic and cultural factors that determine an individual's choice, that in turn creates the flow of people into apprenticeships. It is particularly important to understand the extent to which it is indeed a choice, rather than a last resort in the event of unemployment or failure with other routes.

Figure 1a shows the relative size of each of these sectors (based on an estimate of the total number of individuals in them at any one time) and hence highlights how they may compete for attention from people moving between them. **Figure 1b** contains details of the recent policy activity in each sector, that is then discussed in the remainder of this paper.

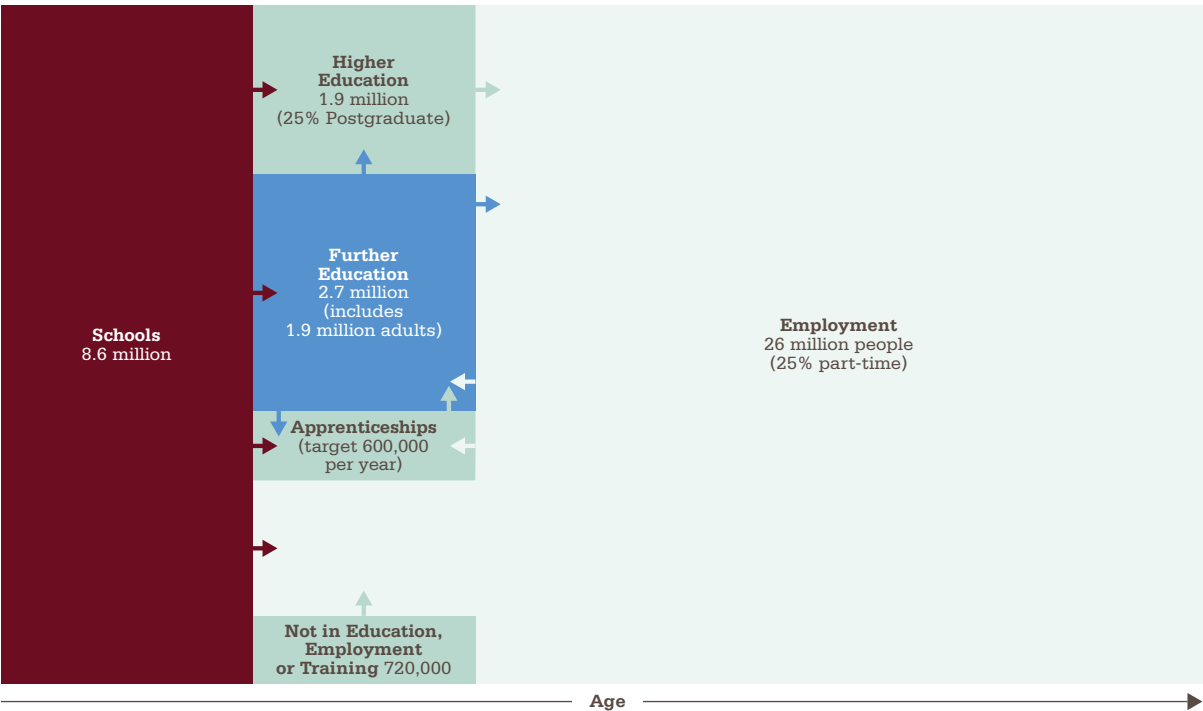


Figure 1a: Total population in England engaged in each sector

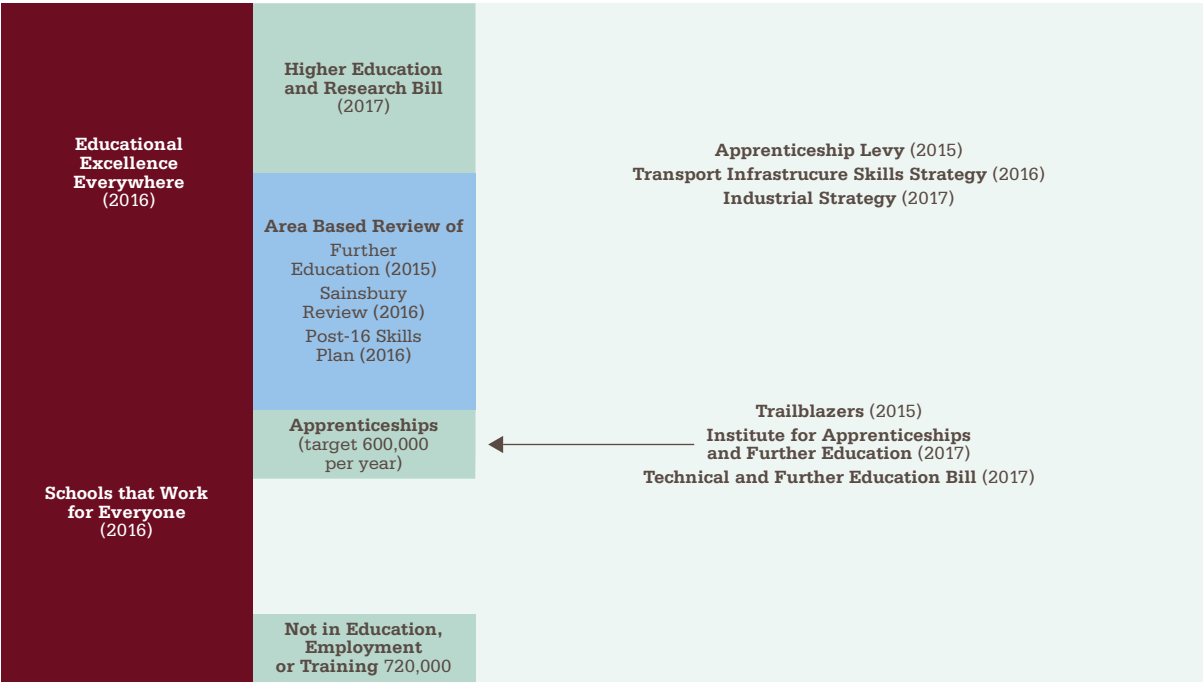


Figure 1b: Total population in England engaged in each sector

The Institution of Mechanical Engineers' Position

The overall desire to increase the quality and the size of the pool of engineering talent available to UK industry is warmly welcomed. It is widely known that the sector continues to suffer a structural skills shortage that is particularly acute for skilled technical roles. Moreover, the Institution supports the view that apprenticeships should take account of the rapid rate of technological development, by building in resilience. This means we need training for occupations, not just for jobs. Most importantly, we must take radical action to ensure behaviours change away from those which have got us to where we are today. The proposed Industrial Strategy gives a valuable focus as to why change is needed. The Institution of Mechanical Engineers' recommendations address just how that change might be delivered.

Specifically we call upon:

1. The Professional Engineering Institutions must provide guidance on need, and ensure maintenance of personal competence standards, as apprenticeship volumes increase. Standards need to be developed for all Vocational Qualification levels as well as those that naturally fit the EngTech, IEng and CEng grades.
2. The Government's Apprenticeship Levy to fund stakeholder communication and engagement activity as well as provide quality delivery. Public perceptions are as great a barrier as affordability for both the apprentice and the employer, especially for the SME sector.
3. The Industrial Strategy team to develop plans that meet the needs of each region and industrial sector. Targeting specific issues one-by-one, for example in advanced manufacturing skills, will have more impact than general incentives. More work such as the DfT Skills Strategy should be encouraged.
4. Schools to be part of a robust, modern, well-resourced, cradle-to-grave, careers strategy that will bring about the necessary changes in perceptions. The new T-Level qualifications will fail if they are not accompanied by a change in attitudes to technical education. Teachers, parents and young people are guided in many ways by the regulatory framework we place on our schools – and these do not reward knowledge of technical education.
5. Government in England to reassess its approach to teachers' Continuing Professional Development (CPD). Investment in CPD will retain more experienced STEM teachers in the profession, leading to an increased subject awareness and broader interest from students.

Industrial Strategy

A successful industrial strategy is one that changes lives for the better, not one that just maintains the status quo. It provides the governance, and encourages the investment, to allow society to flourish and people to achieve their potential. The Royal Academy of Engineering has suggested that there are eight essential elements in such a strategy:

- Leadership – effectively a vision and a long-term commitment
- Skills – workforce planning
- Signals and Culture – behaviour of Government in ‘walking the talk’
- Opportunities and Sectors – the need to be selective
- Access to finance – with appropriate long-term commitment
- A robust supply chain – whether local or global
- Policy stability – continuity between Governments
- Manufacturing – capability across sectors and industries

The UK Government's Green Paper (January 2017) sets out ten ‘pillars’ by adding in regional development; infrastructure; and affordable and clean energy; and not expressly mentioning policy stability. The concept of both approaches however is very clear – decide what you are going to do and make sure you are equipped to do it.

In the context of apprenticeships, it is clearly encouraging to see mention of capital funding for new technical education colleges and a “comprehensive careers strategy” in schools that will make it easier to apply. There is also a commitment to “ambitious new approaches to encourage lifelong learning” which will support people through industrial change.

The actual delivery of the strategy will vary between industrial sectors. The Transport Infrastructure Skills Strategy paper from 2016 is therefore welcome. Created by Patrick McLoughlin and now endorsed by Chris Grayling, it has survived the first hurdle of political stability. At this sectoral level it is also able to offer specific targets, such as 30,000 apprentices, and target specific employers, for example Crossrail, HS2 and Highways England to engage with schools and colleges to ensure targets are met.



Roles for the Professional Engineering Institutions (PEIs)

The PEIs are at heart, bodies of peer-reviewed professionals. Existing processes to assess competence (a combination of academic achievement and work experience) are well embedded and ideally suited to an end-point assessment of an apprentice. Their governance under licence from the Engineering Council is also appropriate for an independent measure of maintaining standards.

A key additional benefit, is the position of the PEIs at the interface between academia and industry. They are set up to naturally take a sectoral approach and engage across employers to quantify the true needs for skills, including on a geographic basis. Indeed they can bring to bear an important 'averaging' effect, to minimise the proliferation of multiple and overlapping standards and also to ensure that it is not just the loudest voices that get heard.

The key challenge for PEIs is to move beyond their 'three-tier' system of EngTech, IEng and CEng accreditation, to the six-level system needed to match with apprenticeship standards from Level 2 to Level 7. This extra detail is clearly required by the employer-led shaping of standards, as we have seen across many Trailblazer apprenticeships. While it would require new work on behalf of the PEIs, it is not beyond their capability to design assessments suitable for intermediate grades like this.

Higher Education

Higher Education is an aspiration for many, even though only 40% of society actually take part. The Government remains committed to increase this percentage if possible. If successful, it is not clear if this will be at the expense of Further Education or Apprenticeships, as much as NEETs (those Not in Education, Employment or Training). The Higher Education and Research Bill is specifically designed to “boost social mobility, life chances and opportunity for all.” It has been written to address perceived issues in Higher Education, specifically:

- Insufficient provision of two-year degrees
- A system that favoured those from advantaged backgrounds
- 20% of graduates not ever taking up graduate-level employment
- A need to expand the number of graduates to meet economic growth projections

It aims to make it “simpler and quicker for innovative and specialist providers to set up [and] award degrees”. It also embodies in the Bill a Teaching Excellence Framework to link funding to quality and not simply to quantity; and a new regulator (the Office for Students), partly to increase transparency for applicants on acceptance and progression rates for each course.

The concern must be that an existing world-class system (three of the top ten universities in the world are in the UK) has as much to lose as to gain from attempts at rapid expansion through introduction of new players. It also needs to be set in the context of a parallel target of 25% growth in apprenticeships, which starts competing to some extent for the same cohort of students. Moreover, it is not clear that new Higher Education providers will be keen to offer those expensive-to-teach options that are the core of our skills shortage issues. The combination of these two factors drawing on a fixed cohort of potential students, may well mean there is little change in output in key areas. Indeed there may be some ‘double-counting’ if there is an expansion in the number of degree apprenticeships which could appear in both categories.

Further Education

The Post-16 Skills Plan (July 2016) covers the Government’s desire to “support young people and adults to secure a lifetime of sustained skilled employment and meet the needs of our growing and rapidly changing economy.” It builds on the Sainsbury Review of Technical Education (April 2016). It aims to create bridging courses to allow for much freer movement between technical and academic options. It also introduced the idea of a ‘transition year’ after GCSE, to increase readiness for later attainment at A-Level or alternatively in college-based education linked to industry. Critical of the Sector Skills Councils for being “too remote from employers” it celebrates the 240 “Trailblazer” apprenticeship standards in place, with plans for another 150 (as of July 2016).

The Plan specifically acknowledges the difficulties in attracting women and black, Asian and other minority ethnic students into technical education. It highlights for example that although women started 9,000 Level 2 Apprenticeships in hairdressing in 2013/14, the equivalent figure for engineering was just 80 (less than 1%). Targets are set (20% female intake by 2020; gender parity in the working population by 2030; 20% increase in black, Asian and minority ethnic starts by 2020), but no techniques are described for how these will be achieved.

The Sainsbury Review also reflects the challenge of “recruiting technical education teachers with well-developed pedagogical skills”. It therefore recommends that “Accessing high-quality professional development throughout their teaching career is essential.” This is against the backdrop of the Area-based review of Further Education, which addresses the financial sustainability of many education providers. Anticipating 50 to 80 mergers of colleges (out of a total of approximately 350) as a result of the process, shows how many are currently struggling to stay solvent and hence unlikely to be considering the long-term development of their staff.

Apprenticeships

The National Audit Office (NAO) published a review in 2016 that provides a useful baseline to the apprenticeship landscape. It showed that in 2005–10 there were 1.1 million apprenticeship starts in England. This increased to 2.4 million between 2010 and 2015, with the largest increase (884,000) coming from adults aged over 24. It also showed that during that growth, the percentage of these apprenticeships that were across Level 2 (academically equivalent to GCSE) and Level 3 (academically equivalent to A-Level) dropped only slightly from 99.8% to 98.2%. One intention in moving to apprenticeship standards rather than the prior frameworks, is to accelerate this trend towards apprenticeships representing ever-higher competence. Indeed, as of January 2017, as little as only 67.8% of standards 'approved for delivery' through the Trailblazer process (187 out of 276) remain at either Level 2 or Level 3, with a rapidly growing population at Level 4 and above.

There is a concern, however, about embedding complexity by giving employers full control in setting standards. The NAO reported that the approach might lead to "a larger number of narrow and overlapping standards that may restrict the extent to which apprentices might gain transferable skills." It speculated that "there could be as many as 1,600 standards by 2020 compared with 224 previous frameworks." It is the clear goal, however, of the Institute for Apprenticeships (created by the Technical and Further Education Bill) to simplify what had developed in the previous system, where it points to 4,661 Ofqual-regulated qualifications in 597 pathways through the 224 frameworks.

The 'core principles' of what an apprenticeship should be, set out in the Draft Strategic Guidance to the Institute for Apprenticeships and the Institute of Apprenticeships Operating Plan (January 2017), are very laudable. They require that to be an apprenticeship, a training scheme needs to:

- Be related to a job in a skilled occupation
- Be a recognised 'accreditation'
- Last at least 12 months and have at least 20% off-the-job training
- Develop maths, English and transferable skills
- Lead to achievement by the apprentice of a standard
- Be good enough for professional recognition where appropriate
- Be employer-led
- Be assessed through a single end-point assessment

Huge challenges, however, lie in co-ordinating the number of organisations that continue to operate in technical and further education. The focus is interaction with Ofqual, Ofsted, the Skills Funding Agency (SFA), but as the diagram opposite shows (from the Institute for Apprenticeships' own operating plan), it is a far-from-simple picture, with standard setting and standard monitoring often split between different bodies.

A key enabler of this expansion will be the Apprenticeship Levy, which becomes operational in April 2017. It is intended to create both resources (£2.8bn according to the Institute for Fiscal Studies) and demand (through levy-paying employers trying to get their money back). It allows also for non-levy paying employers (most SMEs) to take part in the scheme and benefit from its accredited operation, if they contribute 10% cash in advance to the training provider. The key challenge, as with the multiplicity of standards, seems to be the complexity and need to 'close off loopholes' to ensure that the core principles are delivered. Perhaps tellingly, the EEF Frequently Asked Questions valuable guidelines on the levy already extend to 16 pages.

The engineering profession's reaction to both the new Institute and the new levy has been mixed. In 2016 they raised concerns about the lack of focus on the adult population (who make up the majority of the apprentice community and are the main target for the growth to 3 million starts); the lack of peripheral funding support to train staff to operate around, and encourage, apprenticeship take-up; the restriction of the funding solely to high-quality approved schemes, rather than allowing a small amount of 'taster' work experience which might in turn encourage full-scheme uptake; and finally the lack of sector targets as opposed to sector incentives for those shortage occupations highlighted by the Industrial Strategy.

The Institution of Mechanical Engineers' evidence to the Sub-Committee on Education, Skills and the Economy (March 2016) drew attention to the potential shortage of quality training providers in key subjects, but also the potential for linking to Innovate UK's manufacturing centres, which have the latest equipment for students to experience. We were also keen to highlight the need to strengthen awareness in schools of the possibilities offered by further education, as part of their meeting the Gatsby 'eight benchmarks' for quality careers advice.

Apprenticeships in the Education and Skills Landscape of England

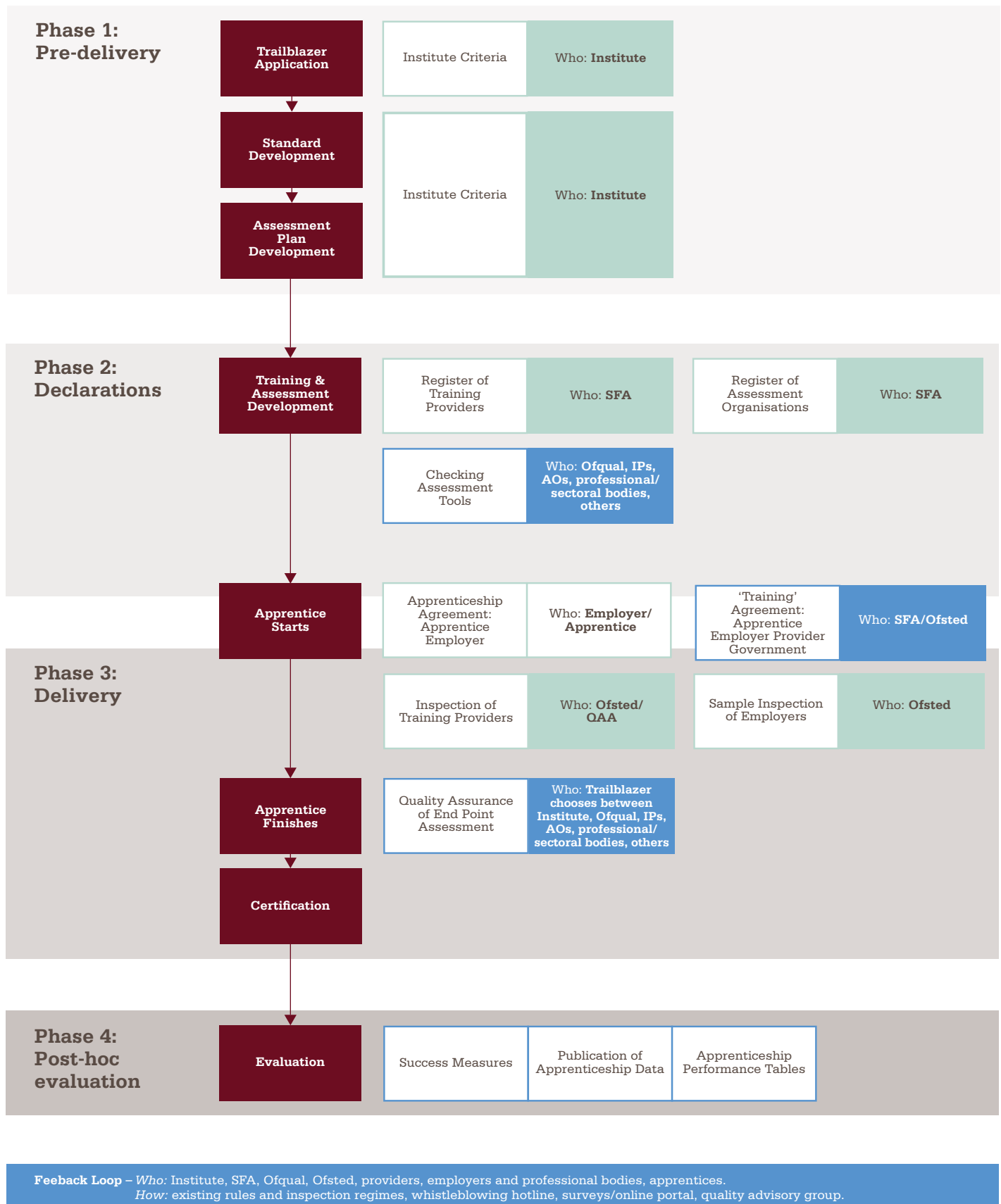


Figure 2: Complexity of the technical and further education landscape

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We need training for
occupations not just
for jobs.



Schools

Schools remain focused on academic achievement. Government initiatives generally work both to increase individual grade attainment at GCSE and also to have the schools rated by Ofsted as 'Good' or 'Outstanding'. The transition for students to employment, to further education or to training, is taken as a whole, with the aim to have as few as possible in the NEET category.

Specifically, there have been two significant Government Papers in the last year. The first – 'Educational Excellence Everywhere' (March 2016) – commented on all aspects of schools (teachers, leaders, schools governance, collaboration between schools, curriculum change, individuals' progress and finance) with the underlying aim of moving "to a system where every school is an academy". It listed 12 DfE delivery priorities, which had 38 sub-objectives. Just two of these related to so-called 'destination' measures that describe what a child does after leaving school. Both were extremely general and neither did much to ensure that all positive outcomes (continuing education, employment or training) are viewed with equal status. Although difficult to measure, the destination of students after school is surely a more sophisticated assessment of the value added than examination results alone. Importantly, there was no reference at all to the Gatsby Good Career Guidance work, which has correctly formed the basis of the DfE-funded Careers and Enterprise Company thinking.

The second – 'Schools that Work for Everyone' (September 2016) – looked in more detail at collaboration. The aim was to ensure that best practice would be shared and the education system would thereby extend "opportunity to everyone, not just the privileged few". On first inspection, this simply places the emphasis on academic achievement and school management. The engineering community certainly responded with criticism that it did not address the apparent public perception that technical pathways are less valuable than academic ones. The Green Paper also made no mention at all of University Technical Colleges (UTCs), which can play an important role in integrating technical, practical and academic learning. Recent news that seven UTCs have now closed, leaving just 55 in operation, suggests that DfE may not see their survival as a priority.

Throughout both papers, there is little emphasis on teachers' Continuing Professional Development outside schools themselves. Sharing of best practice between schools does not go far in creating real-world context for subject teaching. External schemes, such as those funded through Project ENTHUSE, including the Science Learning Networks, the Stimulating Physics Network, Maths Hubs and the Computing at School Master Teacher Network, do exist. Their finite reach and schools' lack of resources to adopt them mean they often remain for the few, not the many. While teacher CPD funding is just one element of the overall school budget, it will inevitably be marginalised when other cost pressures, for example salaries for teachers in shortage subjects, are managed by the school. Typical industry standards of about 5% of salary being spent on personal development are clearly not being met in schools, according to the Government's own survey.

The Industrial Strategy (through leadership) and the Apprenticeship Levy (by providing resources) together offer a great opportunity to accelerate the development of technician skills in the UK. To take full advantage, it is essential that the following steps are taken.

Key Issues

- **Professional Engineering Institutions** need to use their unique position at the interface between education and employment, to uphold standards of personal competence as systems change. Their work should be based on providing guidance on overall need for skills. Importantly they must also adapt to offer standards for all Vocational Qualification levels as well as those that naturally fit the existing EngTech, IEng and CEng grades.
- **Apprenticeships** need to focus not only on quality, but also on perceptions and awareness. They are an option for higher education, further education, and employment, not just to avoid becoming a NEET. The levy brings a welcome boost in resources, but this needs to drive change in behaviour, not just a change in funding mechanism. The use of UCAS to promote degree apprenticeships alongside other degree course options is an excellent example of progress. Further work on adult engagement, using schemes such as the Talent Retention Service, is essential. Broadening of the proposed uses of the levy away from solely training delivery would provide, for example, valuable resources in teacher training, work experience schemes and improving SME engagement.
- **The Industrial Strategy** needs to ensure that it does indeed take a sectoral and regional approach. More analyses such as the Department for Transport skills strategy are needed, to focus investments on actual projects that deliver incremental improvements, which strengthen local links between education and employment.
- **In schools** new approaches need to challenge the status barrier to following a technical rather than an academic route. The use of Gatsby Good Career Guidance as the framework for Ofsted assessment of schools; the change to a broader-based curriculum to 18 to increase exposure to science; and the portrayal of engineering as being of social benefit rather than an isolated specialism; will all be of value.
- **In further education** teachers need to be supported to develop best-practice combinations of technical and pedagogical skills. As with schools, assessment of how colleges train and maintain the professional learning of their lecturers needs to be an explicit and critical part of Ofsted inspection. Appropriate resources (circa 5% of total salary bill) should be set aside for ensuring the quality and up-to-date relevance of their teaching.
- **In higher education** teaching in schools needs to be seen as a much more common career choice for STEM graduates. Existing incentives for teacher training in shortage subjects need to be extended to offer a more credible option for graduates already in high demand by industry.



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**Institution of
Mechanical Engineers**

1 Birdcage Walk
Westminster
London SW1H 9JJ

T +44 (0)20 7304 6862
F +44 (0)20 7222 8553

media@imeche.org
imeche.org