

# Increasing the Knowledge and Provision of Teachers of Earth Science

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In a previous edition of *Teaching Earth Sciences*, Chris King (2003) reported an encouraging upturn in numbers of 'A' level geology students. This article considers the provision of teachers for future students and outlines two Teacher Training Agency (TTA) sponsored approaches to increasing the subject knowledge of trainee teachers during and prior to their formal training period.

## Introduction

Although offset by a slight increase in the number of environmental science candidates, over the last ten years, in common with other physical science subjects, there has been a decline in the number of candidates being entered for 'A' level geology (ESEU, 2003). Not only is this of concern in its own right but also has the additional effect of reducing the pool of suitable candidates for initial teacher training (ITT) courses in the future. This has the potential to exacerbate the situation and geology could be faced with a self-fuelling spiral of decline.

When selecting candidates for Initial Teacher Training (ITT) it would be unusual to find the perfect trainee who matches exactly all the success criteria for experience and subject knowledge. In our own institution, for example, a large proportion of prospective science trainees have an area in their subject knowledge that needs to be addressed in order for them to reach Qualified Teacher Status (QTS). Currently, as a result of the interview and during the training process, these individuals are set targets and strategies negotiated as to how they might meet their individual knowledge requirements both prior to and during their formal training. Some taught sessions are organised, led by tutors, external agencies such as the Earth Science Education Unit and students themselves, to meet the more common needs although, due to the limited time available, it would be true to say that a significant proportion of the topics need to be addressed by the individual through a process of supported self study. But what of the candidates who would benefit from help above the norm? The TTA is aware of this issue and is currently financing two schemes in an attempt to address the problem. Outlined below are two approaches to the enhancement of subject knowledge for those following any route (TTA, 2003a) to the award of QTS.

## Short Subject Knowledge Booster Courses

Subject Knowledge Booster Courses replace the Subject Support and Supplementary Support Courses previously funded by the TTA which, if the reports of our own trainees are representative of others in other institutions, have been received very favourably. A total of 17 three year contracts (TTA, 2003b) to run subject knowledge booster courses have been awarded by the TTA and each will occupy two weeks full time study or

the equivalent on a part time basis. Typical courses, for those already accepted on a route to QTS, are currently held over a series of Saturdays, so as to avoid regular Monday to Friday commitments. However, a series of Saturday sessions might not suit everyone and, as an alternative, our own institution will be offering 2004 and 2005 courses in the first two weeks of September in an attempt to plug the knowledge gap before mainstream Post Graduate Certificate of Education (PGCE) students embark upon their full time course but at the same time avoid pre-course primary experiences and/or induction weeks. Since our own past experience, and that of similar institutions, is that the majority of trainee science teachers have strengths in biology related sciences (Twidle et al 2002) and perhaps are less confident in some aspects of physical science, our course aims to cover the physical sciences (including earth science) only. However, broader approaches are available and the list of advertised courses may be found on the TTA web-site (TTA, 2003b).

Although members of these courses are largely self-selecting, applications could be as a result of a recommendation to the individual by an interviewing or supervising tutor. Irrespective of the student's host organisation, these courses are free to participants.

## Pre Initial Teacher Training Courses

Not surprisingly, as highlighted in the Council for Science and Technology Report (CST, 2000) there is a strong correlation between a teacher's highest subject qualifications and their levels of confidence in teaching that subject. However, the same document also reports a high number of Key Stage 3 and 4 teachers of physical science without even an 'A' level in the subject being taught and more than half of the teachers without a relevant degree in the specialist area. Although there

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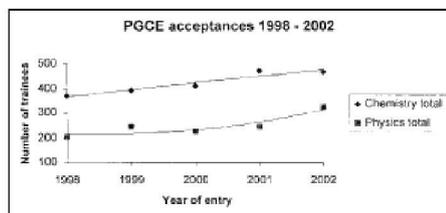


Figure 1: Acceptances to PGCE Chemistry and Physics Courses (Adapted from GTTR, 2003)

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would appear to have been some increase in the recruitment of both chemistry and physics graduates onto teacher training courses (See Figure 1), the overall recruitment has still to recover to the 1994 'peak'.

Compared with the figures for chemistry and physics, those for geology (See Figure 2) appear to have remained static.

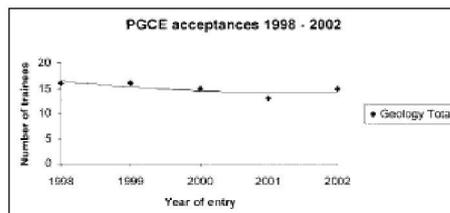


Figure 2:  
Acceptances to  
PGCE Geology  
Courses (Adapted  
from GTTR, 2003)

Not only is there a deficit in basic subject knowledge but King et al. (2003) report that many of the texts used in secondary schools have an inadequate coverage of the earth science content of the National Curriculum, coupled with a very high error level. To compound the problem, young science teachers in post also reported difficulty in identifying and accessing suitable subject related professional development (CST, 2000). What can be done to ameliorate the situation? The TTA response is to try and utilise a potential pool of applicants who may have a desire to teach the physical sciences but lack the relevant background to be suitable and confident specialists.

Following on from a pilot scheme for mathematics, which began in February 2003 at University College Chichester and Liverpool Hope University, two national pre Initial Teacher Training pilot courses will be offered in physics, beginning in January 2004 at Keele University and St. Martin's College, Lancaster. Chemistry (including elements of earth science) is next in line and planning is underway for two pilot schemes to start in January 2005. It is intended that both of these pilots will each recruit 20 students, the exercise being repeated in 2006, and will be full time for 26 weeks prior to the students starting on a recognised route to QTS. If these courses are successful it is hoped that they will subsequently be rolled out on a national level. The aim is to increase the students' chemistry and earth science subject knowledge so that they could teach with confidence to at least Key Stage 4, although those with the aptitude could teach post 16.

Since trainees currently receive a training bursary, it might not be unreasonable to expect some to give a limited amount of their own time so that they may attend a short series of sessions, at no cost to themselves, in order to augment their subject knowledge during the time they are actively following a course that will lead to QTS. However, the TTA recognises that giving up 26 weeks in order to attend a full time pre-training course is a different matter and may have financial

implications for those giving up full-time employment in order to attend. As a result, these courses will be offered at no cost to the students and a bursary scheme, similar to that for PGCE students, is to operate with participants on the courses receiving a bursary of £150 per week for up to 26 weeks.

Some agencies in the field of education may have been criticised for attempting to introduce new initiatives across the board without careful trialing and evaluation. On this occasion though, the TTA is to be commended for accepting that there is an issue to address, devising an approach that may help and carrying out suitable pilots before introducing the scheme on a larger scale.

## References

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## Biographical Data

John Twidle taught chemistry and physics for many years in independent, secondary modern and comprehensive schools. His current position is that of Lecturer in Science Education at Loughborough University. His research interests include language in science and use of the Internet to support science teaching.

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