

Education for Sustainable Development: An Empirical Study of the Tensions and Challenges Faced by Geography Student Teachers

Graham Corney

University of Oxford, Department of Educational Studies, Oxford, UK

This is a qualitative study of the challenges identified by geography student teachers in their learning to teach about education for sustainable development in English secondary schools. The student teachers were participating in a development and research study in the context of an established initial teacher education programme consisting of contributions from school-based and university partners. Data for a cohort of 19 post-graduate student teachers, from open proformas and follow-up interviews, were analysed to identify what the student teachers themselves saw as the challenges. Three main areas of challenge were identified and are discussed in depth, namely challenges related to the complexity of subject matter, to teaching and learning approaches and strategies, and to differences between student teachers' beliefs about education for sustainable development and the context for their teaching. A conclusion draws on the nature of these challenges to suggest appropriate student teacher learning outcomes and activities for consideration by teacher educators.

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Introduction

The launch of the United Nations Decade of Education for Sustainable Development (DESD, 2005–14) firmly places the spotlight on one of the greatest challenges facing all societies. Indeed, the message of DESD (UNESCO, 2004: 7) is that sustainable development 'is a life-wide and lifelong endeavour which challenges individuals, institutions and societies to view tomorrow as a day that belongs to us all, or it will not belong to anyone'.

While sustainable development is a complex, contested idea as discussed below, it can be argued that its central focus is on the nature of inter-relationships between environment, economy and society, and that these also lie at the heart of geographical education. As such, the inclusion of education for sustainable development (ESD) within initial teacher education courses, particularly in geography, is crucially important if schools and colleges are to help young people understand the need for and ways of developing more sustainable lifestyles.

However, much of the literature on ESD, including the contribution of geography teachers, is based on rhetoric and exhortation, and there is a lack of

empirical, classroom-related studies which would provide evidence for professional development. This paper reports on a development and research project carried out as a first step in extending ESD inclusion in an existing geography teacher education course, and in so doing, providing empirical evidence to contribute to on-going debates about ESD in the school curriculum. The project was carried out in the context of the English secondary school curriculum (11–18 age range) and was supported by the Teacher Training Agency (the regulatory body for teacher training in England).

The paper focuses on the key research question: What do geography student teachers identify as the main challenges and tensions in learning to develop ESD in secondary schools? It begins by summarising the conceptual background and methodology of the study and the course activities initiated, then presents and discusses the main findings, and concludes with suggestions for course development and linked research.

Conceptual Background

The conceptual background draws primarily on literature in ESD and geography education, with a shorter consideration of context in terms of the nature of initial teacher education.

While the definition of sustainable development in the Brundlandt Commission Report (WCED, 1987: 43), that 'sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs', has been widely accepted by policy makers and educationalists, it is open to differing and contested interpretations (Rauch, 2002; Scott & Gough, 2003). This is perhaps inevitable given that it brings together two potentially conflicting aims, sustaining/conserving and development (Bonnett, 1999), and its wide currency. Thus the heart of the debate appears to be between those who view economic priorities and outcomes as dominant compared with those who adopt a broader interpretation (Summers *et al.*, 2004), exemplified, for example, in Sauve's (1996) typology of conceptions of sustainable development. In this typology, two conceptions reflect predominantly economic views of development and environment (namely 'continuous development owing to technological innovation and free trade' and 'development as dependent on a world order and production modes') and two reflect more community based and cultural perspectives ('alternative development' and 'autonomous development (or indigenous development)').

However, two trends in the literature are significant, and need to be taken into account in developing ESD in schools and initial teacher education. The first is the growing consensus that any definition of sustainable development needs to centre on inter-relationships between environmental, economic and social factors. Gough (2002: 65), for example, argues that 'we cannot hope to separate our understanding of the environment from our social and economic interactions with it' while Luke (2001) writes about needing to abolish what he sees as an artificial distinction between the environment on the one hand and economy/ society/ community on the other. In the field of geography education, this 'people-environment' or 'human-environment' inter-relationship is frequently recognised as the crux of the subject (see e.g. Geographical Association,

1999; IGU, 2005; Naish *et al.*, 1987). However, in the framework of this inter-relationship and particularly related to teaching and learning about sustainability, some geography educationalists (e.g. Huckle & Sterling, 1996; Morgan, 2000) have argued for greater consideration of social and political perspectives.

The second trend in the literature on sustainable development is support for differing interpretations rather than seeking a consensus in terms of both the concept and process of sustainable development. Thus Sauve (2002: 2) writes of 'diverse and complementary ways of relating to the environment', while Scott and Oulton (1999: 94) point to 'a multiplicity of approaches . . . selected to meet clearly identified goals suited to the social, cultural, political and philosophical contexts in which education takes place'. However, while these two trends are to be welcomed by many researchers in the field, it is argued that they may present challenges for student teachers, related to the complexity of subject matter for ESD and in turn to the need for individual understanding and interpretation of this subject matter for teaching.

Combining education with sustainable development adds to the complexities of definitions and interpretations, in that consideration of differing ideologies of education is fundamentally important. In relation to the field of the investigation reported here, educational ideologies have been related to geography education (e.g. Slater, 1992), environmental education (e.g. Fien, 1993), and sustainable education (e.g. Sterling, 2001). Most recently, Sterling (2001: 57) has developed the idea of a continuum based on 'the varieties of response by educational thinking and practice to the challenge of sustainability', reflecting 'progressive responses from accommodation through reformation to transformation'. Thus he identifies education about sustainability, described as first order learning, education for sustainability, or second order learning, and education as sustainability, or third order learning. These responses can be carried out in a transmissive or transformative manner, the former advocating positive values and behaviour promoting sustainable development and the latter focusing on more open-ended enquiries leading to learners' own interpretations and responses (Nikel, 2004). In a similar way, Jickling (1992: 8) in his arrestingly entitled article 'Why I don't want my children educated for sustainable development' argues that educating pupils for sustainable development raises questions about whether 'education should aim to advance a particular end such as sustainable development' or 'to make people behave in a certain way', compared with enabling 'students to debate, evaluate and judge for themselves the relative merits of contesting positions'. The latter approach appears to have much in common with the notion of action competence emphasised in, for example, much of the Danish literature (Jensen & Schnack, 1997; Jensen *et al.* (2000).

These broad approaches to teaching about sustainable development issues have much in common with the literature on controversial issues. Guidance and research about various teacher roles and teaching approaches for handling controversial issues with school students has been published over the years (e.g. Kelly, 1986; QCA, 2000; Stradling *et al.*, 1984). Possible teacher roles include that of a balanced approach, giving learners access to a range of perspectives and viewpoints and encouraging them to make up their own minds about an issue. While such an approach appears to have much in common with the final phase

of the geographical enquiry process and the notion of action competence, it may conflict with a more committed teacher role in which a teacher's aims are to encourage action related to changing learners' behaviour to becoming more sustainable.

Recent research by Oulton *et al.* (2004), in the context of citizenship education which in England can include ESD, suggests that many teachers are under-prepared and feel constrained in their ability to handle these issues, and Morgan (2002), writing about citizenship and geography education, identifies consideration of the teacher's role as needing further development and investigation. This evidence not only reinforces the complexity of teaching about value-laden subject matter, but it also has implications for the nature of teacher education in terms of the contribution which might be anticipated from experienced teachers, as discussed in the next section.

In contrast to these divergent and contested broad approaches to teaching, the literature on specific pedagogy for ESD is less divergent and contested than that on subject matter and broad approaches to teaching. Largely exhortational, it advocates more learner-centred and interactive teaching strategies, demonstrating, though rarely explicitly, constructivist approaches to teaching and learning (e.g. Bennett & Dunne, 1995). Typically, these centre on investigations and enquiries into differing viewpoints and value positions on sustainability issues, embracing discussion and debate, experiential and fieldwork activities, and investigation of futures scenarios, all of which are aimed at developing a range of skills and enabling learners to develop, express and justify their own views (Hicks, 2002; Huckle, 2003; Jensen *et al.*, 2000; UNESCO, 2004). Such approaches and strategies are described in many geography education articles and texts (e.g. GA, 1999; IGU, 2005; Naish *et al.*, 2002; Reid, 2000; Roberts, 2003; Smith, 2005) and are familiar to geography teachers.

However, in my experience (and as noted by Lambert & Balderstone, 2000), carrying out these strategies is technically demanding for student teachers and this may present challenges for them in teaching about sustainability issues.

The final area of the conceptual background, the nature of initial teacher education, is now briefly considered. In England, although there is an increasing diversity of routes into the teaching profession, the most common route for training to teach geography in secondary schools remains the one-year post-graduate (PGCE) course (see King, 2004, and for approaches in several countries, Kent, 2004). Such courses are based on a partnership between schools and a higher education institution (HEI), although individual partnership arrangements and consequently the contribution of the partners varies considerably.

The PGCE course taken by the student teachers in this study is a well-established collaborative partnership between schools, Oxford University and the local education authority (Furlong *et al.*, 2000). Furthermore, it was conceptualised on the understanding that HEI and school-based teacher educators contribute distinctive types of knowledge which student teachers draw on as they develop their own understanding and classroom practice (McIntyre, 1988, 1990). Thus HEI tutors tend to contribute 'academic' or 'propositional' knowledge, which is largely decontextualised because of their role working with many schools and their greater opportunities for reading and carrying out research. In comparison,

school-based teacher educators contribute 'professional craft knowledge', the complex, multi-dimensional knowledge demonstrated in the everyday practice of teachers and which reflects their position, drawing on the practicalities of teaching and learning in a particular school (Hagger, 1997). Furthermore, it was conceptualised that student teachers draw on their preconceptions and developing beliefs about teaching, and through reflecting on their experiences, actively construct their own professional knowledge and understanding (Grossman, 1990; Putnam & Borko, 1997).

Thus the conceptualisation of the PGCE Course taken by the student teachers in this study may present a further, different kind of challenge to student teachers in addition to the specific challenges related to the subject matter and pedagogy of ESD.

Methodology

Course development

As this was a development and research project based on collaboration between university and school teacher educators, a group of two lecturers and four mentors was established to initiate and subsequently evaluate activities. At the outset, it was envisaged that the work would focus on developments with these four mentors ('pilot' mentors) and their paired student teachers in four schools. However, interest from other mentors and student teachers resulted in the involvement of the whole year group of 15 mentors from 15 schools working with 22 student teachers. Such involvement reflected more appropriately an agreed ethical principle that work should be integrated into normal course practice as far as possible.

The following activities were initiated for student teachers:

(1) Term 1

- a university session consisting of discussion of pre-assigned reading of sources reflecting different interpretations of SD and ESD; small group lesson planning focused on sustainability issues in the local area; and setting up a school-based activity;
- a school-based activity consisting of discussion with mentors about their personal, departmental and school policies and practice for ESD;
- a university session debriefing school discussions, and then evaluating approaches for teaching sustainability issues globally and locally, including activities on Fair Trade issues, the concept of ecological footprints, and alternative futures scenarios;
- a further university session investigating the teaching of controversial issues.

(2) Term 2

- in school: teaching, evaluating and reflecting on a short sequence of lessons within the geography curriculum focusing on sustainable development; an additional outcome of this was a written assignment;
- university-based evaluation and discussions.

(3) Term 3

- further teaching experience;
- university-based presentations and discussions involving all student teachers, mentors and lecturers.

Data collection and analysis

Data collection in the study focused on two areas, the challenges and tensions student teachers specified in learning to teach about sustainable development, and their learning related especially to aspects of subject matter and pedagogy (reported elsewhere). The following techniques were employed:

- (1) At the start of the course: all student teachers recorded in an open proforma their preconceptions about secondary school ESD teaching.
- (2) During the course: details of university sessions were noted; and in school, a sample of first term general discussions and second term post-lesson debriefings between 'pilot' mentors and their student teachers were tape-recorded and transcribed.
- (3) At the end of the course: all student teachers recorded in a second open-proforma examples of their learning and its attributed sources, and described the challenges and tensions they had faced in learning to teach about sustainable development. Interviews were held with seven student teachers who responded to an invitation to be interviewed about their written responses.

Data for a cohort of 19 student teachers who completed the start and end of course proforma were analysed through inductive categorising (see Coffrey & Atkinson, 1996) and this led to identification of the challenges student teachers specified in the end of course proforma and interviews. Each written response was read and the challenges specified were added to a summary sheet. Categories for coding the examples were then generated, and through splitting and splicing categories (Dey, 1993), three broad areas of challenge sub-divided into nine closely related categories were created (see Table 1 and the account which follows).

Results: Challenges and Tensions in Learning to Teach about Sustainable Development

The areas and categories of challenges identified from the student teachers' examples are described with extracts from written responses, supplemented by relevant interview data. The first area consists of challenges related to the complexity of subject matter (created from 11 examples), the second related to teaching and learning approaches and strategies (23 examples), and the third related to differences between student teachers' beliefs about ESD and the context for teaching (20 examples).

Related to the Complexity of Subject Matter

Challenges related to the complexity of subject matter consist of two inter-related categories (see Table 1).

Table 1 Challenges and tensions identified by student teachers in learning to teach about SD

<i>Tension and Challenges</i>	
A. RELATED TO THE COMPLEXITY OF SD SUBJECT MATTER	11
A1. Understanding complex subject matter	2
A2. Recognising these complexities in thinking about teaching	9
B. RELATED TO TEACHING AND LEARNING APPROACHES/ STRATEGIES	23
B1. Choosing an approach for teaching about sustainable development	11
B2. Managing student discussion	3
B3. Managing student reactions	5
B4. Going beyond the classroom	4
C. RELATED TO DIFFERENCES BETWEEN STUDENT TEACHERS' BELIEFS ABOUT ESD AND THE CONTEXT FOR TEACHING	20
C1. About the nature of current Geography schemes of work	9
C2. About experienced teachers' attitudes/ beliefs	7
C3. About introducing strong/ radical approaches to ESD	4

Numbers are the total of examples categorised from student teacher proforma responses

Understanding complex subject matter

This category reflects two responses. Respondent 14 wrote that 'There is no simple solution to the world's problems, and that's what makes SD so complex', elaborating that 'it often involves conflict and strong viewpoints'. Respondent 5 noted that 'the complexity of issues and their inter-connectedness makes it very difficult to define SD', explaining in interview that:

I've spent a lot of time reading about sustainable development . . . starting to draw on different resources, visual and theoretical . . . once you're aware of it, everywhere you go there seems to be another opportunity to learn something about it.

Recognising these complexities in thinking about teaching

This category reflects nine examples, illustrated by the sample data extracts which follow. Respondent 9 noted that 'SD is such a contested idea that it's hard to have a clear notion of how to teach it', while respondent 1 stated the challenge in terms of 'bridging the gap between my ideological conceptions of sustainable development and the practicalities of conveying it to young people'. Drawing on experience of teaching about the future of Antarctica, this student teacher explained in interview:

I've got a lot of ideas about SD . . . (It's) very complex, all these contradictions and values . . . But I don't have a vision of how the world should be made more sustainable . . . And so, introducing all this complexity can be uncomfortable. I find it uncomfortable and disorientating.

Respondents 16 and 4 noted that concepts contributing to the process of sustainable development were 'abstract' or 'remote' and difficult for students to relate to their own experience. Respondent 7 referred explicitly to some difficult concepts and 'terminology', noting that 'equity, development, sustainable, welfare, distribution, generation are difficult terms for people even with good literacy to fully understand'.

Thus student teachers in this research identify two challenges in their learning to teach about sustainable development which relate to subject matter. The first is expressed by student teachers in this research in terms of understanding the complexity of sustainable development issues, the nature and inter-connectedness of its sub-concepts, and its value laden nature reflected in contested meanings and differing aims. These are similar in nature to features of subject matter described in the literature (e.g. Scott & Gough, 2003; Scott & Oulton, 1999) and noted in the conceptual background. The second is student teacher recognition that the complexity of subject matter to do with sustainable development, including its associated concepts, presents challenges when thinking about how to teach this area in secondary schools.

Related to Teaching and Learning Approaches and Strategies

Challenges related to teaching and learning approaches consist of four closely related categories (see Table 1).

Choosing an approach for teaching about sustainable development

Three distinct but inter-related sets of challenges were identified from the data, and all can be related to aspects of teaching about controversial issues more generally in the literature.

The first, consisting of three examples, relates to 'deciding what stance to take on ESD – how radical to be' (respondent 10). Respondent 8, referring to teaching about ecotourism in Kenya, saw the challenge as 'deciding what you're expectations are about changing pupils' lifestyles', adding 'Do you say that water skiing on Mombasa beach is inappropriate and you shouldn't take part in this?'. Respondent 17, also questioning 'How radical can you be professionally?' acknowledged the professional implications of taking a particular stance, noting that 'you can get into political hot water – teachers have to be careful in supporting certain viewpoints'.

The challenge for student teachers here illustrates discussion in the literature referred to in the conceptual framework (e.g. Sterling, 2001), and reflects Oulton *et al.*'s (2004: 491) observation that 'the extent to which teachers should or should not actively encourage students to adopt certain values seems open to debate'.

The second area of challenge, consisting of 6 examples, reflects the view of student teachers who, having chosen an approach encouraging students to make their own informed decisions, faced a further dilemma in the extent to which they felt able to express their own views about sustainable development issues. Respondent 7 saw this as 'how to give your own opinion but not bias student thinking and responses', while respondent 9 saw it as 'trying not to impose your view or any view on students (but) encouraging critical thinking'. This latter example was expressed in a rather similar way by respondent 18, who

was concerned with 'helping students recognise that their own viewpoint and possible future actions are valid rather than there being a correct answer'. The challenge was taken a stage further by respondent 10 who recognised that this dilemma existed 'particularly when your own views might be quite strong'.

The third area of challenge reflects examples quoted by two student teachers who had chosen to promote sustainable development through advocating positive values and behaviour, along the lines of Sterling's (2001) transformative view of education. These examples relate to the challenge of what can be described as professional credibility. Respondent 6 was concerned about 'being hypocritical in teaching' in that 'our teaching and lifestyles may not be compatible'. Similarly, respondent 5, stating the challenge as centred on 'the morality of teaching how to live' explained in interview:

I believe . . . (through) the way you live your life, you are actively showing what you think. If you drive everywhere and don't actually live some of the ethics that you're talking about, then it means nothing . . . it doesn't make sense to the pupils if you . . . say: 'Yes, ecotourism is a really good idea' when you've just come back from a Spanish package tour . . . I don't think you can teach about it with any credibility and expect pupils to grasp why it's important if you're not demonstrating it.

The fact that almost half of the challenges related to teaching and learning approaches/strategies refers to this category (choosing an approach for teaching about sustainable development, see Table 1) provides empirical evidence about the nature of this challenge for student teachers. As with aspects of subject matter, the student teachers in this study are identifying broad approaches to ESD and the teaching of controversial issues which are present in the literature, and they are finding them challenging to put into practice.

Managing student discussion

The three examples in this category centred on different aspects of managing discussion with students. Respondent 14 found it challenging 'to facilitate discussion in a way that makes everybody feel their opinion is valid', and explained in interview:

Parts of geography are less controversial . . . for example, coastal processes . . . explaining how longshore drift works . . . I don't think you're going to debate whether it does or doesn't happen like that, so you don't need to be able to facilitate discussion, you need other skills . . . But . . . the management side of coastal geography can become hugely contested . . . that's where my interest lies, in sustainable issues . . . in getting pupils to think, debate and justify their views based on (what) they've learned, so they can develop their ideas.

Respondent 5 focused on learning how to manage discussion towards the end of a lesson or lesson sequence on a particular issue ie debriefing (see Leat & Kinniment, 2000):

debrief is crucial when you're doing things that are about people's opinions . . . You're rapidly trying to get through . . . global warming or

something else, and then also debrief at the end . . . to allow pupils time to do an activity and then really think about it and debate with each other (about) why things are happening . . . and to think 'What does that mean? What did I learn out of that?'

Respondent 18 saw it as challenging if students had not been prepared for analysis of multiple perspectives (Oulton *et al.*, 2004), and for discussion and expressing their own viewpoints, noting that: 'SD is complex – a challenge when pupils don't have the background knowledge to tackle issues and have had little practice in analysing issues from different angles'.

These examples draw attention to technicalities of managing discussion, the specific demands of managing debriefing, and the need for progression in building student understanding of issues and developing skills over time, again providing valuable empirical evidence of challenges in learning to teach for course planners.

Managing student reactions

This challenge, reflecting five examples, encapsulates two distinct emphases.

The first, related to ESD subject matter, reflects two clearly written responses. Thus respondent 13 observed that 'students don't see the relevance of some global issues to their lives and lose interest', while respondent 15 found it a challenge 'helping students see the relevance of some global issues to their lives'.

The second emphasis concerns the challenge of overcoming student feelings of powerlessness and pessimism about the future. Respondent 18 stated this as 'helping students appreciate that their proposed actions are valid, and encouraging optimism about the future', and respondent 1 described in interview:

. . . the potential for leaving young people feeling quite negative that (environmental) problems are too big and there's nothing they can do . . . I'd rather they felt they could do something positive . . . I don't think it's easy to make decisions about cleaning up our lifestyles and making any part of our lives sustainable. You have to make choices, you have to get rid of certain things that you like . . . They may not want to do that, it's uncomfortable.

Both emphases reflect features of teaching about environmental and sustainability issues in the literature, for which studying global issues in the context of local issues and the local community are frequently suggested (e.g. Job *et al.*, 1999). Despite this, however, it seems likely that the 'uncomfortable' feelings expressed by respondent 1 may well be a feature of ESD, and the most helpful approach for students lies in encouraging optimism, as noted by respondent 18, in adopting similar arguments to that of NGOs such as OXFAM and WWF, and other agencies. In addition, the challenges and suggested approaches have similarities with those in the following category.

Going beyond the classroom

This final category to do with teaching approaches and strategies reflects four responses which also show differing stances related to a continuum from promoting sustainable behaviour to developing skills for action competence.

For respondent 4, 'it was difficult to get pupils to realise that what they do has an impact and they can make a difference'. Explaining in interview about lessons with 15 year old students on 'what we could do to make the school environment better', this respondent had observed that 'through this work, students seemed to think "Well I can make a difference if I do something at the local scale"'. However, the real challenge was in 'getting students to be enthusiastic and passionate about it if it's something they think they can't do anything about . . . when you say to pupils "Well you should try and walk . . . more often to save fossil fuels", it's not just them you're trying to influence, it's their parents as well.'

Respondent 9 similarly saw it as 'hard work . . . to take it a step further' and encourage students to 'take action', while for respondent 15, it was challenging to find appropriate 'local issues which students (could) engage in'.

Respondent 6 saw the challenge as being 'how can we encourage (students) into acting to bring about change?', and, in interview, gave a vision of how this might be approached:

Students care about issues . . . so once they've learned about the issues (they need) the chance to respond. And instead of doing it as individuals, which we found wasn't very effective in that we all wrote individual letters to the head of the local recycling unit and an MP, and we got nothing back . . . is the idea I had about a conference. It's a way of bringing schools together and saying 'This is what we've been studying, this is what we've found out, this is a possible solution', and then log into change . . . but as one voice. It would . . . make (students) realise that . . . there is some purpose to our studying the world . . . and how to safeguard its future. And also the whole political process . . . how does democracy work? How do you lobby an MP? How do you bring about change? . . . I think if you teach students how to do it, you give them the tools, the confidence so they can do something.

Once again, the examples referred to in this category reflect features of ESD in the literature which also are challenging to put into practice. Thus the idea of taking action, relates to the later stages of geographical enquiry (Naish *et al.*, 2002), developing skills such as decision-making, personal judgement, and personal response. This last example demonstrates empirically characteristics of action competence (Jensen & Schnack, 1997: 173–4), and in some ways mirrors the questions they pose: 'How far can, will and dare we go with regard to actions which are integrated within teaching? We will let these questions remain open, but are inclined to say we should dare a lot, as long as objectives are of an educational nature!'. This category of challenges shows student teachers in this study grappling with these very questions.

Related to Differences Between Student Teachers' Beliefs about ESD and the Context for Teaching

This third set of challenges consists of three closely related categories to do with the context in which student teachers were teaching (see Table 1).

About the nature of current geography schemes of work

Three areas of challenge were identified in this category, based on nine

examples. These challenges arose when student teachers tried to extend the teaching of sustainable development through the existing schemes of work in the schools in which they were placed.

Thus, lack of time was perceived as challenging by respondent 12, who referred to 'rigid schemes of work', and respondent 15, who noted that 'National Curriculum and exam syllabuses don't allow much time' and require more 'radical educational thinking'. In addition, respondent 19 specifically saw the challenge in terms of 'finding time for students to be involved in ESD issues personally'.

The nature of existing syllabuses was referred to by respondent 2, who saw these as 'very content driven compared with a much more skills based (approach)', the same challenge referred to by respondent 18, who compared 'traditional geography taught in schools and encouraged by existing resources and the National Curriculum' with 'more emphasis on enquiry approaches and using case/local studies'. Furthermore, respondent 11 observed that there was a lack of 'scope to do local action projects'.

Difficulties in integrating ESD throughout the geography curriculum were noted by three respondents, one of whom (respondent 4) commented in interview that:

although certain topics lend themselves to integrating sustainable development, ideally it should be integrated across the geography curriculum . . . so that . . . it seems like an everyday part and . . . gets (pupils) used to the concept from year 7, so that by the time they get to year 11, they think it's completely normal . . . just like (the way in which teachers) try to spread ICT through the curriculum.

These three areas of challenge for student teachers working primarily in geography departments can be related to the whole-school findings of the OFSTED (2003) report in England based on visits to 26 schools identified as exemplifying good practice in the promotion of ESD. The report noted that the profile of ESD was raised in a school when ESD became integrated into the curriculum, especially through reviewing and revising schemes of work. Thus, it is suggested, challenges arose for the student teachers in this study when the ESD profile in the school in which they were working was less developed than they would have wished and they were acting, in effect, as change agents.

About experienced teachers' attitudes/beliefs

Three closely related areas of challenge, based on seven examples, were identified in this category. As with the previous category, these challenges arose when student teachers wanted to extend the teaching of sustainable development in their schools and found constraints related to experienced teachers' professional beliefs.

Related to ESD content, some teachers believed that 'sustainable development is too difficult to grasp, especially by (younger) pupils' (respondent 19), and some felt that 'topics like global warming are taught in science and so don't need teaching in geography' (respondent 13).

Related to teaching and learning approaches, some teachers were 'uncomfortable teaching about controversial issues, especially to lower ability classes' (respondent 13), a similar point to some who were reluctant to engage in discus-

sion, debates and role plays (respondent 4), and some were reluctant to develop investigative work outside the classroom related to local issues (respondents 12).

Related to curriculum change, the lack of 'a critical mass' of teachers in a department who wished to extend the teaching of ESD was noted by respondent 2, and this idea was reiterated in the challenge for respondent 5 who observed that 'no-one was willing' to re-write schemes of work to integrate ESD so 'it slipped off the agenda'.

These challenges have content similarity with some of those in the previous category, but what distinguishes these is experienced teachers' professional beliefs about ESD. Much of the rapidly expanding teacher thinking research, concerned with establishing teachers' professional knowledge base, draws attention to the significance of individual teachers' professional beliefs for their practice (e.g. Banks *et al.*, 1999; Calderhead, 1996; Husbands *et al.*, 2003). The challenges reported by student teachers in this category highlight differing beliefs about the practice of ESD in secondary schools between student teachers and some of the experienced teachers they worked with. The area of these challenges relates to some of the key features of ESD discussed in the literature and drawn on in the conceptual framework.

In addition, it is suggested that challenges in both this and the previous category also relate to the differing contexts and discourses of school-based and HEI based contributions to student teacher learning. To some extent, this reflects the conceptualisation of the PGCE Course (McIntyre, 1988, 1990). However, specifically related to learning about ESD, it can be argued that the challenges stated by student teachers in developing their own professional knowledge and understanding (Putnam & Borke, 1997) reflect interplay between the considerable propositional, philosophical literature in the field and the more recently developing professional knowledge and practice related to ESD development in a particular school.

About introducing strong/radical approaches to ESD

Identification of this category takes the difference in professional beliefs between some of the student teachers and some of their experienced colleagues a stage further in that it reflects four responses which demonstrate challenges related to the context of teaching for student teachers with progressive, transformative orientations towards ESD (Sterling, 2001).

Respondent 7 spoke of the challenge in relation to several teachers worked with during the PGCE year. Thus they 'are reluctant to move into stronger interpretations of ESD – education for sustainability', yet this orientation was 'an excellent idea' although 'there were tensions in terms of how you do that'.

Two respondents saw the challenge at the school level. Respondent 12 saw it specifically as 'convincing the head teacher about getting solar panels for the school', while respondent 6 saw it more generally as 'teaching about sustainable environments in a school which is not sustainable'. This respondent in interview posed the question: 'How can you change the world unless you change the school first?', and referred to the practical difficulties pupils had faced when they suggested changes to the school's use of resources, especially photocopying.

Finally, respondent 1 expressed the challenge at the level of the educational system. Thus 'trying to introduce radical ideas within the context of an educational system which is geared towards reproducing the norms of society rather than challenging them' was the crux. It concerned 'the tensions between whether you go along with how the school is conditioning people – to carry on with the way society is – or whether you're going to incite students to challenge that', and currently, 'I think it's easier to do the first one'. This was seen to be 'an ideological problem, but also an emotional and practical problem'.

Conclusions and Implications

Having participated in an innovative sequence of activities designed to promote their understanding and practice in developing ESD in secondary schools, the geography student teachers in this study identified tensions and challenges for their understanding and practice. These were grouped into three main areas – challenges related to the complexity of subject matter, to teaching and learning approaches and strategies, and to differences between student teachers' beliefs about ESD and the context for their teaching.

Given the challenges stated, it is suggested that inclusion of ESD within geography initial teacher education courses, particularly for intending secondary school teachers, should be designed to promote in student teachers:

- understanding of the complex nature of sustainable development as subject matter for ESD, as developed in different sources reflecting different perspectives, and including consideration of social and political issues together with economic and environmental;
- appreciation of differing interpretations of the aims and purpose of ESD, particularly relating to differing educational ideologies and the implications for student learning related especially to the concepts of action competence and behaviour change;
- understanding and developing competence in approaches to teaching about controversial issues, including differing teacher roles (neutrality, balance, commitment) and stances related to their personal beliefs about sustainability issues;
- understanding and developing competence in strategies for active student participation in the learning process, particularly discussion, debate, and role play based on differing perspectives and value positions related to sustainability issues;
- understanding and developing competence in selecting local issues and case studies and in carrying out investigations in the local community which make sustainability issues interesting and relevant to students' lives and experiences, and which promote in students the skills of action competence related to sustainability;
- skills of reflection about differing philosophies and practices related to ESD so that they both develop and can reason about their own professional understanding, beliefs and practices and can rationalise and discuss these with colleagues.

It is suggested that to achieve these student teacher learning outcomes, a

progressive, closely integrated and coherent programme of school and HEI activities should be developed, taking into account the specific nature of the potential contributions of school-based and HEI-based teacher educators. In addition, further development and research is needed into how provision can be made in the already tightly packed ITE curriculum and what the outcomes and the challenges are in terms of student teacher learning and practice related to types of provision. Such development and research should provide empirical evidence to contribute to the development of ESD in initial teacher education and to inform wider discourse on the nature of ESD in the school curriculum.

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Correspondence

Any correspondence should be directed to Graham Corney, University of Oxford, Dept of Educational Studies, 15 Norham Gardens, Oxford OX2 6PY, UK (graham.corney@edstud.ox.ac.uk).

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