House of Commons Education Select Committee: Attracting, training and retaining the best teachers

Response by the Wellcome Trust

October 2011

KEY POINTS

1. Given the remit of the Wellcome Trust, our response is directed primarily at science teaching. However, some comments are relevant to all areas of education. The key messages of this submission are:

   - A comprehensive approach to recruiting, training, and retaining high quality teachers in the workforce is essential. While we are encouraged by moves to increase the recruitment of graduates into teaching, this will not be enough to tackle teacher shortages in the sciences. Additional focus on training and retaining, we well as facilitating the return of teachers to the workforce (e.g. from career breaks) is vital.

   - Teachers must gain a minimum level of subject knowledge across all three sciences in initial teacher training (ITT) to ensure high standards of teaching in science subjects. We urge the Government to take on board findings of the review of *Acquisition of science subject knowledge and pedagogy Initial Teacher Training*, which highlights varying levels of subject knowledge training across ITT providers. We attach a copy of this report for your information.

   - There is a need to increase the science expertise in primary schools. We encourage the Government to support our pilot scheme to provide Continuing Professional Development (CPD) for primary teachers. This scheme will develop primary science coordinators, without a background in science, into highly trained science specialists. This would build on the successful government mathematics scheme - the Mathematics Specialist Teacher (MaST) programme.

   - Subject specific CPD is vital to increase the quality of science teaching in schools as well as retain high quality teachers in the workforce. We urge the Government to commit to continued co-funding of the National and regional Science Learning Centres and Project ENTHUSE, subject to the outcome of the forthcoming review.

INTRODUCTION

Attracting the best science teachers

2. Recruiting teachers with strong subject knowledge has been shown to have a positive impact on the quality of teaching and attainment in schools[1]. This is especially pertinent in the sciences, where teaching complex material requires a deep knowledge of the

[1] Royal Society (2007). *The UK's science and mathematics teaching workforce* http://royalsociety.org/uploadedFiles/Royal_Society_Content/education/policy/state-of-nation/SNR1_full_report.pdf

subject. Well qualified teachers can draw on a greater breadth and depth of subject knowledge to inspire young people to learn more.

3. Although there have been improvements in recruitment, there is still a shortage of science specialist teachers at primary and secondary level, particularly in the physical sciences. Initiatives such as Teach First have helped to attract high quality graduates into teaching, and we are encouraged by the Government's commitment to extending programmes such as these. However, more can be done and we welcome the aim set out by the Government to increase the number of high quality teachers in the system through incentivising excellent science and mathematics graduates[2,3]. By steadily raising the bar, we are optimistic that the status of the profession will be enhanced, which, over time, will help to attract better qualified applicants.

4. In addition, we would like to see the promotion of graduate engineers as potential mathematics and physics teachers. Nearly 15,000 engineers graduated in England in 2010, compared to 5,500 mathematicians and 2,200 physicists. With the knowledge and skills they acquire, they are clearly a cohort of graduates that should be encouraged to enter the teaching profession. However, both the engineers themselves and schools seldom recognise this opportunity. The Government should therefore make a concerted effort to promote this opportunity for the teaching of mathematics and physics to both graduates and to schools.

5. One area of concern regards bursaries to incentivise high quality graduates into primary teaching. A very low proportion of science and mathematics graduates enter primary training[4]. For example, in the 17,640 maintained primary schools in England, only 3% and 2% of teachers are science and mathematics specialists respectively[5]. While those entering training for shortage subjects in secondary will receive £20,000, prospective primary teachers – even with qualifications in mathematics, chemistry and physics - will receive a maximum of £9,000. To avoid deterring science and mathematics graduates from primary teaching, we believe it is important to bring the bursaries available to primary trainees up to the level for secondary trainees.

6. Currently each school has a science or mathematics coordinator. However, they will probably not be a graduate in that subject, nor even have studied it beyond GCSE level. This is of great concern as children's interest in science is generally initiated in primary school. The Government introduced a programme to train a 'mathematics champion' in each school following a recommendation from the Williams review of mathematics teaching[6]. We believe this should also be the case for science and agree with the Royal Society's call for a highly trained science specialist in every primary school, especially

[2] Department for Education (2010). *The importance of teaching: the Schools White Paper* https://www.education.gov.uk/publications/eOrderingDownload/CM-7980.pdf
[3] Department for Education (2011). *Training our next generation of outstanding teachers* http://media.education.gov.uk/assets/files/pdf/t/training%20our%20next%20generation%20of%20outstanding%20teachers.pdf
[4] Royal Society (2007). *The UK's science and mathematics teaching workforce* http://royalsociety.org/uploadedFiles/Royal_Society_Content/education/policy/state-of-nation/SNR1_full_report.pdf
[5] The Royal Society (2010). "State of the Nation – Science and Mathematics Education 5-14". http://royalsociety.org/WorkArea/DownloadAsset.aspx?id=4294971776
[6] Sir Peter Williams (2008). *Independent review of mathematics teaching in early years settings and primary schools* https://www.education.gov.uk/publications/eOrderingDownload/Williams%20Mathematics.pdf

given the success of the programme for mathematics specialists[7]. We provide further information on how to achieve this in the section on training teachers below.

High quality training of science teachers

7. The continuing development of teachers throughout their careers is essential to increase the quality of teaching in our schools. This is particularly important in science, where a firm basis of subject knowledge is needed from the start, as well as the opportunity to keep up-to-date with contemporary science in a fast moving environment. We have provided comment on areas of training separately below. However, we emphasise that training should be seen as a whole and not the sum of its parts.

Initial Teacher Training (ITT)

8. ITT is the first step to a successful career in teaching and therefore must be fit for purpose. We believe the Government's proposed reforms to ITT go some way to increasing the quality of teaching in schools. However, we would like to emphasise two points: the importance of assuring a minimum level of subject knowledge during initial teacher training, and evaluation of any changes to practice.

9. It is a particular feature of science that teachers are often required to teach outside their first subject specialism: for example a biology specialist may well have to teach chemistry and physics up to GCSE level. An appropriate level of basic subject knowledge is therefore essential. The Trust recently commissioned a study from the University of Birmingham into the subject knowledge content of different ITT courses[8]. This study shows much variation across different institutions, particularly in the subject knowledge content of the school-based component of ITT. We urge the Government to take on board the findings of this report and make clear what steps will be taken to assure that trainees emerge with a minimum level of subject knowledge across all three sciences.

10. Further, if the proposed teaching schools train science teachers in ITT and CPD, the relevant specialist expertise will be needed to assure that training is the same standard as other providers. Moving to a more diverse provision of ITT could exacerbate the variation seen across institutions and make it harder to assure high quality training across all providers. There is clearly scope to work with existing resources such as the Science Learning Centres to ensure that standards do not drop with more dispersed provision of training.

11. We urge the Department to set out how it will monitor and evaluate the impact of these proposals in practice, in particular the impact on quantity and quality of teachers in the profession. If there are indications that new arrangements are leading to a fall in teachers for shortage subjects, rapid intervention will be needed.

Continuity between ITT and continuing professional development (CPD)

12. ITT and CPD should not be separate processes, but too often they are. Initial training is only the start of what should be a career-long process of professional development. Newly-qualified teachers (NQTs) still have much to learn, and although the best schools

[7] Royal Society (2010). *The Scientific Century: securing our future prosperity* http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2010/4294970126.pdf
[8] Roger Lock, David Salt and Allan Soares, University of Birmingham (2011). *Acquisition of science subject knowledge and pedagogy Initial Teacher Training.*

have excellent induction programmes at the beginning of the NQT year, the process is far from complete at the end of the year.

13. Teachers realise the need for CPD in the early stages of their career. However, they are more likely to take up opportunities for generic CPD rather than science specific courses[9]. We would like to see a more proactive strategy for systematically developing the skills and knowledge of science teachers, especially in the early years of their careers, to build on knowledge gained in ITT and link with CPD. This will help retain them in the system as well as developing them as professionals.

The importance of high quality CPD

14. Good subject specific CPD should be a regular part of good teaching practice and is vital for increasing the quality of teaching in schools. It is particularly important for science teachers: to keep them up-to-date with scientific developments; to equip them with skills to deal with changes to the curricula; and to learn innovative techniques to explain contemporary science in the classroom. The National Science Learning Centre (NSLC) and network of regional Science Learning Centres, funded in partnership by the Wellcome Trust and DfE, is an existing resource providing high quality CPD to science teachers and technicians across the UK.

15. A continuing problem for teachers and schools is finding the time and money to cover teachers attending CPD courses. To address this, DfE, industry and the Wellcome Trust joined forces in Project ENTHUSE. This initiative provides funding for CPD courses, travel and teaching cover for teachers from across the country to upgrade their subject knowledge and teaching skills at the NSLC in York. Similarly, DfE funds the Impact Awards for teachers attending courses at their regional Science Learning Centre.

16. Evaluations of the Science Learning Centres and Project ENTHUSE showed their significant impact on the quality of science teaching and attainment in UK schools[10,11]. The National Audit Office recognise in their report[12] (2010) the impact that training courses supplied by the National network of Science Learning Centres have had in improving teaching and increasing take-up of science and mathematics in schools.

17. The current funding for Project ENTHUSE and the National network of Science Learning Centres ends in March 2013, with a decision of future funding to be made by June 2012. DfE and the Wellcome Trust are commissioning evaluation studies to underpin the already strong external evidence of success. Subject to this evidence the Wellcome Trust is prepared to continue its support for these initiatives for a further five years alongside other funding partners. We urge the Government to provide its continued support for these initiatives in the same respect.

18. We were encouraged by the introduction of the National Scholarship Fund for Teachers as a further resource for teachers to undertake CPD. However, there is a need to widen the remit of the scholarship to cover all attendance costs, including teaching cover, so that it is in line with similar existing schemes such as Project ENTHUSE and Impact Awards. As mentioned above, one of the main reasons schools do not promote external

[9] Roger Lock, David Salt and Allan Soares, University of Birmingham (2011). *Acquisition of science subject knowledge and pedagogy Initial Teacher Training.*
[10] https://www.sciencelearningcentres.org.uk/research-and-impact/networkimpactreport0910.pdf
[11] https://www.sciencelearningcentres.org.uk/research-and-impact/enthuseimpactreport.pdf
[12] National Audit Office (November 2010). *Educating the Next Generation of Scientists* http://www.nao.org.uk//idoc.ashx?docId=95a6046d-8162-438c-b074-c9975db8a90e&version=-1

CPD more is the availability and cost of cover teachers. And with the introduction of 'Rarely Cover' further limiting schools' room for manoeuvre on staff cover, too many perceived barriers exist to teachers undertaking CPD. We urge DfE to address this issue.

Primary science teaching

19. Young people's interest in science is often sparked in primary schools, yet a survey by the Wellcome Trust and the NSLC suggests that the majority of primary schools have experienced a decline in the status of science over the past two years. This follows the removal of science tests at age 11, and is linked to the long-term weakness of primary teachers' knowledge and confidence in science[13].

20. To address this, we will pilot a CPD programme that will train a primary science specialist in a large number of schools. Working with the National network of Science Learning Centres, and with input from DfE, the pilot will train teachers who are acting as primary science coordinator that do not have a background in science. The programme is scheduled to commence in summer 2012 and will be accompanied by a robust evaluation to examine evidence of impact. We urge the Government to support this pilot and, depending on its success, enable its national roll-out of the scheme to reach every primary school.

Retaining the best science teachers

21. The current impetus to recruit high quality teachers will not be sufficient to tackle the historic shortage of science specialist teachers in schools, especially in physics and chemistry. It is therefore essential to retain good teachers in the workforce. Worrying data show that, of teachers receiving Qualified Teacher Status (QTS) in 1999, just fewer than 60 per cent of new recruits were still teachers after 5 years[14]. Initiatives such as Teach First show an impressive 90 per cent retention for the first 2 years in the programme following QTS (for which they are committed). However, only 50 per cent remain in teaching after that time[15]. Clearly improvements need to be made to increase the retention of high quality teachers in the system.

22. As mentioned in the Science and Learning Expert Group report, access to high-quality CPD and interactions with Higher Education Institutions and employers, are important factors in improving retention[16]. In this light, we welcome the recommendation of the recent Science and Technology Committee inquiry that Ofsted should report on how effectively schools provide opportunities for CPD, specifically to externally provided subject training[17]. This provides further weight to the role of providers such as the National network of Science Learning Centres in delivering this high quality training which can attract and retain teachers in the system.

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[13] Primary science survey carried out in July 2011, with 467 respondents. Detailed results will be available on the Wellcome Trust website.
[14] Royal Society (2007). *The UK's science and mathematics teaching workforce* http://royalsociety.org/uploadedFiles/Royal_Society_Content/education/policy/state-of-nation/SNR1_full_report.pdf
[15] http://www.teachfirst.org.uk/OurWork/
[16] Report of the Science and Learning Expert Group (2010). Science and mathematics secondary education for the 21st century http://interactive.bis.gov.uk/scienceandsociety/site/learning/files/2010/02/Science-and-Learning-Expert-Group-Report-Annexes-31.pdf
[17] House of Commons Science and Technology Committee (2011), *Practical experiments in school science lessons and science field trips* http://www.publications.parliament.uk/pa/cm201012/cmselect/cmsctech/1060/1060i.pdf

23. The role and provision of technicians should not be underestimated as a factor in the retention of teachers. Recent studies have shown that technicians provide invaluable support to teachers in preparing and managing practical work and demonstrations[18], allowing them to focus on teaching. Heavy workload has been cited as one of the main reasons for teachers leaving the profession[19] and the work of technicians reduces the burden on the teacher. We therefore believe the Government needs to raise the profile of technicians and provide good incentives to attract and retain them in schools, including CPD.

24. Government changes to the system have also been cited as reasons for teachers leaving the profession. Given the upcoming revision of the National Curriculum, it will be particularly important to support teachers to deliver a curriculum that is less prescriptive than its current form. Since the introduction of the National Curriculum teachers have had to deal with moving goal posts and changes to the system. Many teachers only have experience in the current regime. High-quality on-going professional development, as well as revision of initial teacher training, will therefore be essential to support teachers in this transition period.

25. Finally, a recent survey commissioned by the Training and Development Agency (TDA) suggests that over 16,000 teachers who have left the classroom in the last 5 years, due to taking a career break for example, have tried to return to teaching without success. Worryingly, one third of these teachers were in shortage subjects such as mathematics and science[20]. The Government must facilitate the return of highly qualified and experienced teachers to our schools following career breaks. Failing to do so would mean a huge waste of time, investment and resources in training these teachers up to a high standard.

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[18] Report of the Science and Learning Expert Group (2010). Science and mathematics secondary education for the 21st century http://interactive.bis.gov.uk/scienceandsociety/site/learning/files/2010/02/Science-and-Learning-Expert-Group-Report-Annexes-31.pdf

[19] Smithers and Robinson (2003). *Factors affecting teachers' decisions to leave the profession* https://www.education.gov.uk/publications/eOrderingDownload/RR430.pdf

[20] http://www.tda.gov.uk/about/media-relations/press-releases-2011/26-09-2011.aspx?keywords=career+break