



## 1 THE SCIENCE COUNCIL

- 1.1 The Science Council is a membership organisation of learned societies and professional bodies drawn from across science and its applications. Collectively our members represent almost 500,000 individuals including scientists, teachers and senior executives in industry, academia and the public sector. There are currently 41 member organisations: a list 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 organisations and the wider scientific community: examples include LMI analysis of the UK Science Workforce and Diversity, Equality and Inclusion.<sup>1</sup>
- 1.2 The Science Council's principal area of work is to advance the professional practice of science across the breadth of the science workforce, including non-graduate and technical roles in science. A key aspect of this is professional registration and having introduced Chartered Scientist (CSci)<sup>2</sup> in 2004, the Science Council has added Chartered Science Teacher (CSciTeach), Registered Scientist (RSci) and Registered Science Technician (RSciTech).<sup>3</sup> RSci and RSciTech aim to raise the profile, aspirations and retention of scientists at graduate and technician level.
- 1.3 In preparing this submission we have consulted with member organisations to identify areas of common interest. In addition a number of members will be responding individually to the inquiry.

## 2 **The UK needs a strong vocational education system**

- 2.1 We welcome the Government's focus on improving adult vocational education. Hitherto much of the focus of science workforce investment has been in the graduate workforce with little recognition among policy-makers that not every science-based job is a graduate job. To meet anticipated skills demands across the knowledge and science-based sectors it is vital that the UK's non-graduate technician workforce is significantly expanded.<sup>4</sup> The further education (FE) sector has a vital role to play in training and developing technicians to meet this demand.
- 2.2 The term 'vocational' has come to be used misleadingly to describe a range of qualifications that encompass practical, technical and professional learning styles as opposed to academic and knowledge based learning. We believe the term 'vocational' should describe qualifications that deliver the necessary education and training required to pursue a particular 'vocation' or profession.
- 2.3 Good vocationally-focused education of all kinds will be highly valued by employers and will enable progression to the next career level. Government must review the provision and range of vocational science qualifications to develop non-graduate vocation pathways into science. There is also an opportunity to explore how additional qualifications could be developed to draw on practical and applied learning methods at the same time as embedding essential core science knowledge. Professional bodies, industry and employment sectors must play a part in the development and delivery of this.

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<sup>1</sup> <http://www.sciencecouncil.org/content/diversity-equality-and-inclusion>

<sup>2</sup> <http://www.charteredscientist.org/>

<sup>3</sup> <http://www.professionalregisters.org/>

<sup>4</sup> <http://www.smf.co.uk/wp-content/uploads/2013/03/Publication-In-The-Balance-The-STEM-human-capital-crunch.pdf>

### 3 Delivering high-level professional and technical skills for the workplace

- 3.1 Demand for workers across the UK economy with science qualifications, particularly practical and technical skills is high.<sup>5</sup> However, concern persists among employers about a lack of high-quality practical and technical skills currently available in the workforce compared to competitor countries.<sup>6</sup> To succeed in the global race, the UK must attract, education, train and retain a highly-skilled science workforce.<sup>7</sup>
- 3.2 As science becomes more complex and interconnected, the roles undertaken by scientists now often require high-level practical and technical skills. Vocational and technical education enables learners to gain expertise in the application of science knowledge along with other skills that will enable them to develop solutions to major global challenges. As science becomes ever more interdisciplinary the UK needs more people with higher-level technical and practical skills.

### 4 Providing vocational education opportunities for all

- 4.1 Training in practical and other skills equip individuals to advance their career, and also enable employers to fill skills gaps by upskilling their existing workforce. We support the Government's intention to provide more opportunities for people of all ages to gain essential qualifications such as English and Maths. FE can also be a mechanism to provide people with the necessary 'digital literacy' to participate in the 21<sup>st</sup> Century economy.<sup>8</sup>

#### Opportunities for young people still in full-time education

- 4.2 Young people starting courses at age 14 are making choices at a time when they are rarely well informed or ready to decide on career options. The qualifications landscape can be hard to navigate, and if a poorly informed choice is made by a young person, they may then find at a later stage that the qualifications they have chosen close down potential career pathways. Recent research shows that many young people and parents have a narrow view of where science can lead and lack awareness of the range of post-16 routes.<sup>9</sup> Continuing lack of information and clarity about the range of vocational education opportunities and the careers to which they will lead is likely to perpetuate this.
- 4.3 Young people that do not flourish in academic subjects are very often driven towards vocational qualifications and pathways within which there is little or no opportunity to change direction.<sup>10</sup> This may also be the case for those pursuing an academic route.
- 4.4 There must be a broad and flexible vocational education system that enables movement through and across different strands of the education system, as well as between different vocational and academic fields.
- 4.5 There must be a wider choice of options at 14-19 along with good-quality careers IAEG about science careers, including non-graduate pathways. The Russell Group's '*Opening Doors*'<sup>11</sup> publication could be a good model to replicate to provide young people with information about potential vocational and non-graduate pathways.
- 4.6 Many young people will not be ready to take up an apprenticeship. Science traineeship<sup>12</sup> opportunities need to be expanded to provide more young people with the opportunity to gain essential core skills and experience of working in science before

<sup>5</sup> [http://www.sciencecouncil.org/sites/default/files/UK\\_Science\\_Workforce\\_FinalReport\\_TBR\\_2011.pdf](http://www.sciencecouncil.org/sites/default/files/UK_Science_Workforce_FinalReport_TBR_2011.pdf)

<sup>6</sup> <http://www.cbi.org.uk/media-centre/press-releases/2014/07/employers-want-education-system-to-better-prepare-young-people-for-life-outside-school-gates-outside-school-gates-cbi-pearson-survey/>

<sup>7</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/387780/PU1719\\_HMT\\_Science\\_.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/387780/PU1719_HMT_Science_.pdf)

<sup>8</sup> <http://www.sciencecouncil.org/content/digital-skills>

<sup>9</sup> <http://www.kcl.ac.uk/sspp/departments/education/research/aspires/ASPIRES-final-report-December-2013.pdf>

<sup>10</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/180504/DFE-00031-2011.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/180504/DFE-00031-2011.pdf)

<sup>11</sup> <http://www.russellgroup.org/Russell%20Group%20Opening%20Doors%20Jan%202015%20-%20complete.pdf>

<sup>12</sup> <http://www.scienceindustrypartnership.com/traineeships/>

they decide to progress further with their education.

- 4.7 Establishing greater numbers of Higher and Advanced Apprenticeships in science should be an essential element of the Government's programme to confront the near total absence of science apprenticeships.<sup>13</sup>

#### **Further opportunities for career-changers**

- 4.8 There must be a broad and flexible vocational education system that encourages people of all ages to realise their career ambitions. Widening access to vocational education may help to attract more people into the science professions<sup>14</sup>; this must be a key strategic aim for the UK.
- 4.9 Access to vocational education opportunities should be available for all those with the ambition and commitment to succeed. However, career choices are often influenced by particular barriers, either real or perceived; for example financial issues or lack of confidence in ability. These are multi-faceted issues but must be addressed by Government in partnership with relevant stakeholders.
- 4.10 No clear pathway exists for those wanting to progress from a non-science-based career to a science-based career. Widening existing education and training options for career-changers could help to facilitate the transition. Extending access to traineeships in science<sup>15</sup> to adults would provide opportunities for career changers the necessary experience and preparation in a technically-focused occupation before taking up an apprenticeship or further education options. It could also provide those that are long-term unemployed with an opportunity to gain new skills and re-enter the workforce.
- 4.11 The Regional Growth Fund could provide local authorities with access to financial support to leverage further funding for investment in local and regional vocational skills provision.

### **5 The need for a qualified FE teaching workforce**

- 5.1 Vital for delivery of vocational and technical education will be a sufficient number of suitably qualified teachers, with the necessary technical and teaching expertise. However, few teachers possess both high-quality practical skills and the pedagogical skills to equip learners sufficiently<sup>16</sup>; the knock-on effect being that these skills are not well taught in science.
- 5.2 FE teaching needs to be seen as attractive career option. A deeper understanding of the current and projected FE teaching workforce is needed to underpin strategies to develop a sustainable and highly-skilled workforce. Industry also needs to work with the FE sector to help shape training programmes, contribute to teaching and provide workplace opportunities for teachers to update their knowledge and skills.
- 5.3 The FE sector needs a TeachFirst-style agency to help attract more people into FE teaching including those with valuable science-based industry experience.
- 5.4 High-quality vocational education can be costly to deliver as it often requires specialist facilities and a critical mass of learners to make courses viable. Further education colleges must be appropriately resourced to provide the necessary education and training environment for learners to gain relevant and high-level technical skills and knowledge.

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<sup>13</sup> <https://www.gov.uk/government/statistical-data-sets/fe-data-library-apprenticeships>

<sup>14</sup> <http://www.sciencecouncil.org/content/diversity-equality-and-inclusion>

<sup>15</sup> <http://www.scienceindustrypartnership.com/traineeships/>

<sup>16</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/326000/bis-14-679-further-education-workforce-strategy-the-government-strategy-support-workforce-excellence-in-further-education.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/326000/bis-14-679-further-education-workforce-strategy-the-government-strategy-support-workforce-excellence-in-further-education.pdf)

## **6 The geographical delivery of vocational education**

- 6.1 Vocational education delivery relies on local rather than national provision, and often depends on relationships between local industries, universities and other education providers. In some coastal and rural areas there is a shortage of provision of science qualifications in FE, in part because of lack of local university or large research or innovation-driven employers.
- 6.2 Many vocational qualifications remain sector and employer specific. This presents issues for the quality control, consistency and equivalence of qualifications, which are potential barriers to transferability and mobility. Linking vocational education to professional registration could be a way of ensuring that learners gain the transferable skills as well as maintaining the professional standards sought by employers across all employment sectors.<sup>17</sup>
- 6.3 We support in principle National Colleges as a mechanism for delivery of higher-level technical and vocational training. However, the education and training offered must provide learners with a wide range of skills and knowledge to move through and across different employment sectors. National Colleges' must link their qualifications and training to professional registration because it provides individuals with recognition of skills and knowledge that are transferrable to other employers or sectors.<sup>18</sup> National Colleges or similar regional and national centres of excellence must provide opportunities for learners without local access to laboratory spaces to undertake practical and technical experiments.
- 6.4 Local Enterprise Partnerships (LEP) can play a key role in developing a regional post-16 education and skills strategy. Regional strategies must be appropriate for the particular area but must also be part of a joined-up national strategy founded on the UK's key strategic goals. LEPs should be encouraged to take responsibility and ownership to formulate and implement regional skills strategies. Greater Government investment and leadership is needed to achieve this.
- 6.5 Small but significant incentives such as reduced rail or bus costs or free car parking for adult learners could provide a great incentive for people to take-up vocational education opportunities.

## **7 Rebranding vocational education**

- 7.1 We do not consider there to be any urgent need to re-brand vocational education. It is more important at this stage to address issues of quality and provision. Re-branding vocational education at this stage could lead to unnecessary confusion among relevant stakeholders. If a re-branding exercise is launched, we have a strong preference for vocational education to be described as 'Technical education'.
- 7.2 Many employers are unfamiliar with recent policy changes to vocational education. A stable policy environment is essential if vocational qualifications in science are to gain the respect and trust of employers and learners.
- 7.3 Professional bodies have a well-established track record for providing a link to professional standards. Using 'professional' in any rebranding exercise may cause confusion and downgrade the value and esteem of existing professional registers.

## **8 Encouraging investment in employee education and training**

- 8.1 The UK must do more to retain and re-train its qualified science workforce. Policies and initiatives that seek to improve supply of high-quality science skills should be perceived as an investment in increasing the UK's long-term global competitiveness. Very few technicians, for example are trained in higher education institutions; yet they

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<sup>17</sup> <http://www.professionalregisters.org/>

<sup>18</sup> <http://www.professionalregisters.org/>

are a vital part of the UK's science R&D workforce and should be supported.

- 8.2 Appropriate mechanisms are needed to foster a culture of support and shared responsibility between employers and employees to contribute to employees' education and training needs. This could be achieved through a combination of employees' salary sacrifice along with employers' national insurance contributions or other tax relief schemes.

## **9 Further points of note**

- 9.1 We consider 44 questions to be excessive and will not necessarily lead to comprehensive answers. We also note the timing of the consultation. Given the potential for change of ministers and other personnel after the general election, a new Government may decide on a new direction for adult vocational education and publish an alternative consultation. We hope that this will not be the case.
- 9.2 It would be helpful for the Government to update its Consultation Principles<sup>19</sup> to include information about public consultations taking place over the course of a general election.

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<sup>19</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/255180/Consultation-Principles-Oct-2013.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255180/Consultation-Principles-Oct-2013.pdf)

## Member Organisations of the Science Council

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Association for Clinical Biochemistry and Laboratory Medicine  
Association of Neurophysiological Scientists  
Association for Science Education  
British Academy of Audiology  
British Association of Sport and Exercise Science  
British Computer Society  
British Psychological Society  
British Society of Soil Scientists  
Chartered Institution of Water and Environmental Management  
College of Podiatry  
Energy Institute  
Geological Society of London  
Institute of Biomedical Science  
Institute of Brewing and Distilling  
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 Measurement and Control  
Institute of Physics and Engineering in Medicine  
Institute of Physics  
Institute of Science and Technology  
Institute of Water  
Institution of Chemical Engineers  
Institution of Environmental Sciences  
London Mathematical Society  
Mineralogical Society  
Nuclear Institute  
Oil and Colour Chemists' Association  
Operational Research Society  
Physiological Society  
Royal Astronomical Society  
Royal Meteorological Society  
Royal Society of Chemistry  
Royal Statistical Society  
Society for Cardiological Science and Technology  
Society for General Microbiology  
Society of Biology  
Society of Dyers & Colourists  
The Organisation for Professionals in Regulatory Affairs