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Dear Professor Wolf,

***Response to call for evidence - Review of 14-19 Vocational Education***

**The Science Council**

The Science Council is an umbrella organisation of over 30 learned societies and professional bodies in the UK drawn from across science and its applications: a list of member organisations is attached. In addition to providing a mechanism for the sector to work collectively, the Science Council develops and leads collaborative projects working with member bodies and the wider community, including Future Morph a web site that is designed to provide information for young people, their parents and teachers about careers from studying science and maths. The Science Council awards the professional qualification of Chartered Scientist (CSci) and is now leading an initiative which aims to raise the profile and aspirations of technician and graduate scientists by developing new professional registers at these levels. Collectively our member bodies represent more than 300,000 individual members, including scientists, teachers and senior executives in industry, academia and the public sector.

The Science Council has a keen interest in enhancing the level and quality of science education, knowledge and skills in the UK and welcomes the opportunity to contribute to this timely review of vocational education.

The Science Council's strength comes from its multi-disciplinarity, enabling us to draw from the breadth of science and types of scientists in responding to complex issues in science and education. In preparing this submission we have consulted member bodies: there is a high level of agreement across the sector on the key issues and concerns and, in addition to the initial comments set out below, we have identified some areas that we will now explore further within the research project we are undertaking related to technicians: I therefore hope that it will be acceptable to submit supplementary evidence later in the year that is drawn from this research.

**Context**

There is well-documented demand for science, technology, engineering and mathematics (STEM) skills in the current UK economy. Estimates from UKCES suggest that 58% of all new jobs in the UK economy will require a high level of STEM skills (at least Level 3 or 4). We need therefore to significantly increase the numbers of students we attract to STEM subjects and to educate, train and skill them for the future workforce.

***What is the appropriate target audience for a vocational education offer, and in particular from what age is it appropriate for young people to be engaging in vocational education?***

We consider that the term 'vocational' *should* describe qualifications that deliver the education and training required to pursue a 'vocation' or profession. As such, vocational qualifications would have value beyond 14-19 and we suggest that there would be benefit in ensuring that equivalent qualifications were available to older learners.

***How can we improve the organisation of vocational education for 14-19 year olds? This would include funding mechanisms; institutional suitability, accountability and incentives; and the role of the third sector, private training providers, employers and awarding bodies. It would also include arrangements for developing qualifications, including who bears the cost, and whether there is a need for an official quality benchmark for vocational education and awards.***

To ensure the value of vocational education is maximised a wide range of stakeholders must play a part in the development and delivery. For science, this should include the full range of subject specialists, industry and employment sectors and Higher Education Institutions. However, this process must be mindful of the fact that vocational education relies on local, not national, availability. In addition, the development of any new qualifications must allow sufficient time for development, piloting and evaluation of the content, its delivery and assessment.

***What principles should underpin content, structure and teaching methods? Specifically, how can vocational education best respond to the current and expected future labour market? and how can it provide a positive incentive to participation by young people, in particular those who are at risk of disengaging from learning?***

14-16

We believe that good quality science education to the age of 16 is fundamentally important to the development of the essential STEM skills that underpin the practice of science at all levels. The Science Council therefore strongly supports science within the National Curriculum up to age 16 and is concerned recent developments that may mean this is not be the case in all schools and colleges or in all devolved administrations.

Science in secondary education

We recognise that vocational qualifications are often perceived as having less rigour in the core sciences. This may or may not be true and we believe it would be worth exploring further, particularly for Level 3 qualifications.

Without a sufficient grounding in all the sciences and maths, it is our view that students cannot develop the deeper knowledge and skills necessary to become professional scientists at any level. This may already be provided for in the National Curriculum and would account for the fact that there were relatively few vocational qualifications in the core science disciplines to Level 2. However, we believe there may be some potential for developing vocational qualifications at this level with the aim of widening participation in STEM and perhaps linking to lifelong learning opportunities: there will need to be serious consideration given to the science content of any vocational qualifications at this level.

In our preliminary review of current vocational qualifications we identified that many did not appear to have a recognisable link to a vocation, profession or even specific occupation or employer. We are aware that very few qualifications at NVQ1-3 are recognised or accredited by professional bodies in science (though this is more common in engineering)

and therefore do not currently provide a vocational pathway to a science profession. This is often not clear to students.

The term vocational has come to be used misleadingly to describe qualifications that focus on practical, applied or work-related learning styles rather than academic and knowledge based learning. Whilst we consider the term vocational may not be the appropriate description, there is a consensus within the Science Council that more needs to be done to develop qualifications that offer students alternatives to academic learning routes, traditionally GCSE and A levels. Alongside the review of vocational qualifications and the National Curriculum, there is an opportunity to explore how other qualifications could be developed to draw on practical and applied learning methods at the same time as embedding essential core science knowledge: it is essential that this opportunity is taken if the UK is to significantly increase the study of STEM post-16 in order to meet anticipated skills demand.

#### Practical and technical skills and assessment

There is widespread concern amongst science employers with regard to a lack of practical and technical skills, particularly amongst graduates. We recognise that this is an important issue in the education and training of professionals in science at all levels: there is potential for a review of vocational qualifications to begin to address this by developing practical and technical qualifications that can be offered alongside traditional academic qualifications. One of the concerns raised in relation to this is with regard to appropriate assessment methods for practical and project elements of qualifications. Educators report that many schools focus on academic learning with the aim of achieving higher grades. In developing an appropriate framework of qualifications for vocational and other non-academic routes, and to improve the take-up and credibility of these qualifications, it will be essential that this issue is addressed.

High quality vocational education can be more costly to deliver: for example, as hands on education often requires smaller group sizes and specialist facilities. Colleges play a large part in successfully delivering vocational education courses for students who prefer college settings over school settings. It will be important for the review to consider the impact of the reduction in funding to further education colleges resulting from the current comprehensive spending review.

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

##### Progression

There is a widely held perception that in order to become a scientist, gaining a degree is the only possible academic pathway. We recognise that in the past, other routes have also been valid and many senior practising scientists have progressed from apprenticeships and experience routes. However, this route is relatively rare in today's science industries where the practice of science is increasingly more complex and multi-disciplinary and the apprentice route hardly exists for entry to science careers.

In principle we believe it should be possible to advance from technician level in science through to Chartered status and we believe that progression and transferability must therefore be built into qualification pathways: such an approach underpins our work in the development of a Science Technician Register.

It will be important in reviewing qualifications for 14-19 that structures enable and encourage movement through and across different strands of the education system, as well as enabling movement between and across different vocational and academic fields.

The qualifications should have consistency and relevance for employers so that they can also support lifelong learning and access to re-skilling and up-skilling of those already in the workforce. Any new structure which encompasses numerous pathways would need to be simple and understandable for various stakeholders.

#### Equivalence

A further issue is qualification equivalence. There is broad consensus amongst our member bodies that the strengths of vocational qualifications as an alternative to academic education pathways has been devalued over time: alternative routes need greater recognition and promotion. Seeking to make direct comparison with existing qualifications and education pathways is unhelpful and does not promote the distinctive value of vocational qualifications. It also leads to potential confusion with regard to qualifications accepted for HE.

#### Transferability

There is a strong geographical bias for some qualifications and we note that some are not just sector specific but are employer specific. This is potentially a barrier to transferability and mobility but also contributes to the perception that the qualifications are of less value: most young people now appreciate that they are unlikely to have a single employer and that their employment and career is likely to involve several changes during their lifetime. These issues also present difficulties for the quality control, consistency and equivalence of qualifications.

#### Careers Education, Information, Advice and Guidance

We are concerned that advice for young people on qualification choice is poor: if an ill-informed choice was made, then young people would find that vocational qualifications might close down career pathways. We note that for those courses that start at 14 (as for sector specific diplomas) young people are making choices at a time when they are rarely well-informed or ready to decide on career options. Better careers EIAG is therefore vital in communicating the variety of options available. Stakeholders need to provide impartial careers EIAG to young people, making them aware of the value of pursuing different courses and subjects and which course options would give them greater choice later. IAG provision and opportunities for lifelong learning for older cohorts must also be recognised as important issues.

#### The role of professional bodies

Our discussion with member bodies has explored whether professional bodies might play a role in developing greater clarity by recognising or accrediting qualifications: we plan to pursue this further in relation to the development of the technician route into science and would be pleased to report on progress in a couple of months.

Yours sincerely,



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Chief Executive

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**Member Organisations of the Science Council  
October 2010**

Association for Clinical Biochemistry  
Association of Neurophysiological Scientists  
Association for Science Education  
British Computer Society/Chartered Institute for IT  
British Psychological Society  
Chartered Institution of Water and Environmental Management  
Energy Institute  
Geological Society of London  
Institute of Biomedical Science  
Institute of Brewing and Distilling  
Institute of Clinical Research  
Institute of Corrosion  
Institute of Food Science and Technology  
Institute of Marine Engineering, Science and Technology  
Institute of Materials, Minerals and Mining  
Institute of Mathematics and its Applications  
Institute of Physics and Engineering in Medicine  
Institute of Physics  
Institute of Professional Soil Scientists  
Institution of Chemical Engineers  
Institution of Environmental Sciences  
London Mathematical Society  
Mineralogical Society  
Nuclear Institute  
Oil and Colour Chemists' Association  
Royal Astronomical Society  
Royal Meteorological Society  
Royal Society of Chemistry  
Royal Statistical Society  
Society for General Microbiology  
Society of Biology  
Society of Dyers & Colourists