



# **E4E briefing on education and training for engineering**

## **Education for Engineering**

Education for Engineering (E4E) is an important source of advice to UK governments on engineering-related education and skills matters, and acts on behalf of the professional engineering community. E4E is committed to ensuring the health of all areas of education and training that bear on the formation and progression of engineers.

E4E sees a future Britain where professional engineers and technicians<sup>1</sup> are properly recognised for the contribution they make. Skills for the engineering and technology sectors are essential for growth of the UK economy. These skills are needed to underpin the UK's ambitions to be a global leader in high-value technology-based industries of the future. Investment in engineering skills could provide a greater opportunity for social mobility for young people in the UK.

## **E4E has identified six immediate policy priorities for the Coalition Government**

- Promote the standing of qualified technicians and highlight the contribution of professional engineers and technicians to society and the economy
- Support careers education and guidance on professional engineering and technology careers
- Clarify and support engineering-related qualifications
- Reinforce teaching expertise
- Reinforce subject/discipline and inter- subject CPD, including industry experience
- Take steps to enable a more diverse engineering workforce.

## **Promote the standing of qualified technicians and highlight the contribution of professional engineers and technicians to society and the economy**

The high value added economy the country needs depends on attracting young people into engineering and technology roles. Government can play a big part by properly acknowledging the contribution citizens with these skills make to society.

We will work with Government to raise the status of technicians and increase the number of apprenticeships to get more young people into meaningful employment in engineering and production industries.

The newly formed Technician Council should be an effective way to create a common framework of technician standards across health, science, ICT and engineering and to promote the status of registered technicians. E4E has already committed to support the Technician Council by advising on engineering and ICT-related education and training policy matters, promoting the Council's work and encouraging technicians to seek professional registration.

We look to the Government to honour its commitment to increase the number of apprenticeships, particularly at Advanced/Modern Apprenticeship and Higher levels. These can be highly effective routes to creating our technician class, as is the original Young Apprenticeship.

We will work with Government to ensure that engineering programmes in Higher Education are properly funded to produce the next generation of engineering graduates with the skills needed by employers.

We would like Government to consider some form of statutory recognition of the existing professional structure in engineering as a way of acknowledging the important contribution professional engineers and technicians make to society.

## **Support careers education and guidance on professional engineering and technology careers**

Many people lose the opportunity to benefit from a career in engineering and technology through lack of timely careers advice. Making careers advice available as and when needed will enable more young people to choose engineering as a career and ensure that they take up appropriate science, design & technology, ICT, engineering and mathematics subjects to make this happen. We also recognise the importance of easily accessible advice for adults to develop the right skills and improve job prospects.

The Government's proposal to introduce a single, all-age careers service is welcomed. The National Apprenticeship Service and the Specification of Apprenticeship Standards are also viewed as very positive steps towards encouraging work-based routes into engineering.

More use should be made of the considerable and wide ranging experience of the professional engineering community. E4E is committed to providing advice to the national systems on entry to and progression in professional engineering and technology careers. Drawing on its member organisations E4E can also provide access to opportunities such as enhancement experiences and bursaries.

## **Clarify and support engineering-related qualifications**

Whilst promoting freedom and flexibility, all schools should be encouraged to provide access to a rich mix of vocational and general qualifications to meet the needs of learners and to create a future generation of engineers.

E4E is committed to clarifying and promoting a range of engineering-related qualifications and occupational pathways. We welcome the Government's commitment to vocational qualifications such as the BTEC suite (including HNC and HND) and we look forward to seeing more Technical Academies. 14-19 Diplomas in engineering, manufacturing and in construction & the built environment have been supported by the engineering profession and opportunities should be sought to build upon the work done in their development and introduction.

The further education sector, including work-based-learning providers, provides an important source of vocational and occupational engineering and ICT practitioner learning and is a fundamental element of the skills infrastructure. The sector is the principal means of training future engineering and ICT technicians and of re-skilling and up-skilling those already in the workforce. We urge the Government to ensure that all regions of the UK are able to offer high quality vocational and occupational engineering learning opportunities – including within workplaces - so that the UK can produce and sustain a high calibre engineering and technician workforce.

There is a lack of understanding in schools and colleges of the relative value and employment potential of engineering-related vocational qualifications. The engineering profession relies on high-quality vocational education and thus welcomes the Department for Business, Innovation and Skills' current research on the state of engineering within the Further Education sector, for example the number and take-up of engineering qualifications. This study will be completed in early August, after which we urge the Government to continue to develop this work year on year and to make tools available to access and make greater use of the data.

## **Reinforce teaching expertise**

Only through the highest quality teaching by expert subject enthusiasts will young people be inspired to become the next generation of engineers. Individual sciences and mathematics at the higher levels should ideally be taught by those holding closely-related degrees. We applaud the Government's commitment to attract more science and mathematics graduates to be teachers. In particular, we welcome plans to introduce a new programme called Teach Now, which will operate along similar lines to Teach First but, rather than focusing on new graduates, will be aimed at attracting people mid-way through their career into teaching.

We fully support the excellent initiatives supporting science, design & technology, ICT, engineering and mathematics teachers: STEMNET, the Stimulating Physics Network, The Further Mathematics Support Programme, the national and regional Science Learning Centres, the National Centre for Excellence in Teaching Mathematics and Digital D&T (electronics, systems & control and CAD/CAM). We urge Government to preserve these.

## **Reinforce subject/discipline and inter- subject CPD, including industry experience**

Inspired teaching requires wide-ranging knowledge and experience on which to draw. Many subjects and disciplines contribute to an education for engineering - in particular mathematics, sciences, design & technology and practitioner aspects of ICT. There is particular need for subject-specific CPD as well as inter-subject CPD for teaching staff in schools and colleges to enable the connections between subjects to be made explicit and understood by learners.

E4E also advocates more regular opportunities for teaching and support staff to experience placements in business and industry. This is particularly important for staff working in the secondary and tertiary phases as such experiences contribute to more relevant teaching and learning but can also broaden teachers' understanding and help them give better informal guidance to students.

## Take steps to enable a more diverse engineering workforce

The UK suffers more than many developed countries from a lack of diversity in the professional engineering workforce, especially at technician and advanced apprenticeship level. This goes well beyond a single-focus gender issue to encompass all dimensions of equality. Prospective apprentices are not always aware of the very large pay disparities between apprenticeships in different sectors. This reinforces lack of diversity because women and minorities are less motivated to apply for apprenticeships in fields that are not traditional for them. By way of illustration, engineering and construction sector apprentices are paid substantially more during training than their counterparts in the care sector.

In 2005 the former Employers for Apprentices and the former Equal Opportunities Commission expressed strong concern that prospective apprentices could not make fully informed choices about different apprenticeship sectors because apprenticeship pay scales were not published. Five years later no highly visible action has been taken to resolve this situation.

Hence, E4E urges that the National Apprenticeship Service (NAS) immediately publish a table on its website of indicative apprenticeship pay in each sub-type of apprenticeship at each level (and by region if available) and make reference to this in its campaigning and information materials. When the SASE-compliant frameworks are published, NAS is also urged to publish an on-line summary of the hours that apprentices in different sectors might expect to be working and training (on and off-the-job)<sup>2</sup> and a table which indicates the extent (number of years/months) of each type/level.

## About Education for Engineering

E4E is the mechanism through which the engineering profession offers coordinated and clear advice on education to UK Government and the devolved Assemblies. It deals with all aspects of learning that underpin engineering. It is both proactive and reactive to ensure that the education system continually remains appropriate to meet the challenges facing society. It is hosted by The Royal Academy of Engineering with a wide membership drawn from the professional engineering community including all of the professional engineering institutions.

### E4E Members

British Computer Society	Institution of Royal Engineers
British Institute of Non-Destructive Testing	Institute of Acoustics
Chartered Institution of Building Services Engineers	Institute of Materials, Minerals and Mining
Chartered Institution of Highways & Transportation	Institute of Physics
Chartered Institute of Plumbing and Heating Engineering	Institute of Physics and Engineering in Medicine
Chartered Institution of Water and Environmental Management	Institution of Railway Signal Engineers
Energy Institute	Institution of Structural Engineers
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Institution of Civil Engineers	Nuclear Institute
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The Institution of Diesel and Gas Turbine Engineers	Society of Environmental Engineers
Institution of Engineering Designers	Society of Operations Engineers
Institution of Engineering and Technology	The Welding Institute
Institution of Fire Engineers	
Institution of Gas Engineers and Managers	
Institute of Highway Engineers	Engineering Council
Institute of Healthcare Engineering and Estate Management	EngineeringUK
Institution of Lighting Engineers	The Royal Academy of Engineering
Institute of Marine Engineering, Science and Technology	
Institution of Mechanical Engineers	
Institute of Measurement and Control	

**E4E is supported by an Expert Panel whose members include:**

Design and Technology Association, Engineering Professors' Council, SEMTA, Specialist Schools and Academies Trust, STEMNET, and Women Into Science, Engineering and Construction (WISE)

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