

# Training our next generation of outstanding teachers. An improvement strategy for discussion

A SCORE response to the Department for Education's consultation on  
*Training our next generation of outstanding teachers*

29 July 2011

Cc Marianne Cutler (Association for Science Education)  
Professor Peter Main (Institute of Physics)  
Libby Steele (Royal Society)  
Professor Jim Iley (Royal Society of Chemistry)  
Rachel Lambert-Forsyth (Society of Biology)

## **SCORE**

SCORE is a collaboration of organisations, which aims to improve science education in UK schools and colleges by supporting the development and implementation of effective education policy.

SCORE is currently chaired by Professor Graham Hutchings FRS and comprises the Association for Science Education, Institute of Physics, Royal Society, Royal Society of Chemistry, and Society of Biology.

### **Association for Science Education**

The Association for Science Education (ASE) is the largest subject association for education in the UK. Members include teachers, technicians and others involved in science education. The Association plays a significant role in promoting excellence in teaching and learning of science in schools and colleges. Working closely with the science professional bodies, industry and business, ASE provides a UK-wide network bringing together individuals and organisations to share ideas and tackle challenges in science teaching, develop resources and foster high quality continuing professional development.

### **Institute of Physics**

The Institute of Physics is a scientific charity devoted to increasing the practice, understanding and application of physics. It has a worldwide membership of around 40,000 and is a leading communicator of physics-related science to all audiences, from specialists through to Government and the general public. The Institute's Education Department works in policy, teacher recruitment and retention, teacher support and student support.

### **Royal Society**

The Royal Society is a Fellowship of more than 1,400 outstanding individuals from all areas of science, mathematics, engineering and medicine, who form a global scientific network of the highest calibre. The Society is committed to an evidence-based approach to supporting responsible policy-making within science and education, drawing upon high quality information and advice from its Fellows and Foreign Members, the wider scientific and education communities and others to achieve this.

### **Royal Society of Chemistry**

The Royal Society of Chemistry is the UK professional body for chemical scientists and the largest organisation in Europe for advancing the chemical sciences. Supported by a worldwide network of over 47,500 members and an international publishing business, the Society's activities span education, conferences, science policy and the promotion of chemistry to the public.

### **Society of Biology**

The Society of Biology is a single unified voice for biology: advising Government and influencing policy; advancing education and professional development; supporting its members, and engaging and encouraging public interest in the life sciences. The Society represents a diverse membership of over 80,000 – including, students, practising scientists and interested non-professionals – as individuals, or through learned societies and other organisations. The Society supports and recognises excellence in biology teaching and champions a biology curriculum that challenges students and encourages their passion for biology.

## About this response

1. The SCORE member organisations have worked together to provide the Department for Education with evidence on its consultation document *Training our next generation of outstanding teachers*. This response is therefore supported by each of the organisations forming SCORE.
2. SCORE member organisations welcome the opportunity to inform the Department's initial teacher training strategy. SCORE agrees with the Department's assertion (paragraph 1) that 'Nothing is more important to the quality of a school system than the quality of its teachers' and SCORE would like this to be reflected in reforms that will genuinely help to reverse the chronic shortages of specialist science and mathematics teachers in England.<sup>1</sup>
3. Earlier this month, SCORE provided the Department with a briefing paper on subject specialist teaching in the sciences. The briefing paper proposes definitions of subject specialism in the sciences and the importance of using these definitions to set teacher training allocations in these subjects and to improve the quality, consistency and reliability of records on specialist subject teachers.<sup>2</sup>
4. In summary in this response:
  - a. SCORE welcomes the desire to raise the status of the teaching profession but this cannot simply be achieved by raising the bar for entry. The strategy must also consider how to develop graduates into effective, teaching professionals through their ITT and probationary years.
  - b. SCORE sees it essential that STEM graduates entering primary teacher training courses are entitled to the same level of support as those entering secondary ITT courses. There is a known shortage of STEM graduates entering primary ITT and the strategy should reflect this.
  - c. SCORE is concerned that the initial teaching training infrastructure is set to become increasingly complex under the Department's proposals, that the rationale for this is unclear and that this will prove confusing and frustrating for applicants. It is strongly recommended the Department communicates clearly the difference between the various training routes and ensures there is coherence between the various models.

## Addressing the imbalance of science specialist teachers

5. The strategy rightly recognises the need to address the current imbalance between the number of specialist physics, chemistry and biology teachers. SCORE welcomes the introduction of specific allocations for physics and chemistry Initial Teacher Training

---

<sup>1</sup> For example:

Royal Society 2007 *The UK's science and mathematics teaching workforce. A 'state of the nation' report*. London: Royal Society.

Institute of Physics 2010 Teachers are in short supply. In *Physics and: teacher numbers. An Institute of Physics briefing note*.

<sup>2</sup> SCORE 2011 *Subject specialist teaching in the sciences: definitions, targets and data* (see <http://www.score-education.org/media/7987/spec-teach.pdf> )

(ITT) courses and that these allocations reflect the current need. However, to support subject specialism across the sciences in the short and long term, SCORE strongly recommends that there is a specific allocation for biology ITT. It should not be grouped with general sciences, as is currently the case.

6. The SCORE definition of a specialist teacher in the sciences should be used in the recruitment of chemistry, physics and biology trainee teachers in order to maintain a consistent data set regarding the subject expertise of entrants to teaching. ITT providers should record the subject expertise of entrants onto ITT courses which will either be identified through their degree (using the Joint Academic Coding System (JACS) subject grouping for guidance or through completion of a 24 week Subject Knowledge Enhancement (SKE) programme. This data should be kept by the Department for Education and help inform future ITT allocations.
7. This year's announcement of ITT places came far too late which consequently has affected course provision in 2011/12. In future, places should be allocated much earlier in the academic year, to allow ITT providers to secure places for successful applicants.

### **Enhancing selection of new teachers**

8. SCORE welcomes the desire to 'raise the status of the profession'. Changing selection procedures will contribute to this. However, we would like to see a clearer expression of how graduates can develop into effective, respected professionals through their ITT and probationary years.
9. SCORE supports the Department's proposals to test the literacy and numeracy skills of candidates seeking places on postgraduate initial teacher training courses and to restrict the number of retakes candidates may sit.
10. SCORE agrees with the strategy that it is important to assess candidates' interpersonal skills. However, the guidelines on assessing interpersonal skills should build on existing good practice and selection should be based on potential.
11. SCORE also believes that, for consistency and in the interests of achieving a robust common standard, the literacy, numeracy and interpersonal skills tests should be applicable to those seeking entry to all teacher training programmes (including those run by Teach First).

### *Subject knowledge tests*

12. SCORE recommends that the Department explores the use of subject-specific tests for initial teacher trainees. These tests could lend confidence that trainees/teachers have a sufficient breadth and depth of knowledge and understanding of their discipline. The Department should consider whether such tests could be introduced either for applicants to initial teacher training courses in the sciences or as part of the conditions satisfying the awarding of qualified teacher status or both. It should be possible for graduates to attend a subject knowledge enhancement (SKE) course before taking (or retaking) an entrance test. Such tests are being developed and trialled by the Institute of Physics and Royal Society of Chemistry with support from the Gatsby Charitable Foundation and all SCORE member organisations would welcome the opportunity to discuss the potential of such tests with the Department.

13. SCORE considers that it is vital that Ofsted inspection of ITT providers' selection procedures should include a subject-specific component, and that this is included within its assessment reports.

#### *Plans to expand Teach First*

14. SCORE notes that the Department is increasingly looking to Teach First to provide a solution to recruitment in shortage subjects, including the sciences. However, its focus for science remains at secondary schools. Given that only 3% of the in-service primary workforce in England hold a specialist first degree in science<sup>3</sup>, SCORE would like to see a similar focus on the recruitment of STEM graduates into primary teaching.
15. SCORE has concerns that the plans within the consultation to expand Teach First appear to be predicated on its success in attracting recruits rather than convincing data evidencing long-term retention of individual completers, and additional, richer, measures of achievement. Indeed evidence suggests that Teach First has one of the lowest retention rates among teacher training routes and given its name, its links with businesses and the employment prospects post Teach First this is unsurprising. Any ITT strategy that aims to tackle the current teacher shortages in the sciences must consider retention alongside recruitment.
16. In addition, Teach First is an expensive model to run in comparison to other teacher training models. SCORE acknowledges that currently the cost of Teach First is heavily subsidised by business but this may not always be the case.
17. The size of Teach First's allocation for training primary teachers and how this allocation will be divided by first degree subject specialism is unclear. SCORE is not persuaded that recruits onto the primary programme with degrees in non-science subjects will receive the support necessary to equip them with the specialist science knowledge and pedagogical skills (e.g. in practical work) required for them to develop into effective primary teachers.

#### **Bursaries to attract graduates with appropriate STEM qualifications**

18. SCORE agrees that financial incentives should be offered to help attract STEM graduates into teaching careers where there are currently shortages (i.e. chemistry and physics). SCORE recommends, however, that the impact of any bursary scheme is monitored and that it doesn't consequently lead to shortages in other curriculum subjects e.g. biology.
19. SCORE recognises that the headline bursaries are as much concerned with raising the perceived status of teaching, as with improving the knowledge base. However, SCORE has concerns that the message given will deter potential candidates with lower degree classifications. Degree class alone cannot and should not provide a proxy for teaching aptitude. In particular, any decision to exclude holders of third class degrees from the bursaries may result in a loss of potential teaching talent and will make it harder to

---

<sup>3</sup> Royal Society 2010 *Science and mathematics education, 5–14. A 'state of the nation' report*, p. 36. London: Royal Society.

achieve targets in shortage subjects. In 2009/10, for example, 100 physics graduates with a 3<sup>rd</sup> class degree were recruited onto ITT courses (and this was still 300 shy of the TDA target for physics teachers).

20. SCORE notes that degree class is a weak indicator of potential teaching quality and that, although it fully recognises the need for good subject knowledge, it is not a good proxy for the subject knowledge needed to teach the subject at school level. A subject knowledge test focused on school-appropriate knowledge provides a direct measure of the necessary subject knowledge (see paragraphs 8-9).
21. SCORE would like to see funding to encourage the development of good subject knowledge (through SKE courses before PGCE and mentoring after it) and financial incentives to encourage good teachers to stay in teaching.
22. SCORE recommends that it be made clear that the bursaries are available for graduates entering teacher training in a particular subject rather than the first degree subject a graduate holds. This would be likely to enhance applications for physics PGCE places from engineers. It should also be made clear that those entering physics and chemistry ITT without relevant subject knowledge could undertake a 24 week (or more) SKE course prior to beginning their teacher training.
23. SCORE also believes the proposed funding model needs to be modified because:

- **It is not clear who would potentially be eligible for a bursary award**

For instance, clarification is needed as to (i) whether first and second class degree equivalent qualifications (e.g. NVQ Level 5, Higher National Diplomas, BTEC professional diplomas) would qualify for a bursary; (ii) whether degree class is the same regardless of institution (iii) how individuals holding such degree equivalent qualifications and/or a Masters degree and/or a doctorate would be funded; (iv) consideration of individuals with appropriate qualifications and industry experience; (v) whether the bursaries are open to all graduates regardless of when the degree was obtained and (vi) whether those choosing to train by a more direct Bachelor of Education (BEd) route, particularly those taking a course that includes specialist science modules, would qualify for funding and, if so, precisely how this would be determined and awarded.

- **It only recognises the need for science and mathematics subject specialists at secondary level**

SCORE believes it is **essential** that STEM graduates entering primary teacher training courses should be entitled to the same levels of support as those embarking on secondary initial teacher training courses. This is because:

- (i) Recent data obtained from the GTCE show that only 3% of the in-service primary workforce in England holds specialist first degree and initial teacher training qualifications in science.<sup>4</sup> Given there is such a shortage in science primary specialism the bursary should acknowledge top science graduates (including chemistry, physics **AND** biology) who wish to pursue a career in

---

<sup>4</sup> Royal Society 2010 *Science and mathematics education, 5–14. A 'state of the nation' report*, p. 36. London: Royal Society.

primary teaching similar to the way it acknowledges the top graduates opting to teach secondary physics and chemistry.

- (ii) TDA data show that the number of STEM graduates taking primary PGCE courses has plummeted in recent years, e.g. from 428 in 2004 to 227 in 2006.<sup>5</sup>
- (iii) There is overwhelming research evidence showing that primary teachers lack confidence in teaching science and that this negatively affects pupils' attitude towards the subject and their attainment and progression in it during their secondary education.<sup>6,7</sup>

- **It may deter STEM graduates from applying to primary PGCE courses**

The current funding model sends out a clear signal to graduates that the Government considers the needs of secondary education to be more important than those of primary education. Such a message (i) may deter that proportion of STEM graduates who would wish to train to be primary teachers from seeking to do so; and (ii) would be mistaken given that accumulated evidence from recent longitudinal research shows that a combination of a high quality pre-school experience and effective primary education plays a crucial role in providing pupils with a solid foundation for their future education.<sup>8</sup>

- **It is unclear how the bursaries would be administered in practice**

The Department should clarify (i) precisely when the bursaries would be awarded; (ii) whether or not the bursaries would be awarded directly to trainees and, additionally, whether they would be administered as a single payment or through instalments.

- **The proposed bursary model will not improve retention rates**

While SCORE accepts that the proposed bursary is designed to attract graduates into a career in teaching and welcomes the larger bursaries for shortage subjects, the model will not improve retention. Given that just under half of newly qualified teachers will have left the maintained sector within the first five years of embarking on their teaching career, the Government should increase their commitment to investigating the reasons behind this leakage and tackling them. Reducing this loss would in part address the shortages of specialist teachers in physics and chemistry.

#### *Funding the Graduate Teacher Programme*

24. SCORE believes that employment-based routes into teaching as a whole should be reviewed, including Troops into teaching, with a view to developing a proper strategy for

---

<sup>5</sup> Royal Society 2007 *The UK's science and mathematics teaching workforce. A 'state of the nation' report*, p. 34. London: Royal Society.

<sup>6</sup> Royal Society 2010 *Science and mathematics education, 5–14. A 'state of the nation' report*, p. 36. London: Royal Society.

<sup>7</sup> For a review, see: Harlen, W 2008 Science as a key component of the primary curriculum: a rationale with policy implications. In *Perspectives on education. 1. Primary science*. London: Wellcome Trust.

<sup>8</sup> See <http://eppe.ioe.ac.uk/>, accessed 21 July 2011.

employment-based entry which includes adequate training in subject knowledge and pedagogical content knowledge.

25. SCORE notes that the Department has never set subject-specific targets for employment-based routes into teaching, and that this may have affected the success of this scheme.
26. The numbers of GTP entrants and completers in the sciences are small but this has proved a successful route into teaching. However extending the programme, whilst maintaining quality, will present difficulties, particularly in shortage subject like chemistry and physics. For instance, the current proportion of trainee physics teachers training through the GTP route is about 10% reflecting the fact that there are fewer high quality departments of physics in schools than there are for other subjects<sup>9</sup>.

### **Reforming the provision of initial teacher training**

27. SCORE is concerned that the initial teacher training infrastructure is set to become increasingly complex under the Department's proposals, that the rationale for this is unclear and that this will prove confusing and frustrating for applicants (see paragraph 34). While the differences between SCITT, School direct and the new teaching schools (as well as the proposed University Training Schools) all need to be communicated far more clearly, there are deeper concerns about fragmentation and lack of coherence. Instead the proposed strategy encourages the ITT system to move further away from setting a common set of standards between the various teaching training models.
28. SCORE is concerned that the consultation document gives no indication of either the number of teaching schools the Department intends to establish, or the number of providers that will operate via the School direct model and over what period of time these will be set up. Given that not all providers offer training in all subjects, that, as the proposals acknowledge, only 22% of science teachers hold a chemistry degree and 14% hold a physics degree, and that some 500 schools in England do not have a specialist physics teacher,<sup>10</sup> SCORE is very concerned about how subject-specific national recruitment targets will be set in future and how these targets will be converted to individual provider allocations.
29. Specifically on teaching schools which, in addition to offering training and support, will identify and co-ordinate expertise in partner schools to lead peer-to-peer learning:
  - a. This sounds very attractive in principle but SCORE has a number of serious concerns about how it would work in practice and whether there are enough schools that could take this on.
  - b. It is not clear how the teaching schools will be identified and defined. Would a teaching school cover all subjects or would it specialise in areas of expertise? It is not necessarily the case that all teachers (or even all departments) in an excellent

---

<sup>9</sup> Institute of Physics 2011 response to the House of Commons Public Bill Committee's Call for Evidence on the Education Bill in March 2011

<sup>10</sup> Institute of Physics 2010 Teachers are in short supply. In *Physics and: teacher numbers*. London: Institute of Physics.

school will be excellent. A school might be chosen on its overall quality and provide a very poor experience for those learning to teach, say, chemistry.

- c. It is not necessarily the case that an excellent teacher will make an excellent (or even good) trainer. SCORE would like to see some provision made for a selection process and quality control for those training the next generation of teachers – beyond the fact that they teach in an excellent school.
  - d. Given the severe teacher shortages in chemistry and physics, SCORE is concerned that trainee teachers and newly qualified teachers in these subjects may simply not be able to access the subject-specific and pedagogical support and guidance they require.
  - e. There is a risk that excellent schools are identified as being suitable for becoming training schools and, as a consequence, the teaching and learning in them suffers because lessons are shifted to inexperienced (trainee) teachers and the time of their good teachers is given over to training rather than teaching.
30. Specifically on School direct, which provides a mechanism for schools who are not accredited ITT providers to train teachers:
- a. Extending school based training through Schools direct will present difficulties in shortage subjects. Given the severe teacher shortages in physics and chemistry, SCORE is unclear how the Government will ensure trainee physics and chemistry teachers training through this route are adequately supported.
  - b. Experience of PGCE courses and placements suggest that there will not be enough schools to take the number of full time trainees that are needed. About 400 physics trainees come through a university-based PGCE route, which includes a school placement. This placement is less onerous on the school than a full-time trainee; even so, the providers find it hard to find placements.
  - c. SCORE agrees that teacher training should include extensive periods in schools. This is already the case on most HE-based courses. However, a difficulty faced by many providers is finding placements for trainees. We therefore recommend that schools are encouraged – through Ofsted ratings – to provide placements for HE-based trainees.
  - d. The strategy states that Schools direct will be required to employ the teachers they train post-teaching qualification. This is not currently the case with other existing teacher training routes for new graduates. Introducing such inequity may disadvantage NQTs trained by other providers and, depending on the percentages of teachers that are trained through ‘School direct’, may deleteriously affect future recruitment. Guaranteed employment raises the question about the anticipated return on the investment made by a trainee teacher. The Government should focus on only investing in training teachers the maintained sector requires so that employment post-qualification is more secure for all teacher training routes.
31. Where teacher training is concentrated in higher education institutions, there is a need to ensure that ITT lecturers, whose main responsibilities are to teach rather than conduct research, and the institutions themselves, are treated with special dispensation for the purposes of the Research Assessment Exercise.

32. People who are excellent trainers are not necessarily good researchers. However, they are pressured to do research. Whilst research is needed, it may not suit all the best educators: the research may not be of the highest quality and they may be distracted from educating new teachers.
33. SCORE believes that regardless of the Department's desire to give schools greater responsibility for teacher training, all trainee teachers should maintain a genuine connection with a Higher Education institution. Both a firm grounding in the philosophy of education and access to the latest educational research are essential in (i) developing understanding of the purpose of education; (ii) the role of the teacher; (iii) fostering effective classroom practice; and (iv) establishing an appreciation of the need for teachers to reflect on their teaching and continually update their subject knowledge and pedagogical skills.
34. While SCORE is encouraged to see that the new teaching standards established by the Coates review enshrine the need for teachers to engage in continuing professional development (CPD), the standards fail to emphasise the importance of subject specific CPD. Subject specific CPD should be a teacher's entitlement. It provides specialist subject teachers with the opportunity to grow and develop in their specialism and remain engaged with their subject. Subject specific CPD also helps non-specialist teachers to address the basic gaps or misconceptions in their subject knowledge, conceptual understanding and pedagogical content knowledge.
35. The role of the learned societies and teaching associations in establishing, and maintaining standards, especially regarding subject specific professional development should be encouraged as part of a drive to support and increase professionalism in teaching: e.g. qualifications such as Chartered Science Teacher should fit into a broader vision of teacher professionalism.
36. SCORE is also concerned that there is no wider consideration of the post-qualification training and development or recognition of the need to focus on retention as well as recruitment. In particular, there is a need to consider the support (e.g. mentoring) required by newly qualified teachers as they embark on their teaching careers, which the present system does not cover. SCORE believes that there are strong arguments for extending the length of teacher training courses to 18–24 months, bringing courses more in line with overseas ITT.

### **Facilitating the applications process**

37. SCORE welcomes the Department's proposals to create a centralised system for applications and to ensure that applications are processed in parallel, rather than through the sequential system operating currently. These will simplify the applications process and help ensure that applicants' interest is maintained. Such a system may also allow greater efficiency in assessing suitability for teaching and the identification of extra preparation in terms of subject knowledge or training in interpersonal skills for those deemed unsuitable in the first instance. The current system manages to turn away more than a hundred physics graduates a year, despite the massive shortage in that area, and much more can be done to offer extra support to such candidates. However, it is not clear how a central system will work with the increasingly diverse training routes. The Department should ensure that any changes made to the current

system are clearly communicated to ITT providers and monitor the impact of these changes on the application process.