

The Provision of Subject Knowledge Enhancement in Shortage Subject Areas in Secondary PGCE at the University of Worcester

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"Physics in schools and colleges is at risk through redefinition and lack of teachers with expertise in the subject. Many of those with degrees in physics came through the education system when physics was more clearly identifiable as a subject, and they will be retiring soon. There is already a severe shortage. If physics is to survive in schools, both as essential education and a platform for higher level study and research, there is a need for urgent action." (Smithers & Robinson 2008: p. iv)

The 1988 Education reform Act and the subsequent National Curriculum introduced the requirement that all students study a balance of biology, physics, chemistry, earth science and astronomy to age 16. A key argument for the introduction of *balanced science* as it came to be known was that it would enable girls and boys to experience the full range of biological and physical sciences without being pressured by gender stereotypes to opt for one area or another at the age of 14. It was hoped that this would increase the demand for A level sciences and lead to equal numbers of boys and girls opting for each of the sciences post-16. A consequence of this was that science teachers were expected to deliver a broader range of topics and traditional subject discipline boundaries became less distinct. Traditionally there had always been a shortage of teachers specialising in the physical sciences and it may be argued that this, and the shift in emphasis towards the *balanced* approach, was responsible for a loss in subject identity in chemistry and physics particularly at Key Stage 3 where many fundamental physical and chemical principles had traditionally explored.

The current generation of PGCE potential secondary science applicants are largely the product of this balanced approach and it has become increasingly noticeable at interviews that prospective students were lacking in subject knowledge at an alarmingly fundamental level in physics and chemistry. Owing to the nature of current trends in science teacher deployment in schools, there was a need to generate the skills to deliver in all science disciplines. On our secondary PGCE science course at the University of Worcester our graduates have the designation of science teachers with a specialism in biology, chemistry or physics.

Currently, there are only 140 hours of science specific input on our secondary course and with the plethora of aspects to science teaching that we have to cover there is precious little time to teach subject content. We do ask our students to complete a subject audit prior to the course and the expectation is that they will attempt to address gaps in their subject knowledge by independent study both before and during the course and on school placements.

The Training and Development Agency (TDA) has recognised this recruitment dilemma that faces secondary science providers when filling places on their courses. One solution has been the setting up of booster and enhancement courses in

shortage subject areas; physics and chemistry being two such areas. These are short courses aimed at students who are suitably qualified to train to teach science but with a notable subject weakness. Prior to the current cohort of students, we have made a condition of acceptance that some students attend a booster course run by another provider.

Whilst this was of benefit to the student concerned as it resulted in a place on the course, it often meant the inconvenience of travelling long distances to attend the course when the closeness of Worcester was one of their criteria for choosing the University. It also meant that our secondary science staff were in no way instrumental in their progress on the course.

In February 2008 we bid for a grant to run our own booster course to address our concerns about sending students to other providers. The bid for a 10 day physical science course was accepted and we ran the course over two weeks, one in July and one in August.

The course was designed to have a large practical element and in order to deliver in this way specialist accommodation was required. University laboratories were not an option due to pressure from existing courses and a lack of school science orientated equipment. We investigated the possibility of using a school as a base and having an existing partner school in the locality with a science specialist status presented us with an opportunity to consolidate the partnership and in doing so contribute to one of the aims of the University's strategic plan i.e. *Working with Partners*. At an exploratory meeting with the school's Headteacher, he was very enthusiastic at the opportunity to add to its credentials in support of a possible application for a second specialism as a Training School. With the school's support the course took place in the school summer holiday. The teaching was also enriched by sessions delivered by the school's own staff and the technician was on hand to meet equipment needs.

In the course of the external evaluation the arrangement was remarked upon as *...unusual but worked well*. In discussion with the participants they *... appreciated the chance to work in an 'authentic' environment*.

During interviews, participants were full of praise for the staff and the teaching they had experienced, as well as the way the content had been organised.

"The focus on misconceptions was good..."

"It is useful to experience different teaching styles ..."

"They (staff) will teach at a higher level if requested..."

"They (staff) are happy to let us have their email addresses...they keep emphasising that we should ask questions if we don't understand ..."

The booster framework has subsequently been revised by the TDA and the University is being funded to run two 10 day Subject Knowledge Enhancement (SKE) courses, one in physics and one in chemistry in the Summer of 2009.

References

Smithers, A. & Robinson, P. (2008) *Physics in Schools 1V Supply and Retention of Teachers Centre for Education and Employment Research*. University of Buckingham