

27 JULY 2011

TRAINING OUR NEXT GENERATION OF OUTSTANDING TEACHERS

A RESPONSE TO THE DEPARTMENT FOR EDUCATION
PROPOSED IMPROVEMENT STRATEGY



GATSBY

ABOUT GATSBY

- 1 Gatsby is a Trust set up in 1967 by David Sainsbury (now Lord Sainsbury of Turville) to realise his charitable objectives. We focus our support on a limited number of areas:
 - Plant science research
 - Neuroscience research
 - Science and engineering education
 - Economic development in Africa
 - Public policy research and advice
 - The Arts

INTRODUCTION

- 2 We applaud the government's renewed emphasis on the role of the teacher in raising standards and increasing post-16 participation. This is particularly crucial in the areas of science, technology, engineering and mathematics (STEM). Gatsby recognised some time ago that the only way to achieve our ambitions regarding the supply of STEM skills to the UK workforce was to ensure that young people were taught by well-qualified and motivated specialists.
- 3 As a result, around 10 years ago Gatsby embarked on a significant programme of work, including research into the problems of attracting science teachers and various projects designed to ameliorate these problems, particularly in the area of physics teaching. We are delighted that the government is now looking to address many of the issues that we and others have highlighted. The importance of recruiting subject specialists is particularly welcomed.
- 4 However, while the ambitions of the government proposals are to be applauded, we are concerned that some of the measures suggested may have a detrimental effect on recruitment. This would be particularly disastrous for physics where there are still significant shortages of teachers.
- 5 Additionally, while moves towards teaching schools may well help to improve retention it is critical that these schools do more than ensure teachers' survival in the classroom. There must be a relentless push towards ensuring all trainee teachers' subject knowledge and subject-specific pedagogy meet the required standards. A science teacher can only be effective when fluent in the concepts of science and able to develop this fluency in learners.

RAISING THE BAR TO ENTRY TO TEACHING

- 6 Gatsby is supportive of the aim to raising the bar to entry to initial teacher training to improve the status of teachers.
- 7 **We do, however, have concerns regarding the implementation and enforcement of the proposed bursary system for trainee teachers. We urge the Department to consider applying rules similar to those used by the government Research Councils, whereby individual circumstances are taken into consideration. When applying for publicly-funded PhDs for example, undergraduate degree class can be enhanced by postgraduate qualifications or relevant work experience.** An extract from the Biotechnology and Biological Sciences Research Council (BBSRC) funding eligibility criteria is given in the Appendix.
- 8 In addition to capitalising on the potential to recruit physicists into physics teaching, it is vital that alternative routes into teaching shortage subjects are maintained. Over the last decade Gatsby has worked with the TDA, National Science Learning Centre, Royal Society of Chemistry (RSC) and

Institute of Physics (IOP) to develop Subject Knowledge Enhancement courses, both prior to initial teacher training and as professional development courses for existing teachers.

- 9 **Gatsby continues to be extremely supportive of Subject Knowledge Enhancement (SKE) courses, having seen many excellent physics teachers produced via this route. We are convinced that SKE courses will remain, for many years to come, a critical component of any successful strategy to recruit sufficient numbers of high-quality physics teachers.**
- 10 **It is unclear how the proposed bursary scheme would operate for those on SKE courses. We argue that it would be inappropriate if the system allowed for an individual with a first class degree in, say, music to undertake a physics enhancement course and be immediately eligible for a £20,000 bursary, while a physics graduate with a 2.1 degree only received £15,000.**
- 11 Indeed, continuing with the example in the previous paragraph, it is difficult to see how the musician would necessarily have greater physics subject knowledge or passion for the subject than a committed individual with a 2.2 physics degree from, say, Imperial College London who, under current plans, would receive just £11,000.
- 12 In addition to the existing alternative routes to qualified teacher status, Gatsby has started to explore how one might encourage more engineers to consider teaching physics and mathematics. As well as being successful science and mathematics teachers in their own right, there is the potential for teachers with a background in engineering to open the eyes of their students to the possibilities of engineering careers and thus address an area of systemic weakness in terms of careers advice in schools.

SUBJECT KNOWLEDGE IN TEACHER TRAINING

- 13 A significant issue for current SKE courses has been the lack of a common standard or curriculum. As a result, we have seen significant variation in the quality of the teachers that these courses have produced. There needs to be a way of ensuring that those embarking on teacher training courses have sufficient subject expertise, especially in the sciences.
- 14 **Indeed we believe there would be value in exploring common subject specialism entry tests to all science initial teacher training. This would help to ensure that those trainee teachers without a degree in their chosen specialism were properly prepared and thus reduce the dropout rate from teacher training.**
- 15 **We are currently working with the IOP and RSC to create diagnostic physics and chemistry tests to support the development of teachers' subject knowledge. These tests could be adapted to set a subject knowledge standard for those entering initial teacher training or on completion of an SKE course. Gatsby would be keen to work in partnership with government to develop these pilot tests further if there was interest from the Department.**

THE STRUCTURE OF INITIAL TEACHER EDUCATION

- 16 We hope that, as elsewhere in the education system, government will allow those involved in initial teacher training the freedom to innovate in response to the needs of schools, individual subject requirements, and the trainee teachers themselves.
- 17 **Gatsby has trialled several small-scale pilots with PGCE courses where subject knowledge is enhanced by intensive, additional tuition. The conclusion from each one of these pilots has been the same: such approaches do work but to secure systemic change the science**

PGCE needs to be lengthened (from 36 to perhaps 42 weeks) to cover the subject knowledge necessary to teach the full range of school science(s) confidently and effectively. Given the depth and breadth of work that needs to be covered within the training of a science teacher, we urge the government to look at incentivising more innovative approaches, including the piloting of longer PGCE courses.

- 18 Gatsby supports the government view that Higher Education Institutions (HEIs) should continue to play a significant role in initial teacher training (ITT). There are a number of important benefits that accrue from ensuring their continued participation in the training of teachers:
- the academic environment afforded by HEIs ensures that trainee teachers develop a reflective approach that means they will be more open to trying different ways of working in the classroom and better at evaluating practice within their own schools;
 - HEIs provide a physical space where trainee teachers can meet other trainees on a regular basis for a prolonged period of time resulting in the development of a very important student support network that provides peer support well beyond the PGCE years. We believe that this has a significant impact on retention; and
 - HEIs are able to co-ordinate schools partnerships, thereby providing PGCE students with the opportunity to experience in some capacity a range of different schools; this helps students to develop insights into the type of school where they might 'fit in' ahead of applying for first job - again important for retention.
- 19 Professional development has a vital role to play in the early years of a teacher's career. It is sometimes assumed that new teachers are fully trained by ITT courses. They are therefore largely left to deal with issues by themselves in their classrooms. Many new teachers struggle with this, feel undermined and consequently leave the profession. This is particularly acute in physics; more than for other subjects, newly qualified physics teachers often find themselves as the only physics specialist in their school and have nowhere to turn for subject specific support.
- 20 **Gatsby has been working with the IOP over the past eight years to develop a mentoring programme for physics teachers in their early career, providing them with support from experienced physics teachers working in other local schools and helping them to become a part of the wider science and physics teaching community. Independent evaluation has shown that this mentoring can improve retention and that both individual teachers and schools as a whole can see significant benefits from such programmes. We would be willing to work with the Department if it had any appetite for building on this work.**
- 21 We are concerned that the introduction of full-cost student fees for ITT courses, rather than direct government funding, will mean that the new Teaching Agency will have significantly less control over teacher quotas. There is a danger that HEI education departments will over-recruit to some subjects and not concentrate efforts on the hard- to-fill subjects such as mathematics, physics and chemistry. We urge the Department to put in place alternative mechanisms to prevent this happening.

CONCLUSION

- 22 Recruiting and retaining sufficient numbers of high-quality physics teachers is a long-standing and stubborn problem. We, and others in the science community who have studied the issues over the years, are firmly of the opinion that the best chance of success lies in a partnership approach between government and those organisations who best understand the physics community and landscape.
- 23 After more than a decade of devising and evaluating programmes to address physics teacher shortages, Gatsby has amassed a unique body of knowledge relating to what works and, equally as important, what does not.

- 24 Looking forward however we intend to adopt a strategy in which Gatsby does not continue to develop new programmes in this area unless the DFE develops an appetite to work in genuine partnership with ourselves and others to find sustainable solutions. We very much hope that this will be the case and we stand ready to respond positively to any government approaches.
- 25 We would welcome the opportunity to discuss with the Department the points raised in this submission. In the meantime, any questions regarding its content should be directed to:

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APPENDIX: EXTRACT FROM BBSRC FUNDING RULES FOR PHDS

ENHANCEMENT

- 1 As a general rule an undergraduate degree below, or below the equivalent of, a UK upper second class honours degree is acceptable if accompanied by one of the following enhancements:
 - a postgraduate Masters degree in a relevant subject will enhance a first degree by one step (eg from a lower second to an upper second). A second postgraduate Masters degree will not, by itself, constitute a further step; it can, however, be regarded as postgraduate work experience (ie one year Masters equates to one year’s relevant postgraduate work experience);
 - completion of 3 years full-time equivalent relevant postgraduate work experience will enhance a first degree by one step, and 6 years or more experience by two steps. ‘Relevant’ employment is regarded as employment which is relevant either to the first degree or to the proposed course of postgraduate study. For example, a graduate in computer studies who has been employed as a computer programmer will have relevant employment experience. Employment undertaken before the completion of undergraduate study does not count for the purposes of enhancement.
- 2 Four year UK first degrees denoted as ‘Masters’ eg MChem are undergraduate degrees and provide no automatic enhancement.
- 3 BBSRC expects to see evidence that universities have appropriate processes in place for the exercise of judgement in making such assessments, bearing in mind the responsibility to properly assess the suitability of a candidate for a research degree programme.

UNEXPECTEDLY LOW DEGREE RESULTS

- 4 Candidates who did not sit their final undergraduate examinations due to a certificated illness, may in some cases be awarded an aegrotat degree. Also, illness or other adverse personal circumstances may result in a candidate attaining a lower than expected level of degree. In these cases, the candidate may have the ability to undertake postgraduate training, and the university should assure itself that:
 - the candidate was suffering from specific health conditions or adverse personal circumstances in the period prior to or during the exams; and
 - the candidate’s performance during previous years of study was such that they would have been expected to have achieved the appropriate level of degree; and
 - the examination procedures did not allow for the adverse conditions to be taken into account.