

## Education for Engineering (E4E)

### Engineering Further Education: the nation needs clear data

November 2009

Engineering is a vital pillar to economic well-being in the UK. 4.3 million people are employed in the sector<sup>1</sup>, it accounts for 23% of UK GDP<sup>2</sup>, and we have the 6<sup>th</sup> highest manufacturing output in the world<sup>3</sup>. Yet the vital contribution made to this by the Further Education (FE) sector in the UK is hampered and obscured by a paucity of publicly available data on that segment of the education system. A clearer view of the contribution to the engineering economy made by the FE system is urgently needed to ensure that the nation is properly placed for economic recovery and long term prosperity.

Wealth creation needs a reliable supply of engineers, and engineering and ICT technicians. UK engineers will also need to contribute to the international response to, for example, climate change, food and water security, energy futures and de-carbonised transportation. Detailed data on the supply of engineers, through engineering Higher Education courses is widely published yet very limited data on the supply of intermediate skills (Level 3 or 4 technician skills) is publicly available. What there is, is most often generic - across all economic sectors, across a range of levels, or across very broad categories such as 'construction & the built environment', 'engineering manufacturing technologies' or 'ICT'.

Government and the Devolved Assemblies look to the engineering profession to support a system of skills acquisition across the UK but neither the profession nor employers can do this without accurate and detailed sub-discipline supply and demand trend data on which to base their decisions. Whilst demand data is now beginning to be provided in greater detail by UKCES detailed sub-degree sub-discipline supply data is urgently required in order to inform policies to support workforce requirements. With the UK's relative international position on intermediate skills forecast to deteriorate from 18<sup>th</sup> place to 21<sup>st</sup> place by 2020<sup>4</sup>, we need to act now.

### What sort of data are required?

E4E recognises that a start has been made on the issue of FE data. The new Data Service<sup>5</sup> is welcome but a closer working partnership with the engineering profession would help to ensure that data that relates to engineering is presented in the most useable form.

Substantial datasets on FE sector learners, qualifications, teaching staff, buildings and so forth are already collected but it appears that much of this isn't reaching Government or the profession. A 2009 DIUS report noted that *"there is very limited data and evidence available on... those with qualifications in STEM [at Level 3 and above] but*

---

<sup>1</sup> Engineering UK, December 2008, the ETB

<sup>2</sup> Office for National Statistics 2009, [www.statistics.gov.uk](http://www.statistics.gov.uk)

<sup>3</sup> Manufacturing: New challenges, new opportunities, BERR, September 2008, [www.berr.gov.uk/files/file47660.pdf](http://www.berr.gov.uk/files/file47660.pdf)

<sup>4</sup> Ambition 2020: World class skills and jobs for the UK, UKCES, 2009

<sup>5</sup> [www.thedataservice.org.uk](http://www.thedataservice.org.uk)

who are not STEM graduates”<sup>6</sup>

Hence, Education for Engineering (E4E), the body that represents the engineering profession on matters of education and skills, is calling for the following data to be made publicly available on an annual and trend basis:

- **Learner data:** More discipline-focused, level and qualification specific analyses of learner numbers; achievements progression and destinations; qualifications obtained and apprenticeships awarded. Reports of data analysis need to be sufficiently detailed, or an analysis tool enabling multiple variables needs to be provided, so that users can readily deduce:
  - age; gender; ethnicity; socio-economic group; and entitlement to free school meals where relevant;
  - UK; country; region;
  - School, college (by general, sixth form, etc) and other provider types;

For the engineering sector, this data needs to consistently differentiate between branches of engineering and sub-disciplines within them as trends in sub-sectors are likely to be different and require differing ‘supply’ responses.

- **College / WBL provider data:** global (rather than only local prospectus) summary information on numbers of colleges and other providers providing specific discipline category courses, teaching and support staff levels, salaries, regional breakdown of provision, regional utilisation and capacity levels.
- **Progression and contextual data:** We need to know more about the flow of students into and out of the Further Education sector. Where they came from (school, college, employment sector(s)) what previous qualifications they brought with them, where they went on to (further training, HE, full/part time work etc.). As one of the tools in enabling this we would like to see evidence of working towards all learners retaining their unique learner number from Early Years onwards to enable researchers to see trends in progression of learners right through their life- course.

Only with this data can the following strategic ambitions be met:

- **Widespread employer engagement in FE.** There is as yet no structured national imperative for engineering employers to invest further in the FE sector. Current levels of investment are based on an employer’s local knowledge only. Growth that depends on this piecemeal approach will be inconsistent and slow. The engineering profession needs detailed data in order to build a rationale for employer engagement in FE and to support investment decisions.
- **Improved social mobility.** The final report of the Panel on Fair Access to the Professions<sup>7</sup> noted that “*the important work of further education colleges needs greater*

---

<sup>6</sup> The demand for Science, Technology, Engineering and Mathematics (STEM) skills, DIUS, January 2009:60

<sup>7</sup> Unleashing aspiration: the final report of the Panel on Fair Access to the Professions, Cabinet Office, July 2009

*recognition as a driver of social mobility*". The engineering profession is very active in providing access to professional recognition and progression through, for example, Advanced Apprenticeship entry but a lack of clarity on the deployment of potential recruits in FE is hampering progress. Clear data on this will have a rapid impact on the profession and on young people.

- **Progress on the nation's skills ambitions.** Years of focus on the role for Higher Education have resulted in the UK strengthening its relative international position on higher skills (currently 12<sup>th</sup> in the world and likely to rise to 10<sup>th</sup> by 2020)<sup>8</sup>. Reversing a decline in intermediate skills will require a similar focus. This will begin with clear data, followed by raised ambition, and will enable sub-discipline-specific drives on learner numbers, attainment and progression as appropriate. This data-driven approach is bearing fruit for STEM subjects in schools (exemplified by the continued rise in entries for A Level mathematics) and if used selectively it can work in FE too.
- **Effective careers education, advice and guidance for post-16 learners.** Evidence shows that learners increasingly look to access education and training on the basis of the employment options that they offer. Whilst steps are being taken to provide employability information for HE courses<sup>9</sup>, the need for this in FE is even more acute as the FE sector caters for a million more learners than the HE sector<sup>10</sup>. For this reason, E4E welcomes the recent DCSF strategy for young people's information advice and guidance<sup>11</sup> as it extends provision to age 19, but with re-skilling and up-skilling of the adult population such a pressing need this can only be part of the required solution.

### **What needs to happen now?**

E4E believes that the case for clear FE data is well made. Much of the necessary data is being collected but not analysed and published centrally in the format we advocate above.

### **We are pressing Government and the Devolved Assemblies for urgent dialogue on how this data can be made available quickly.**

The engineering profession can advise Government agencies on what is needed in analysis and reporting of engineering-related FE sector data. **Rapid early dialogue needs to be built into a sustained partnership between the engineering profession and Government.** E4E is engaging with the political parties to find a shared vision of a renewed FE sector where STEM subjects are given due prominence, recognition and targeted support. We believe employers and prospective learners should be able to invest in this sector secure in the knowledge that their investment will lead directly to employment, and related social mobility and prosperity.

---

<sup>8</sup> Ambition 2020: World class skills and jobs for the UK, UKCES, 2009

<sup>9</sup> Towards Ambition 2020: skills, jobs, growth, UKCES, October 2009

<sup>10</sup> DCSF: Education and training statistics for the United Kingdom (2008). 27<sup>th</sup> November 2008 updated February 2009. [www.dcsf.gov.uk/rsgateway/DB/VOL/v000823/index.shtml](http://www.dcsf.gov.uk/rsgateway/DB/VOL/v000823/index.shtml)

<sup>11</sup> Quality, choice and aspiration: A strategy for young people's information, advice and guidance, DCSF, October 2009

## ANNEX A

### BACKGROUND

There is evidence of excellent FE engineering provision and a strong rise in Work-Based Learning in the UK<sup>12</sup> which E4E applauds. According to the UK Commission for Employment and Skills<sup>13</sup> and the engineering-related Sector Skills Councils, a substantial proportion of UK engineering employees will continue to be associate professionals – engineering and ICT technicians (QCF level 3 and above). A consequence of predicted shortages for future industry demand of this workforce is that all political parties are supporting expansion of apprenticeships. It is pleasing to see that the apprenticeship PSA target for 2010/11 is already nearly met - “*the highest number of starts and completions ever in an academic year*” (The Data Service, DS/SFR4, October 2009; BIS, 22 October 2009<sup>14</sup>).

There are 433 FE Colleges in the UK, 93 of these being Sixth Form Colleges<sup>15</sup>. There are 216 engineering departments in FE Colleges in England<sup>16</sup>. There are many Training Providers (but even approximate numbers are difficult to obtain<sup>17</sup>), licensed to provide post-16 Vocational Training, work-based learning and access to Vocational Qualifications and to receive payment from Government for that training.

### FE Learner Numbers

Best estimates suggest that there were 49,100 full engineering vocational qualification awards made in 2006/2007 out of a total of 145,700 awards<sup>18</sup>. However, the numbers of recent starts and completions in Advanced Apprentices across engineering-related sectors are difficult to pin down. As LSC reports “*There is no national data set that holds comprehensive information about employer engagement with Apprenticeships*” (LSC, 2009: 13)<sup>19</sup>. Whilst the National Apprenticeship Service (NAS) may get to grips with the latter problem, lack of access to reliable statistics on learner numbers is hampering effective monitoring of the state of engineering in FE – there are, for example, also particular difficulties in obtaining detailed reliable engineering-related learner numbers within the components of FE – Sixth Form colleges, FE colleges, prison service, Training Providers and so forth).

In both colleges and work-based learning very few learners are women. (For example, only 2% of engineering apprentices are women. This has been a very long-term problem, the solution to which requires a substantial culture-change in the FE sector and heightened action by government to address social perceptions)<sup>20</sup>. Women could play a

---

<sup>12</sup> Engineering UK. December 2008, The ETB, p40-41

<sup>13</sup> cf UKCES (2009a). *Ambition 2020: World Class Skills and Jobs for the UK*.

UKCES (2009b). *Towards Ambition 2020: skills, jobs, growth*: <http://www.ukces.org.uk/server.php?show=conFileDoc.167>

<sup>14</sup> DBIS. <http://nds.coi.gov.uk/clientmicrosite/content/Detail.aspx?ReleaseID=407817&NewsAreaID=2&ClientID=431>

<sup>15</sup> Association of Colleges (AoC) 2009<sup>15</sup> [http://www.aoc.co.uk/en/about\\_colleges/index.cfm](http://www.aoc.co.uk/en/about_colleges/index.cfm)

<sup>16</sup> Private correspondence with the New Engineering Foundation

<sup>17</sup> The Association of Learning Providers has 482 members (although 90 are FE Colleges) although there is no indication on how many of these provide engineering training.

<sup>18</sup> Papers submitted to E4E by the ETB, 2009

<sup>19</sup> LSC (2009d). *Identifying sectors with prospects for expanding the number of Apprenticeships*. Coventry: LSC Figure 4.3 Standalone NVQs which could be part of a framework by sector [www.lsc.gov.uk/LSCGOVUK/Scripts/PublicationDownload.aspx?id=cb74013a-5a3e-4d30-b049-08b584b15e05](http://www.lsc.gov.uk/LSCGOVUK/Scripts/PublicationDownload.aspx?id=cb74013a-5a3e-4d30-b049-08b584b15e05)

<sup>20</sup> AAN/EHRC(2007). *Daring to be different: The business case for diversity on apprenticeships*

significant part in meeting the predicted future demand for engineers and technicians. However, it is clear that extensive interventions are needed to increase the relatively small proportion of women recruited to FE sector engineering courses and apprenticeships.

### **Teaching workforce**

There are 6700 FE teachers of engineering, technology and manufacturing<sup>21</sup> whereas in 2003 there were 7500 (although uncertainties over the data persist as FE institutions of all types are autonomous bodies responsible for their own staff recruitment and retention). However, this figure does not include those teaching construction and the built environment or computing aspects of engineering. Taking this wider view of engineering, the total teacher workforce is more than twice that size<sup>22</sup> (20,540 in 2004/2005 falling to 14,439 in 2006/2007).

The falls in teacher numbers in engineering, construction and IT reflect steep declines in teacher numbers in FE more generally. This may be partly due to reduced learner numbers and to tutors and instructors leaving or not entering FE teaching because of the (welcome) requirement to hold teaching qualifications. However, despite a fall in absolute numbers, trends since 2002 reveal a steady rise in the proportion of the workforce teaching engineering and construction<sup>23</sup>.

---

<sup>21</sup> Data submitted to the DCSF-DIUS STEM Board, February 2009

<sup>22</sup> Further education workforce data for England: an analysis of staff individualised record (SIR), data 2005/2005, LLUK 2006

<sup>23</sup> Further education workforce data for England, 2006/2007, LLUK 2008

## **ANNEX B**

### **About Education for Engineering**

Education for Engineering (E4E) is the mechanism by which the engineering profession offers clear and coordinated 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, working to ensure that the education system continually remains appropriate to meet the engineering challenges facing society. It is hosted by The Royal Academy of Engineering and has a wide membership drawn from the professional engineering community.

### **E4E Mission Statement**

Education for Engineering works to inform education policy and practice by:

- initiating and contributing to policy debates
- providing decision-makers with high quality information and analysis
- ensuring that all learners are enabled to make connections across areas of learning that support an education for engineering
- highlighting the needs of future engineers and routes into engineering that are open to all

### **Policy Group**

Chaired by Dick Olver FREng, membership is drawn from the Chief Executives of the licensed Professional Engineering Institutions, Engineering Council, the ETB, and The Royal Academy of Engineering.

The Policy Group provides a co-ordinated voice on education for the engineering profession and seeks to influence Government and opinion-formers on issues of education for engineering.

As appropriate, it directs, endorses, commits to and acts on the advice of the E4E Operational Group.

### **Operational Group**

Chaired by Doug Oughton FREng, membership has been agreed with the Professional Engineering Institutions. Members hold education and skills briefs for their respective organisations.

The Operational Group is a forum for discussion on education policy matters. Its objective is to develop well-considered and consensual policy positions on behalf of the engineering profession for consideration and action by the Policy Group.

**Contact**

Dr Rhys Morgan  
Head of Secretariat  
Education for Engineering (E4E)  
3 Carlton House Terrace  
London SW1Y 5DG

Tel: +44 (0)20 7766 0614  
Mob:+44 (0)7799 672883  
[rhys.morgan@raeng.org.uk](mailto:rhys.morgan@raeng.org.uk)