

# Blurring boundaries: creating critical balances between pedagogic and content knowledge in ITE

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## Introduction

Recent research has suggested that primary school teachers can experience low confidence around science education and that this can often translate into poor pedagogy once students, and indeed newly qualified teachers, are in the classroom (e.g. Harlen & Holroyd, 1997; Parker, 2004). The issue of how to support developing primary school teachers who may have poor subject content knowledge and a negative attitude to teaching science is a major challenge for those engaged in teacher development (Parker & Spink, 1997; Tounson, 2000). In relation to this Thurston (2008) has suggested that the most effective strategies to support initial teacher education in primary science teachers includes the development of:

- Awareness outcomes – New awareness of pedagogies and conceptual shifts away from previous assumptions regarding the content or pedagogies used for effective delivery.
- Affective outcomes – Adopt positive meaning to value the changes proposed by professional development. The increased affective response of the teachers to the new learning supports them through periods of uncertainty that occur whilst changes in practice are implemented in the classroom.
- Motivational and attitudinal outcomes - Enhanced motivation and attitudes are particularly important precursors to subsequent impact upon professional practice.
- Knowledge and skills outcomes – Development of critical reflexivity to both curriculum content and pedagogy.

The design of the new primary concurrent degree programme at The Stirling Institute of Education aims to maximize the impact on Initial Teacher Education in terms of leading to more effective learning and teaching by ensuring that students develop both content and pedagogic knowledge and skills (Parker, 2004). This suggestion would be in-line with Shulman's (1987) pedagogic content knowledge (PCK) model. The PCK model maintains that teachers need to have curriculum content knowledge as well as knowledge of how to represent this knowledge to learners. Shulman (1999, p64) reports that teachers must have:

- Content knowledge (C);
- General pedagogic knowledge, with special reference to those broad principles and strategies of classroom management and organization that appear to transcend subject matter (GPK);
- Curriculum knowledge, with particular grasp of materials and programs that serve as 'tools of the trade' for teachers (CK);
- Pedagogical content knowledge, that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding (PCK);
- Knowledge of learners and their characteristics (KL);
- Knowledge of educational contexts, ranging from the workings of the group or classroom, the governance and financing of school districts, to the character of communities and cultures (KE); and
- Knowledge of educational ends, purposes, and values, and their philosophical and historical backgrounds (KPhil).

This new primary degree builds on a range of concurrent degrees offered for secondary education within Stirling, all of which aim to make clear links between subject knowledge and pedagogy. In addition we hope to show how the concurrent nature of the degree allows us to provide an effective programme that addresses the issues that Shulman reports to be required for effective teaching. Codes are provided for each of the areas that Shulman identifies (see list above) and will be referred to in Table 1.

In this session we hope to explore why we believe that a concurrent programme might achieve more effective learning and teaching, as well as outlining what the programme looks like, our experiences to date and our hopes for the future. We will touch on how this integrated approach has allowed us to explore issues across subject boundaries and sectors (both in schools and HE), through, for example, fieldwork. In addition we will explore why 'The Environment', as a course title, is useful in blurring these boundaries between Environmental Science, Education and Geography.

### *What is a concurrent programme?*

The concurrent degree programme at Stirling allows students to study a subject at university level whilst undertaking Initial Teacher Education (ITE) simultaneously. Over the course of a four-year degree structure it is equivalent to gaining an Honours degree as well as a PGDE; both being studied longitudinally and side-by-side. This joint qualification allows students to teach in either the primary or secondary school settings, dependant on the course followed. Whilst this may not be unusual for secondary teacher education what is more unique is the specialism aspect to the primary teacher education programme. As part of the primary programme there are two possible specialisms in the degree which sees students studying modules in either Environmental Science and Biology OR French and Spanish. Students also study education including modules in primary literacy, primary numeracy and a module that focuses on how to make the most effective use of their specialism in the primary school. In order to support all of this students undertake four school placement experiences in primary (primaries 1 through to 7).

The advantages of this programme, for both primary and secondary, in Scotland, is that the degree plus teaching qualification are gained in four years as opposed to five. Additionally it allows the education of primary teachers with a subject specialism. So, for example, the numbers of teachers who have a science or environment subject background which in turn swells the numbers of those who are confident to teach these subject areas in the primary classroom. Finally there is a degree of portability and flexibility. So, for example, on their final placement, in year four of the degree, students can decide not to follow a career in teaching and therefore transfer to their main degree subject only. There is also the possibility for students to transfer between primary and secondary in the early stages of the degree. This flexibility removes some of the pressure on students to complete their Initial Teacher Education course when they may well find that they are not suited to the role.

### *What does the Stirling programme look like?*

Recent figure reported that the average time spent during the preparation of primary school students on geography/environmental education in a sample of 17 programmes of Initial Teacher Education from the UK was 27.76 hours (standard deviation 19.64 hours) (Bowles, 2008). On the Stirling degree programme this figure will be 398 hours. This time equates to students obtaining 288 'credits' in degree level geography/environmental education. Normal degree programmes are 240 credits in Scotland. The students will also have education credits on top of these. Therefore, the manner of degree structure in Stirling plays a large part as the credit rich teacher education programme allows teachers to have both subject specialism and effective teacher education. One of the reasons for this is the willingness of the University of Stirling to invest in credit rich degree programmes.

All of the Initial Teacher Education programmes – both at a primary and secondary level are based upon a common framework. The example provided in the table below is of the Primary ITE degree with a specialism in the environment. In brackets after each module the aspects that Shulman reports make an effective teacher are noted as indicated on page one of this article. By providing this overview we hope to illustrate how we hope to plan a student experience that achieves a critical synthesis between the development of the student as a Geographer/Environmental Scientist and the development of the student as a teacher of these subjects.

Table1: Programme overview of BA Hons in Professional Education (Primary) with specialism in the environment

Semester	Education Modules		Other Subject Modules
1 Autumn	EDU9A1-Learners and Learning in Education (GPK / KL)		BIO1CB (C) ENV1E1 (C)
2 Spring	EDU9A2-Challenges and Trends in Education (KPhil)		BIO2IP (C) ENV2E2 (C)
3 Autumn	EDU9L3-Primary Pedagogy 1-Literacy (CK / PKC)		ENV3E3 (C) SCI1LS (C)
January-February	EDU9A0-5 weeks of school experience (2 weeks nursery/ 3 weeks early years) (KL / KE)		
4 Spring	EDU9A4-Nature and Goals of Teaching (GPK)		ENV4E4 (C) SCI2FS (C)
5 Autumn	EDU9A5-Teaching Units of Work	EDU9N5-Primary Pedagogy 2-Numeracy (CK / PCK)	BIO3EE (C)
January-February	EDU9AP-5 weeks of school experience in middle stages (KL / KE)		
6 Spring	EDU9H6-Differences and Identities (KL / KPhil) EDU9RP- Preparation for thesis	EDU9S6-Primary Pedagogy 3-Environmental Science (CK / PCK)	BIO4BD (C)
May	EDU9HS-4 weeks of school experience in upper stages (KL / KE)		
7 Autumn	EDU9P7/T7-10 weeks of school experience (KL / KE)		
8 Spring	EDU9H8-Honours in main teaching subject (PKC)		

### ***Our experiences to date***

Geography as a secondary ITE subject began at Stirling eight years ago. The subject degree itself is in Environmental Geography and mainly focuses on the physical dimensions of Geography, although there are some tailor-made modules that consider human-physical interactions. Further aspects of human Geography are covered by modules run through other departments in the university such as Scottish Society, Politics and Sociology. The primary programme got underway in autumn 2008. There are two cohorts, one MFL and the other The Environment. The specialism in The Environment, as outlined above, draws upon both Biology and Environmental Science / Geography modules, all of which are offered by the same department within the university. Whilst popular opinion and research might suggest that 'Science' would be a useful specialism title for these primary ITE students the use of the term 'The Environment' was adopted instead. This nomenclature tends to avoid the balkanisation that can occur between academic subject departments and which is often seen in secondary schools. This means that students can see the connections between the wider elements of 'Science' and can additionally make links to the planet and human/physical interactions. It also allows the programme to reflect the philosophy behind the current policy drive in Scotland – that of Curriculum for Excellence (Learning & Teaching Scotland, 2009).

In terms of reflecting upon how the concurrent degree might impact upon new teachers' confidence in teaching and learning it is important to consider their views. Students report a balance in terms of their perceptions of the importance between their subject and education modules. Whilst they are officially registered as education students within the university they clearly appreciate the value of studying both a subject and education. They cite the subject modules as both widening and deepening their understanding of environmental issues, through exploration of a range of discourses, which they see as being transferable to the school curriculum. Whilst they suggest that the education modules:

*gives us the confidence and tools in which to facilitate effective learning and teaching.*

The perceived link between both parts of their degrees is highlighted by comments such as:

*In order to teach about the environment we have to have a safe and effective classroom environment and community in place.*

and

*In order to facilitate effective learning about the environment we must have confidence in what we are teaching and sound subject knowledge. It's only when you have this knowledge basis that you can experiment with different teaching strategies and have confidence in doing so. You need to have a passion for the subject and want to enthuse this in learners.*

It is the balance of this subject knowledge with pedagogic skills that we would see as critical to the success of the programmes.

### **Our hopes for the future**

As the Geography programme has embedded and the primary programme starts to develop we are looking to see how links can now be developed across the two sectors. Links between primary and secondary are increasingly important for a variety of reasons and we hope to embed these in our practice. Plans are in place to run a fieldtrip for both the secondary and primary teacher education students that will encourage them to work together and reflect upon the pedagogies of teaching their subject, especially across the transition stages. HMle (2009) have yet again reported the lack of pace and challenge for pupils in S1/2. Just prior to attending the conference a Scotland wide conference for both primary and secondary trainee teachers from four Universities was convened. This conference gave students the opportunities to work on their professional development in three key areas:

- Finding the Curriculum outside the classroom
- Developing Skills for citizenship: looking at climate change
- ICT to support sustainable development

It is hoped that this sort of cross-sector, cross-curricular development event will be indicative of the exciting opportunities afforded by the running of programmes of Initial Teacher Education organised in this manner.

### **References**

- Bowles, R. (2008). Personal communication
- Harlen, W., & Holroyd, C. (1997). Primary teachers' understanding of concepts in science: impact on confidence and teaching. *International Journal of Science Education*, 19, 93-105.
- HMle (2009). *What does excellence look like?* Retrieved from: [www.scilt.stir.ac.uk/services/documents/SCILT%2008-09%20Revised%20Sep.pps](http://www.scilt.stir.ac.uk/services/documents/SCILT%2008-09%20Revised%20Sep.pps) (30<sup>th</sup> January 2009).
- Learning & Teaching Scotland (2009). *Curriculum for Excellence*. Retrieved from: [www.ltscotland.org.uk/curriculumforexcellence/](http://www.ltscotland.org.uk/curriculumforexcellence/) (25<sup>th</sup> January 2009).
- Parker, J. (2004). The synthesis of subject and pedagogy for effective learning and teaching in primary science education. *British Educational Research Journal*, 30, 819-839.
- Parker, J. & Spink, E. (1997). Becoming science teachers: an evaluation of the initial stages of primary teacher training, *Assessment and Evaluation in Higher Education*, 22(1), pp.17-31.
- Shulman, L.S. (1987). Knowledge and teaching: Foundations on the new reform, *Harvard Education Review*, 57(1), pp. 1-22.
- Shulman, L.S. (1999). Knowledge and teaching: Foundations of the new reform. In J. Leach & B. Moon (1999). *Learners & Pedagogy*. Sage: London. Pp 61-77.
- Thurston, A., Christie, D., Howe, C.J., Tolmie, A. & Topping, K.J. (2008). Effects of continuing professional development on group work practices in Scottish primary schools. *Journal of In-Service Education*, 34(3), 263 - 282.
- Touson, T. (2000). The beliefs of preservice elementary teachers towards science and science teaching, *School Science and Mathematics*, 100, pp. 374-379.