



E4E submission to the Wolf Review of 14-19 Vocational Education

Education for Engineering (E4E) is the mechanism by 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. E4E represents the collective views on education and training policy of 36 Professional Engineering Institutions, the Engineering Council, EngineeringUK and the Royal Academy of Engineering. A full list of E4E members is provided in the annexe. We trust that, in assessing submissions, you will ascribe appropriate weight to E4E's response in view of the wide range of contributing professional engineering institutions and organisations.

As third sector engineering organisations we are chiefly concerned with ensuring there is sufficient supply of people with STEM skills for our industries, ensuring fair access to and progression in the engineering profession, maintaining quality standards and further learning opportunities at all levels so that individuals may be proud of what they achieve, employers confident in their engineer workforce and the public confident in the professionalism of engineers. We are also very aware of the social and economic need to raise the skills levels of the current and future workforce (particularly in our sectors from level 2 to levels 3 and 4) and are committed to helping to increase the number of registered Engineering and ICT Technicians and to supporting their further progression.

Vocational education is a fundamental part of today's educational system and one that is very much in demand by STEM employers. It is not simply a bolt on pathway. It is essential that any consideration of funding, teaching costs, numbers and quality of qualifications or courses should focus on what will most help individuals as well as ensuring the key aim of supplying the UK with its future skilled apprentices and technicians. This will include assuring equity of access, choice, progression and quality.

We are concerned that 'vocational' has been confused with 'practical' learning by some education policy makers. We expand on this point in a further section but the recent address by John Hayes MP to the RSA on the topic of practical learning has reassured us that this issue appears to have been picked up. *How* people learn must cut across general, vocational and occupational learning. However, we take it in context of this review that 'vocational' education refers to vocationally-related qualifications (VRQs) and courses – which do not *necessarily* involve opportunities to learn through authentic practical application. Albeit we would prefer that they did.

There does not have to be a divide by age. Indeed, stage (e.g. QCF level), interests and maturity seem to be much more appropriate measures. Young people who are interested in finding out more about particular occupational disciplines might choose one or two vocational units within a general education. Some will want more vocational study time, some less. Some will want to engage in practical learning within general education. Some will be convinced of what occupation they want to pursue and go directly into an occupational path – as many as possible through Apprenticeship programmes.

Whatever path, it is crucial that there are seamless and accessible progression routes

available to all, particularly from level 1 to level 3.
Neither do all paths to the 'top' have to go via a degree. There are alternative roads.

What we want for every learner is a rich but sound mix of general and vocational learning for as long as possible, practical learning opportunities for all and high quality occupational experience for those who are ready for it (Apprenticeships).

Four key questions

We provide a detailed response to the review below but we first comment on some general aspects which we consider of particular importance for the review:

Are the right vocational courses on offer to those aged 14-19?

We cannot tell. Vocational courses or qualifications are not solely designed to lead directly to occupations.

The history of vocational education is littered with attempts to develop vocational courses and vocational qualifications. TVEI and City & Guilds and BTECs have possibly been amongst the most sturdy over time with the Schools Council work of the 1970s amongst the most far-seeing.

We are not keen to see yet another attempt which fails to draw on teaching and learning expertise or the lessons learnt from the past. There are plenty of vocational qualifications available and the QCF should be utilised to develop shared units where gaps are found, for example where new technologies or (inter)disciplines arise.

However, progression from one level to the next must be built in – preferably with access and extension opportunities.

Are we content with the quality?

Again, we cannot be sure of the overall picture. We can say that our professional engineering institutions scrutinise and approve a wide range of vocational and occupational qualifications as contributing towards meeting the UK standards for Technician registration (*EngTech* and *ICTTech*). Currently there are 172 qualifications with 384 approvals (many approvals are shared). We believe that this kind of third party independent scrutiny should be encouraged.

Are we content with the cost to us as individuals/employers/state?

Because of a lack of transparency in the system we do not know what the total costs are – either to the individual, the employer or the state. More transparent information on the costs of both general and vocational education in the 14-19 phase, including costs of qualification entry, would be helpful.

Do we have the right number of aged 14-19 learners taking vocational options?

We don't know what the 'right' number is or how many learners there are, but we are concerned that the combined supply of FE and HE STEM learners does not meet predicted demand for a STEM workforce outlined by UKCES¹.

From the BIS FE STEM data project² we now have figures for the number of science, technology, engineering and mathematics VRQs taken each year by 16-18 year old learners in the FE and Skills sector and in schools in England. In addition, we know the numbers of students taking applied subjects at GCSE and GCE level, as well as the number taking the excellent new engineering-related 14-19 Diplomas – although these qualifications are not strictly 'vocational'. The biggest gap in our knowledge is in regards to the number of learners aged 14-16 taking vocational options.

Another gap in our knowledge concerns whether the vocational qualifications being taken are ones that allow for progression to higher levels of learning.

The assumption in more recent times that progression is only legitimate via a degree has not encouraged the take-up of vocational learning or qualifications. In addition, it is increasingly being established that the financial returns to an individual of some

¹ UKCES Skills for jobs: today and tomorrow. 2010

² To be published 17 November 2010

(though by no means all) vocational qualifications is low or non-existent.

Commentary on the review questions

In responding to this call for evidence we have particular concerns with three aspects of the inquiry:

- An apparent conflating of practical and vocational education
- The focus on vocational education around a closed 14-19 age range
- Consideration of vocational education divorced from other aspects of the system

We would like to clarify our view on the first aspect, and we feel strongly about this:

Practical education is not a subject or area but is a way of learning that should occur across the curriculum – learning through doing (preferably in authentic contexts). Practical education is particularly emphasised in a range of existing general subjects in schools and in many specialist areas in the Further Education & Skills sector. Practical education must not be construed as low-level skills to prepare people for work. Learning-through-doing is appropriate at any level and should be an element of a broad and balanced education for every young person.

If **vocational education** is taken as a descriptor of learning that may lead to vocationally-related qualifications (VRQs), vocational education could possibly be viewed as a strand or 'pathway' in itself (although in our view, this may not be desirable). However, vocational education does not necessarily involve practical education³. Vocational education could also be viewed, like practical education, as something that occurs across the curriculum.

Neither practical nor vocational education necessarily involves qualifications. Practical learning and vocational learning may occur in formal, informal or non-formal learning contexts⁴.

³ For example, accountancy and business qualifications.

⁴ Broadly as described in European Commission ECVET project glossary:
<http://www.ecvet.net/c.php/ecvet/glossary.rsys>

1 Overall structure of the current system

1a Two or three single most important problems with current institutional, funding and accountability arrangements and why.

- **Stage-not-age: increasingly post-14, stage is more important than age yet the system is still aligned to age**

The momentum behind efforts to move towards a system that permits progression once an individual acquires a level of achievement, rather than when they reach a certain age (stage-not-age), has been lost. This is partly because of age 16 transfer challenges (for example from schools to 6th Form Colleges; FE general colleges). Similar transfer challenges can be found with apprenticeships and other employed roles that do not require minimum achievements in essential learning⁵ as an entry requirement. Furthermore, because of the current funding systems, schools have incentives to retain young people post-16 in provision to which perhaps they are not best suited.

We believe there is a core of learning – including English, Maths and ICT skills - that enable an individual to pursue further study or training and become a useful member of society. However, assessment of individuals' abilities and achievements now often tend to be judged based solely on performance in these core subjects (for example grouping by table in Primary phase, setting by ability in English and mathematics⁶).

While it is desirable that all 19 year olds have acquired capability at a minimum level in a small number of areas (e.g. English, mathematics, ICT skills) each individual will, beyond this core, excel or struggle in different areas of learning. However, we currently have a system of 'choice' at age 14, narrowing to further 'choice' at post 16.

It seems to us, therefore, that a chief problem of the current 14-19 educational model is that it is in reality two phases, both age rather than stage bound (14-16, 16-19) involving an age-bound end to each phase. This model also fails to focus on outcomes at the end of each phase and the minimum outcomes expected. Furthermore, the system treats learners as aged cohorts and 'ability' as if it should be homogeneous across a wide range of strands of learning.

- **Selection - 'choice' is often in reality 'selection'**

Societal norms regarding what constitutes success for 14-19 year olds includes the following: taking at least nine GCSEs, taking at least three A levels, and going on to university. Arguably, these societal norms all stem from the selection criteria to enter university. This is despite the fact that less than half of the young population goes to university.

Geoff Stanton and colleagues (2008)⁷ argue that the "whole educational ecology", involving stages of selection (overt or hidden) which begins well before the age of 16, impacts in lack of diversity and exclusion further up the system, including damaging "the status of vocational provision by associating it in the public mind with lower levels of achievement".⁸

⁵ life-skills, key-skills, functional-skills and in the case of engineering, particularly mathematics, science, design and ICT

⁶ cf Boaler, J. (1997). Setting, Social Class and Survival of the Quickest. *British Educational Research Journal*, 1997, 23 (5) 575-595.

⁷ Stanton G. et al. (2008). *Unfinished business in widening participation the end of the beginning*. London: Learning and Skills Network (LSN).

⁸ Also see *Engineering UK 2009/10*; ETB and the Engineering Council 2009.

We must end the system whereby meeting university entry criteria is the measure of the success of our young people, even though most young people do not take a university route.

In the last decade or so, this societal norm for measuring success has been reinforced by an additional societal norm regarding aspiration – that young people should aspire to go to university, and that not to do so is deviant behaviour. Perceptions of 'failure' (such as de-selection or taking the 'other' route) are not helpful to efforts to motivate more young people to pursue vocational education.

The parity-of-esteem discourse is not necessarily helpful. This discourse was an attempt to create equivalence of different routes, when it may in fact have been better to have engendered appreciation of difference of purpose and style of different routes, which all play to different natural abilities.

- **14-19 or vocational education should not be treated as if they exist in a vacuum**

Although there is plenty of evidence of adherence to Higher Education demand and recent attention paid to the needs of employer organisations (14-19 Diplomas), scant attention is paid to the notion that "the continuum lies in the development of the individual" from the earliest years through to working life⁹.

In terms of aged cohorts, much work has been done to try to ensure a cohesive experience between Primary and Secondary phases, however much less attention has been given to cohesion in and building on an individual's learning between Secondary and Tertiary phases (other than within schools) or between schools and tertiary centres and working environments. Again, current funding regimes contribute to schools with 6th forms having an incentive to keep students on post-16 whether or not that is in the individual's best interest¹⁰. In the event of careers advice being provided internally (by school teachers) this situation could potentially get worse.

Similarly, the demands of HE and of employers have fuelled a dualism – 'academic or vocational'¹¹. This obscures the reality of multiple paths (e.g. general, vocational, occupational) and of multiple ways of learning (e.g. applied, practical, theoretical, visual) as does the discourse that conflates practical with vocational. Thus practical learning across the curriculum and within discrete areas such as areas such as design & technology, geography and science has been reduced. Yet these can all be vital aspects of formative learning for those who wish to pursue engineering and technology. Practical learning involves head, body and critical reflection. It is not a low-skilled activity and neither should it be aligned only to the traditional crafts and trades. Similarly, the vocational versus academic discourse has overshadowed the importance of practical learning in the FE and Skills Sector, including apprenticeships.

Within engineering, progression paths are particularly important. By this we do not mean separate tracks with no interconnections. As with many other professional disciplines, engineering is not a mainstream school curriculum subject (although

⁹ Engineering Council (2001). The Continuum of Design Education for Engineering. Available from: http://www.data.org.uk/index.php?option=com_content&view=article&id=905&Itemid=712 Geoffrey Harrison draws on 'The Alternative Road'. Chapter 35 from 15 to 18 A report of the Central Advisory Council for Education (England), 'The Crowther Report'. HMSO 1959.

¹⁰ cf - Foskett, N. et al (2007). The influence of the school in the decision to participate in learning post-16. *British Educational Research Journal*, 1-26. (<http://eprints.soton.ac.uk/26796/>)

¹¹ vocational for purposes here, describes a pathway, similarly 'academic'

some pupils take the Applied GCSE, AS and A level engineering qualifications and the engineering-related 14-19 Diplomas). A range of subjects contribute to the formative learning of engineers and there needs to be progression from general STEM subjects at the lower levels into specific engineering education and training options later on (at QCF Levels 3 to Level 8). In this respect, engineering differs from, for example, mathematics, a subject which students can study from the early years right the way through to degree level and beyond.

Greater accuracy, honesty and transparency of vocational qualifications and career progression in communications to the public (including learners and their parents) are necessary. This needs to include honest descriptions of the various pathways, likely lifetime financial returns to individuals, realistic descriptions of the sorts of work and further study that vocational education (alone or in combination with general education or apprenticeships) may enable individuals to pursue. Differences between futures built on vocational qualifications alone compared with an apprenticeship for example should also be made clear¹². The UCAS tariff is a further helpful element of information.

1b two or three most important changes that, in your opinion, should and could be made.

- **Focus on an individual's stage: decouple age, stage and one-size moving on**

Decouple age, stage and one-size moving on so that learners move on to further learning when they have acquired sufficient (but not necessarily all) of whatever is deemed appropriate and necessary at each stage. Stages should encompass a range of strands and should overlap so that an individual can press ahead in those areas in which s/he is most capable.

- **Clearly specify minimum expected outcomes by age 19 and focus on additionality, not deficit**

Firmly set out what is considered to be a minimum achievement that no-one should leave publicly funded learning without. All learners struggling at this threshold level should be provided with support until they achieve, while also ensuring continuing support for those learners who are unlikely to achieve the minimum level.

Focus on additionality (not deficit)

Emphasise the minimum to be achieved by the end of each phase. Additional achievements should be recognised (as in the QCF rationale, i.e. build up the small rather than disaggregate from the large).

- **Build on the QCF and utilise the QCF level descriptors to define stage**

The vast majority of 14-19 year olds are capable of achieving at entry level, Level 1, Level 2 or Level 3. However, they will progress at different paces.

With the QCF building-up-of-units model, we see no need to spend money on any new types of qualification or indeed new whole qualifications if units are shared.

¹² cf - DIUS - Fong and Phelps 2008.

McIntosh, S. (2007). *A Cost-Benefit Analysis Of apprenticeships And Other Vocational Qualifications*. DCSF)

Jenkins, A., Greenwood, C. and Vignoles, A. (2007). *The Returns to Qualifications in England: Updating the Evidence Base on Level 2 and Level 3 Vocational Qualifications*. London: Centre for the Economics of Education London School of Economics

Development of units seems a very useful and flexible way forward. Awarding bodies, professional bodies, Sector Skills Councils (SSCs), the 3rd sector and employers can all operate within the QCF. However, the funding mechanism must get to grips with funding learners to take units – the failure of the funding mechanism to do this is already proving a problem (e.g. regarding FE colleges and the integrated VRQ/NVQ workplace learning qualifications).

- **Utilise the QCF to encourage a rich mix of general, practical and vocational learning.**

The QCF model, together with the individual learner record, now provides the vehicle to encourage a rich mix of general, practical and vocational learning as well as underpinning occupational routes such as apprenticeships.

- **Learning (not necessarily qualifications)**

Formal assessment and qualifications clearly play an important part in recognising learning and providing the individual with certificated evidence. However, they are not a necessity in developing learners' skills and understanding. Neither is formal training. Nevertheless, gaining qualifications should be encouraged and it is vital that individuals have a record of learning, demonstrate examples of how new skills and knowledge are used and reflect on what the next steps should be.

2 How can we improve the organisation of vocational education for 14-19 year olds?

As noted earlier, we find it very difficult to see vocational education as a discrete entity, particularly from age 14. At post-16 it is not so difficult to imagine a purely vocational learner, providing they already possess sufficient capability in general subject areas. For example, to work in engineering, the general subject areas in which individuals need some proficiency include mathematics, English, ICT, sciences and design.

However, as outlined above we prefer to consider matters in terms of level rather than age and, up to QCF Level 2, in terms of vocational learning as one aspect of a more general education.

Funding mechanisms

Having different funding bodies based on an age rather than stage partition is not helpful and a single funding agency would be preferable.

Notions of demand also need tackling. While there appears to be some welcome movement towards acknowledging and supporting learner demand¹³ there is still, as noted earlier, demand from HE and from employers. The employer demand in particular focuses on whether certain qualifications that are of value to industry will receive more public funding support (or whether some qualifications at lower levels will receive none). Additionally, uncertainty about whether employers will step up to the mark and contribute their fair share towards the 'public investment should follow private investment' mechanism.

While it is helpful that funding of apprenticeships is handled separately, we do not see the need to make a distinction between vocational education and general

¹³ Learner accounts, more transparent centre information and so forth.

education, particularly up to QCF level 2.

As noted earlier, many ways of learning are regarded as 'practical learning' and as such would probably be seen as both general and vocational. For many, these ways of learning, as well as more specialist occupation-orientated ways of learning, will continue to be part of an individual's learning experience whether they stay on in school, transfer to the FE & Skills Sector, Higher Education or go into employment.

If there is a need to have two different funding organisations handling the funding of different groups of learners, then we suggest a focus on making the division stage-related not age-related. For example, all learning up to QCF Level 2 could be funded through the YPLA and all fundable learning beyond QCF level 2 by the SFA.

If a learning account is to be introduced for post-19 learners, there may be arguments for extending this to all post QCF level 2 learners.

If all learning to QCF Level 2¹⁴ automatically attracted full public funding, then perhaps viewing all qualifications beyond Level 2 as 'options' would make things a lot more transparent, as these would be within the control of the individual through their learning account.

Institutional suitability

The Royal Academy of Engineering and The Engineering Council (E4E members) have been involved with the Department for Business, Innovation and Skills' research on science, technology, engineering, and mathematics qualifications within the Further Education & Skills sector¹⁵. This work includes an indicative guide to the proportion of each qualification achieved in the FE & Skills sector and in schools (England) in a given year by 16-18 year olds.

If 'vocational education' is read as occupationally-oriented but not necessarily practical education, it may not require access to specialist equipment or environments. It would however require teachers with a reasonable level of familiarity with the occupation concerned. These can be found in schools¹⁶ although of course there are also teachers who have never been employed outside of teaching.

In the FE & Skills Sector it appears that more teaching staff have previous discipline-specific working experience. Indeed, because the FE & Skills Sector is more inclined than schools to engage part-time tutors, many FE teaching staff in general FE colleges will have concurrent working experience as practitioners. This may not be the case in 6th Form Colleges.

However, salaries in the FE & Skills Sector are not generally high and contracts can be sporadic so employment may not be attractive to those with extensive or higher level experience. The work-based-learning dimension of the FE & Skills Sector may be the nearest to occupationally well-equipped provision and currently knowledgeable teaching staff. However it is possible that work-based provision will focus more on occupational training rather than vocational education.

¹⁴ Please note that while appreciating difficulties of assurance regarding funding we do not necessarily mean qualifications. We are of the belief that formal, informal and non-formal learning contributes to progression. Learning, reflection and progression are the most important aspects, wherever or however that learning takes place.

¹⁵ The BIS FE STEM DATA report is embargoed until 19th November, 2010

¹⁶ For example the recent influx from the finance sectors teaching mathematics; engineers, designers and architects teaching D&T; dancers teaching dance; practicing musicians teaching music.

It is important that learners can access quality provision of whatever vocational choice they want within a reasonable travel-to-learn distance. The system should also take into account the vulnerability of younger and other more at risk learners.

Learning need not be confined to an institution. As well as widespread e-learning opportunities (suited to vocational learning particularly where no practical work with equipment, materials or people is involved), the more enterprising FE & Skills Sector providers teach in workplaces and other settings.

Furthermore, the consortia and networks that were established for 14-19 education provide a bedrock of a more collaborative model and this should be encouraged¹⁷.

Similarly, re-establishing previous collaborations between colleges and encouraging the continuing work in bringing together regional college staff at discipline level (e.g. ACER in Cambridgeshire), could all help to ensure the availability of a wide range of quality provision in a locality.

Some FE general colleges within these arrangements have become very experienced in catering for 14-16 year olds – including some colleges with special centres. Most FE colleges have long experience of delivering a general curriculum as well as a vocational one and can provide a rich experience at Key Stages 4 and 5.

Accountability and incentives

While we are inclined towards as much local freedom as possible, there do need to be checks and balances to ensure that learners get a quality experience and that they (or the public purse where applicable) are not exploited. Ofsted inspections and thematic reviews, existing quality assurance mechanisms in the FE & Skills sector, encouragement to gain other external quality assurance approvals (such as IiP and people oriented ISO 9001:2008 certification), destinations data and learner and employer opinions can all play a part. In a learner-demand context, such evidence can play a strong part in providers advertising their wares and prescription could be loosened. However, given that selection already exists in many areas (and may increase) added value becomes increasingly important. There will be a need to help the public to appreciate that raw qualification results are only one part of a broader picture.

Funding needs to be on an even playing field so that additional financial incentives to retain pupils in schools or to 'sell' particular qualifications are removed. This cannot of course get around the power of advertising and the general media view. There should be more accurate and honest information about qualifications. This would result in a more aware and critical public regarding education and this would have long term benefits.

We are concerned that tiered systems will return and a broad and balanced initial education will be denied to some learners because of selection at an early age.

Courses leading to qualifications that have likely minimum returns (financially or regarding progression) should be discouraged. Those that have proved to be more valuable to learners should be encouraged. This would include broader programmes such as Apprenticeships. We believe that narrow specialism including dominant focus on the vocational, should be avoided up to at least Level 2.

If greater main contractor and sub-contracting comes into play in the FE and Skills sector, we are concerned about how contractors will be commissioned, quality will be

¹⁷ It should also be recognised that if the Diplomas do not continue, the learning material will still persist and could be exploited effectively in other vocational learning programmes.

assured and maximum funds will be utilised for learning. However, this might also offer a way of discouraging/encouraging courses (but solid evidence must be established).

Role of the third sector at ages 14-19 (vocational education)

Professional Bodies and Regulators (such as the Engineering Council) must be included in discussions about organisation of vocational education for 14-19 year olds and must be included early on in the development of vocational qualifications. Professional bodies, which often operate in a worldwide context, tend towards a generic, flexible and integrated view of working roles and competence¹⁸ rather than micro-concerns. They also have established structures and are independent of government. For example, the Engineering Council holds the national registers of Chartered Engineers (CEng), Incorporated Engineers (IEng), Engineering Technicians (EngTech) and Information and Communication Technology Technicians (ICTTech). It also sets and maintains the internationally recognised standards of competence and ethics that govern the award and retention of these titles. This type of regulatory mechanism is typical of arrangements in a range of professional sectors.

The professional engineering institutions – licenced and quality assured by the Engineering Council – scrutinise, map and approve appropriate engineering and engineering related technology qualifications; programmes such as Advanced Apprenticeship frameworks and employer schemes for simplified access to professional registration as an Engineering or ICT Technician with the Engineering Council.

Competence standards are holistic and briefly specified – assessment is through peer review. At Technician level for example, the competence standard is closely aligned to the QCF level 3 descriptor. In context of this call for evidence it should be noted that although many VRQs have been approved by professional engineering institutions as contributing towards registration requirements, holding vocational qualifications alone is not sufficient evidence of ability to meet the required standards.

The newly formed (BIS supported) Technician Council – covering health, ICT, science and engineering sectors – will also help to simplify the landscape by building on the existing professional registration standards to achieve an expansion and development of technician registers across the sectors.

Role of Further Education & Skills sector, including role of private training providers at ages 14-19 (vocational education)

The Further Education & Skills sector, including independent and work-based-learning providers, provides an important source of vocational and occupational engineering and technology 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.

The (BIS) FE STEM data project includes age data so it will be possible to ascertain, for example, the number of achievements in vocational qualifications by those aged

¹⁸ Where we refer to competence, we wish to make clear that we are referring to it in a professional, holistic sense not *competencies* in a narrow sense. Professional competence can be rigorously assessed in a holistic manner by peers and this is our practice within professional engineering. As with many professions, this rests on a consensual view of what forms good practice in the various disciplines and at different role levels.

16-18 in the FE & Skills sector. These are more likely to be initial qualifications than up-skilling.

One possible strategy for future vocational education could be to let the FE & Skills sector recruit 14+ directly (with safeguards about entitlement and well-being).

Role of Higher Education sector at ages 14-19 (vocational education)

Higher Education is in a position to support 14-19 vocational education through enabling indicative tariffs (UCAS) and demonstrating that it does accept people with appropriate vocational qualifications. This information needs to include clarity about any other qualifications or experiences the accepted individuals hold that were part of the offer calculation and what programmes the individuals were accepted onto. General fuzzy statements about 'we will consider' do not offer much encouragement – genuine cases might.

A particularly crucial role for Higher Education is its research dimension. There should be more research conducted on vocational education, including European (ECVET) and international dimensions.

The Higher Education sector, working with the FE & Skills Sector should consider how it can better support transition. This is already happening in some partnerships¹⁹. The expected writing styles and the assessment regimes of HE are often very different to those of vocational education. An example from initial teacher education²⁰ is that engineers are often adept at succinct report writing but teacher-education demands extended essays. Those with a vocational qualification background may well have chosen that route because the ways of teaching, learning and assessment are different to some traditional general subject models. Examination-based assessments cannot be taken as something people can innately conquer. Additional support could be provided, for example, in revision and exam techniques.

Many degree programmes are vocational programmes even though they are arguably impart a good general education. Engineering is an example of this. Higher Education establishments also offer HNDs, HNCs, Foundation Degrees, other vocational programmes and short courses. The Open University must not be neglected here as it appears to be playing an increasing role in enabling part-time students to progress with flexibility. More universities could follow its example.

In our sectors, the Higher Education Academy Engineering Subject Centre does much good work in supporting teaching and learning and student engagement. Subject Centres could play a key role in supporting vocational education transition.

Role of employers at ages 14-19 (vocational education)

We are unclear as to what is the precise meaning of employers in this context: Employers or their representatives such as UKCES, SSCs, the CBI, IoD or the Chambers of Commerce? The contexts within which large employers operate are often very different to that of smaller employers. Large employers will have a much stronger voice than smaller employers, yet SMEs provide a significant proportion of employment in the UK.

The engineering sector is within the remit of at least twenty SSCs²¹. There are

¹⁹ National HE STEM Programme FE engagement seminar 30 September 2010.

²⁰ Discussion at presentation (Matt McLain and colleagues, Liverpool John Moores University) at Design and Technology Association Education & International Research Conference 2010

²¹ LSC (2009). *Identifying sectors with prospects for expanding the number of*

differences across the SSCs with regard to education. Some of the SSCs that we deal most closely with are much more in tune with education matters than others. Some seek collaboration with professional bodies more regularly than others. Some appear to have more foresight than others. Some SSCs have Awarding Organisation arms and this needs taking into account. We are therefore unable to offer an overall view, but vocational education does have to involve employer representatives.

Most engineering employers are SMEs. Employer engagement in education is welcomed and within our sectors is often forthcoming. Engineering employers are very generous in their volunteer staff support (for example, STEM Ambassadors and engagement in the volunteer work within professional engineering institutions).

Furthermore, employers are not usually knowledgeable about how young people learn, the impacts of assessment models or about what it is that young people currently experience in the curriculum. Nor would we expect them to be; their expertise is in running their businesses. However, as they play a central role in adult education and training, including contributing to the funding, their views are important and influential regarding the shape of pre-19 vocational education. Employers would benefit from more information about vocational education²² and some would benefit from support in becoming more aware of the learning needs of their employees. The IiP could play a greater role here. UnionLearn is doing an excellent job in this area.

Larger employers can play a very important role in promoting vocational education. The recently established Technician Council²³ is an excellent example. Employers for Apprentices is another²⁴.

Role of Awarding Bodies at ages 14-19 (vocational education)

We have found, by and large, Awarding Bodies to be well grounded in vocational education matters. Where a collaborative approach to qualification or unit development is taken, members of E4E are often consulted early on and this is very helpful. Larger Awarding Bodies also contribute extensively to research and their expertise in this area must not be overlooked. Awarding Bodies are also usually a very important source of advice and support to schools and the FE & Skills sector, not least regarding assessment. Some therefore have a key role to play in enabling quality vocational education. However, as with employer bodies, we cannot offer a blanket view as each body needs to be taken on its own merits.

Arrangements for developing vocational qualifications (14-19)

There is a reasonable history within our sectors of the Engineering Council and the professional engineering bodies working with Awarding Bodies and Sector Skills Councils from the early stages in qualification development. This is not however universal and should be more widely encouraged if seeking greater cohesion and simplicity in the system. An example from higher education is that the QAA adopted the Engineering Council benchmark statements for engineering qualifications, so there is now one standard instead of two.

Apprenticeships. Coventry:LSC Figure 4.2 Leading apprenticeship frameworks for each SSC.

²² Perhaps as the National Apprenticeship Service has provided regarding Apprenticeships?

²³ <http://www.engc.org.uk/education--skills/technicians/professional-technicians-and-the-technician-council>

²⁴ <http://www.employersforapprentices.gov.uk/>

We understand that UKCES is working on decreasing the amount of time it takes to get a qualification to market. Where public funding or QCF accreditation is not sought, this process can be remarkably speedy. For example, a bespoke qualification or unit for an employer can be developed by an Awarding Body within days. However, where new national occupational standards (NOS) need to be developed by an SSC, or extensive negotiations are necessary at the validating and funding end of development, the process can take many months.

Many vocational qualifications have a close link to occupational qualifications. This is probably less the case in vocational qualifications/courses designed to suit 14-16 year olds but more so regarding those qualifications designed for adults on which 16-18 year olds might also enroll.

Where a more holistic approach to NOS has been taken, development of vocational qualifications appears to be somewhat more straightforward. Integrated VRQ/NVQ type qualifications such as those developed by SummitSkills, have recently been welcomed. Projects such as the e-scape assessment research project (TERU, Goldsmiths)²⁵ have begun to offer possible, realistic and holistic-focused solutions to age-old assessment difficulties.

Who bears the cost? (vocational education 14-19)

With regard to bearing the cost of learning, in principal we believe that public funding should be used where it is most needed and where it gives most value (in a range of measures) irrespective of where and how it takes place. We would argue that *at least* Level 2 numeracy, mathematics, English language, literacy and ICT user skills are essential for learners, are vital to progression and must always be publically funded. With regard to developing the whole person, creative experiences should also be supported. We also argue that research and critique skills are fundamental for all in an information-rich era.

With respect to developing vocational qualifications, Awarding Bodies should bear the cost where there is a reasonable market. If however employers, providers or others seek bespoke or niche qualifications or units, then development costs should be shared accordingly. Professional bodies within our sectors regularly offer development help and guidance at no charge.

Is there a need for an official quality benchmark for vocational education and awards?

No. This sounds like an additional, complex and totally unnecessary layer of bureaucracy. Instead, as discussed previously, employer and professional body approval of qualifications should be encouraged.

Learner-demand will be a key element of any future system. We can already see in the BIS FE STEM data project the most popular vocational qualifications. These may indicate the result of custom and practice, availability, schools trying to outwit the league tables or learners not necessarily knowing how to choose wisely or having the opportunity to choose. It is therefore vital that learners are provided with high quality information, advice and guidance.

²⁵ <http://www.gold.ac.uk/teru/projectinfo/> - also see rank ordering (e-scape utilises) - <http://www.cambridgeassessment.org.uk/ca/Viewpoints/Viewpoint?id=134363>

Assessment models

As already pressed by Ofqual, increased public education regarding assessment is urgent. This is particularly pertinent to this discussion of vocational education if assessment is to be conducted in ways appropriate to vocational learning. It will be particularly important to avoid a return to a competence-based education and training (CBET) and, as noted earlier, to embrace more holistic approaches.

We believe that internally-moderated continuous assessment is at least as valid, reliable, comparable and manageable as externally-set recall tests.

3 What is the appropriate target audience for a vocational education offer?

From what age is it appropriate for young people to be engaging in vocational education?

The professional engineering community does not generally support specialist education (including vocational) pre- Key Stage 5.

We believe it is crucial that all learners have a sound grounding in mathematics, English, use of ICT, sciences, design and other practical and creative experiences. Vocational education courses tend to be quite narrow.

However, we have strongly supported the original model (including 52 days of working experience) of Young Apprenticeships (YAs) – *alongside* continuing study of a broad and balanced core curriculum at QCF Level 2. We would regard the YAs as occupational rather than vocational, but of course a valued Level 2 vocational qualification such as a BTEC would be part of the package.

4 What principles should underpin content, structure and teaching methods? Specifically:

- **how can vocational education best respond to the current and expected future labour market?**
- **how can it provide a positive incentive to participation by young people, in particular those who are at risk of disengaging from learning?**

Much current useful work in improving teaching and learning in the FE and Skills sector is already undertaken by LSIS, including specifically within engineering disciplines and we are involved in this work.

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 and can also broaden teachers' understanding and help them give better informal careers guidance to students.

However, in our sectors, the supply of quality specialist teaching staff in the FE & Skills sector is of growing concern. We have anecdotal evidence of vacancies being unfilled for over a year and such reports are worrying. Unlike schools, there appears to be no central record through which to check the extent of discipline shortages. We ask the question 'what would be the tipping point at which courses start to close because of staff shortages?' This needs investigation.

Regarding the labour market, while a head-in-sand approach is not to be encouraged, predicting and micro-planning the future in a global employment context feels equally risky. A useful approach would be to give more attention to general trends in UK employment and to generic capacities rather than narrow specialisms, to learning to live with uncertainty but also to develop capacities of seeing where things need changing and learning how to intervene to change them (e.g. as in D&T) and to engage in a variety of ways of learning.

We would also point out for serious consideration the substantive work of the Nuffield Review of 14-19 education & training project. This includes reflection on various vocational initiatives such as TVEI as well as a wide range of evidenced views on the vocational dimension.

It is most unfortunate in our view that the second question here already seems to be positioning vocational as the first or only answer for the at-risk. The at-risk probably deserve the most *sure* ways of progression. While some vocational qualifications are known to underpin and enable progression (e.g. the BTEC suite and those qualifications approved by professional engineering institutions as contributing towards professional registration) others may prove to be cul-de-sacs. If learners are to make wise choices then great care has to be taken informing and advising them about what is available.

Youth Service provision could be revitalised to take a much greater role once again in supporting and encouraging those at risk of disengaging. Outreach education through organisations such as NACRO and the Trade Unions also has value. What does not have value is extended, poorly paid work-experience or simulated-work, such as the programme-led apprenticeships.

We need to move away from 'individualism' in thinking about employment. Employment, unemployment and under-employment are structural issues and however hard we may try to push people up the education system they have to step off the ladder at some point. Furthermore, employers will no doubt continue employing over-qualified people in order to cover a wider range of posts in the flux and swell of business – a problem in our sectors is that these people may well lack the skills needed to do the lower level jobs.

Whatever the macro-economic situation may be, education (vocational or otherwise)²⁶ is only part of any solution.

5 *How can we improve progression from vocational education to positive destinations (work, Apprenticeships, FE, HE)?*

We state again clearly that all paths do not have to be via degrees.

Young Apprenticeships along with a broad Level 2 general education are a tried and tested solution as doors are left open to a full range of progression pathways. Only a well-balanced combination of general and vocational education will keep the maximum number of doors open, particularly for those at or below Level 2. At and

²⁶ Economization of Life, Michelle Murphy. University of Toronto.

beyond level 3, progressive suites such as BTECs that attract UCAS tariff points provide greater surety of progression as does the Apprenticeship/Advanced Apprenticeship/Higher Apprenticeship path. There is already a growing body of evidence that some vocational qualifications, particularly when learning has not been in the workplace, produce minimal lifetime financial returns to the individual. We deduce from this that it seems likely they also fail to support progression. More evidence is needed about both the levels and sectors of vocational qualifications.

Instilling employer-specified competencies and targeting SSC-highlighted shortage skills will ensure that qualifications and skills delivered and developed have positive and valued destinations for the learner.

However, we reiterate that without a very sound, broad and balanced general education, progression opportunities are severely limited.

Annexe

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 Mathematics and it's Applications
Chartered Institute of Plumbing and Heating Engineering	Institute of Physics
Chartered Institution of Water and Environmental Management	Institute of Physics and Engineering in Medicine
Energy Institute	Institution of Railway Signal Engineers
Institution of Agricultural Engineers	Institution of Structural Engineers
Institution of Civil Engineers	Institute of Water
Institution of Chemical Engineers	Nuclear Institute
Institute of Cast Metals Engineers	Royal Aeronautical Society
The Institution of Diesel and Gas Turbine engineers	Royal Institution of Naval Architects
Institution of Engineering Designers	Society of Environmental Engineers
Institution of Engineering and Technology	Society of Operations Engineers
Institution of Fire Engineers	The Welding Institute
Institution of Gas Engineers and Managers	
Institute of Highway Engineers	
Institute of Healthcare Engineering and Estate Management	
Institution of Lighting Engineers	
Institute of Marine Engineering, Science and Technology	Engineering Council
Institution of Mechanical Engineers	Engineering UK
Institute of Measurement and Control	The Royal Academy of Engineering

E4E is supported by an Expert Panel whose members include:

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