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The development of knowledge for teaching physical education in secondary schools over the course of a PGCE year

Abstract

There has been a considerable amount of work on what knowledge student teachers need to develop to become effective teachers. The purpose of this study was to look at the development of knowledge of student physical education teachers in England. Six secondary student physical education teachers completed a journal on a monthly basis throughout their one year course. The student teachers and their mentors were interviewed in school towards the end of their course in June. Responses were analysed inductively. Results showed that knowledge important to develop, knowledge developed and knowledge which still needs to be developed at the end of the course was all related to content knowledge and pedagogical knowledge which they could apply in the immediate practical teaching situation. The results are discussed in relation to the development of student physical education teachers knowledge for teaching.

Key words: knowledge for teaching; student physical education teachers

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Introduction

What knowledge do teachers need to develop to become effective teachers?

There are many different ways of conceptualising knowledge for teaching. In a review of knowledge bases underpinning teacher education in England at different times Hoyle and John (1995) highlighted underpinning knowledge based on the theories of Rousseau and Dewey being replaced by generic knowledge from the social science disciplines of history, philosophy, psychology and sociology of education, translated into useable classroom activities in 'curriculum packages'. In turn, these have been replaced by a number of other conceptualisations of knowledge for teaching. The action research approach in which specific knowledge develops from 'systematic reflection on one's classroom experience, to understand it and to create meaning out of that understanding' (Hopkins, 2002: 5) built on the ideas of Lewin (1946) and Stenhouse (1975). This is related to the development of what Schon (1983) called the reflective practitioner. Schon (1983) suggested that the capacity to reflect on action so as to engage in a process of continuous learning is one of the defining characteristics of professional practice. Other conceptualisations of knowledge include that by Elbaz (1983), who categorised teachers' practical knowledge into: knowledge of self; knowledge of the milieu of teaching; knowledge of the subject matter; knowledge of the curriculum; and knowledge of instruction. For Leinhardt and Smith (1985), teacher knowledge comprised subject matter knowledge and knowledge of lesson structure.

Shulman (1986; 1987) identified seven knowledge bases which form what he regarded as the minimum knowledge for teaching. These knowledge bases are: *Content knowledge* (called subject matter knowledge by other researchers, for example Calderhead and Shorrock, 1997; Grossman et. al., 1989; McDiarmid et. al., 1989). It includes what Schwab (1964) called substantive (knowing which are the important concepts and skills in the subject) and syntactic (knowing how the concepts and skills are structured and organised within the subject) structures of knowledge. *General pedagogical knowledge*: the broad principles and strategies of classroom management and organisation that apply irrespective of the subject. *Curriculum knowledge*: the materials and programmes that serve as 'tools of the trade' for teachers. *Pedagogical content knowledge*: the knowledge that is the basis for the selection, organisation and presentation of the content teachers want their pupils to acquire; i.e. the integration of content and pedagogy for teaching; that which makes the content instructional. Grossman (1990) identified four components of pedagogical content knowledge: knowledge and beliefs about the purposes of teaching a subject at different grade levels; knowledge of pupils' understanding, conceptions and misconceptions of subject matter; knowledge of curriculum materials available for teaching a subject and knowledge of horizontal and vertical curricula for the subject; knowledge of instructional strategies and representations for teaching particular topics. *Knowledge of learners and their characteristics*: both knowledge of learners of a particular age range

(empirical or social knowledge) and cognitive knowledge of learners, comprising knowledge of child development and knowledge of a particular group of learners. *Knowledge of educational contexts*: including a specific school, catchment area and the wider community. *Knowledge of educational ends, purposes, values and philosophical and historical influences*: both short and long-term goals of education and of a subject. This framework is commonly used in research about knowledge for teaching in general and in physical education in particular, with many studies focusing on pedagogical content knowledge (for example Fernandez-Balboa et. al., 1996; Graber, 1995; Griffin et. al., 1996; Newton and Newton, 2001; Rovegno, 1992; Twiselton, 2000; see also a review by Amade-Escot, 2000).

Initial teacher education in England at present is founded on a competency-based conceptualisation of knowledge. There are three standards (Training and Development Agency for Schools (TDA, 2007, see www.tda.gov.uk)) which are the minimum legal requirement of what student teachers must demonstrate they know, understand and are able to do to qualify as a teacher. These are: professional attributes; professional knowledge and understanding; and professional skills. Within these three standards there are 33 individual standards. These generic standards are applicable to student teachers learning to teach different age levels and different subjects.

Purpose

The purpose of this study was to extend previous work to look at what knowledge student physical education teachers and mentors perceive is important for student physical education teachers to develop, what knowledge student physical education teachers actually develop and what knowledge they perceive they still need to develop at the end of their course. This paper is from a larger study funded by a small research grant from the Teacher Training Agency (now the Training and Development Agency for Schools) for England.

Methods

Participants

Six secondary student physical education teachers who completed a one-year post-graduate Certificate in Education (PGCE) course in one of three Universities in England during the 2004/05 academic year were asked to complete a journal on a monthly basis (starting in October and finishing in June) throughout the course of the year; total nine entries. They were also interviewed in school towards the end of their course in June. Their school-based mentor was also interviewed in June.

The course

All three courses focused on learning to teach physical education to secondary aged pupils (age range 11-18 years). Each course was 36 weeks in length, with 24 weeks spent in school and 12 weeks in the university. Although the

pattern of university-based work and school placement over the course of the year was different, on all three courses student teachers spent time in two different schools.

Each course was organised in partnership with different types of schools, including high schools, comprehensive schools, specialist sports colleges and independent schools, all of whom delivered the National Curriculum for Physical Education (NCPE).

On each of the three courses student physical education teachers were assessed against the standards to qualify as a teacher in England.

Instruments

The journals were designed to identify what knowledge was important for student teachers to develop, what knowledge they actually developed and what knowledge they perceive they still need to develop at the end of the course. For each journal entry student teachers were given some broad areas for discussion, but were also encouraged to write anything else they felt appropriate. They were asked to identify specific examples of work to illustrate points they raised.

The purpose of the interviews with student teachers and with school-based mentors was to find out more about each of these specific areas of focus.

Procedures

Data was gathered over one year, with student teachers recording in their journal on nine occasions throughout the year. They were interviewed in their second placement school towards the end of the course. School-based mentors were interviewed once, during the same visit to each school at which the student teacher was interviewed. All interviews were undertaken by the same researcher who was not known to any of the interviewees (student teachers or mentors).

Ethical Issues

There are issues with university tutors engaging in research with the student teachers on their courses. These concerns include: tutors researching the very students who will be graded by them; pressures on student teachers' time; the power differential between the researcher and his/her student teachers; and the ways in which student teachers' rights to withdraw at any point can be made real in the context of their position on the course.

The researchers followed the BERA (2004) guidelines on ethics, which include the following steps to address the specific issues of conducting research with student teachers: participants were fully informed about the nature and consequences of the research in which they were involved and agreed voluntarily to participate by signing a consent form; participants' voluntary informed consent was secured before research started, thereby avoiding deception; all participants were given the right to withdraw from the research for any or no reason, and at any time and they were informed of this right; it was made clear to participant that the treatment of any data provided was confidential and anonymous and participants would not be able to be identified in any way in any research output (names of participants have been changed); interviews were carried out by an experienced research assistant whom the respondents did not know and who could not have any influence on the student teachers in terms of their success or otherwise on their course.

Data analysis

Data analysis is not an easy process because it, 'is not a mechanical or technical process; it is a process of inductive reasoning, thinking and theorising' (Taylor and Bogdan, 1998: 138). Journal entries were analysed inductively to provide evidence in relation to the specific purposes of the study. Interview data was transcribed word for word and then analysed inductively. Thus, the researchers read and re-read the data. Once familiar with the data, content analysis began. Emerging themes from the data were highlighted and once common themes were identified, data was categorised according to the themes created.

The results reported in this paper focus on two themes that arose from this analysis: what knowledge student physical education teachers and school-based mentors perceive is important for student physical education teachers to develop and what knowledge student physical education teachers actually develop and what knowledge they perceive they still need to develop at the end of the PGCE course.

In the results reference is made in brackets, where appropriate, to the source of student teacher data; either the month of an entry in the journal or from the interview.

Results

What knowledge is important for student teachers to develop?

Student teachers and mentors identified a similar range of knowledge as important for student teachers to develop. This focused on knowledge that was directly related to work in schools. This included what was referred to as either content knowledge or subject knowledge: both knowledge of material taught in school, including practical activities (athletics; dance; games; gymnastics; outdoor and adventurous activities; swimming), particularly activities in which student teachers had less background knowledge and experience or which they had less opportunity to teach in school;

and theory material to teach General Certificate of Secondary Education (GCSE) and Advanced (A) level examination classes (examinations taken by pupils in England at ages 16 and 18 years). It also included pedagogical knowledge such as teaching strategies.

The importance of developing subject knowledge was identified by student teachers and mentors, in some instances with explanations as to why this knowledge is important. For example, Ruth (January) explained that 'subject knowledge is the foundation of being a good teacher. If you don't know your stuff pupils will walk all over you, so you have to know enough to be confident'. For Sharon's mentor 'the standard of a lesson comes down to subject knowledge'.

Student teachers and mentors were definite about the importance of knowledge of the material taught in the student teacher's placement school. In addition, they identified as important the development of both knowledge for teaching practical activities in general and knowledge about specific practical activities. Some mentioned specific games such as badminton, basketball, rugby and volleyball. However, because they had little background in dance and gymnastics before starting the course, these were identified by most student teachers as those in which it was most important to develop knowledge. Keith (interview), Lesley (November) and Sharon (interview) all reported the importance of developing knowledge of dance and gymnastics because they, and the majority of student teachers, were weak in these activities prior to starting the course.

Mentors also identified the importance of developing knowledge in games. For example, for Jane's mentor 'Student teachers need all round subject knowledge. They need knowledge of every activity; the components that make up a game and how to break down the skills to teach that game'. Some also mentioned other areas of activity vaguely or specifically, where particular references was made to dance and gymnastics. For example, Sharon's mentor identified that student teachers need 'good games knowledge because most schools offer a games loaded curriculum and knowledge of gymnastics or dance'. She continued that 'They just need a base knowledge of most areas and they need an area of expertise that can be transferred to other activities, and preferably a game'.

Other activities identified by the researchers from their experience of working on PGCE courses in which many student teachers have a limited background when they enter a physical education initial teacher education (ITE) course, such as swimming and outdoor and adventurous activities, were not identified by these student teachers or mentors as important to develop. One reason for this was because they were not required to teach these activities on their school placements.

The importance of developing knowledge of theory to be able to teach GCSE (and in some cases also A level) examination classes was also identified by a number of student teachers and mentors. For example, Sharon (interview) felt that although you have to have general knowledge, you also have to learn how to teach that to the pupils. Using the Kreb cycle (a physiological process) as an example, she explained 'You have to explain in a way

that does not go over their heads'. This was endorsed by mentors. For example, for Sharon's mentor 'knowledge of the theory aspects of sport and of the scientific GCSE material needs to be there'. She explained that she had mentored student teachers with a variety of experience, some with depth of material to degree level [what she called too much depth], but who cannot break it down, whereas others have little or no knowledge of theory for GCSE because of their background.

Other material for teaching in school which was perceived as important was knowledge of the NCPE, mentioned particularly by one mature student teacher who had been at school before it existed.

A range of specific pedagogical knowledge was identified. Lesley (January) reported 'it is really important to understand the different ways children can learn (learning styles) and how your teaching can affect their learning (teaching styles)'. Other student teachers identified classroom management, organisation, differentiation, assessment, teaching pupils with special educational needs (SEN) and use of information and communications technology (ICT) in the classroom.

Some student teachers and mentors linked material for teaching and pedagogical knowledge. For example, Alex (February) identified that 'Knowledge of activities and areas of specialism [taught in the school] is crucial. General knowledge in coaching and dealing with pupils is critical'. Likewise, Ruth (January) said, 'I believe there is a wealth of knowledge. Content knowledge is fundamental, including requirements as prescribed by the NCPE and by department schemes of work. It is also important that as a teacher you have knowledge of different ways of delivering lessons as well as good knowledge of your pupils (including personality, behaviours, medical, cultural and special needs)'. Lesley's mentor explained that 'I believe that strong subject knowledge is essential for all areas of the National Curriculum. Without an understanding of the material they are teaching it is more difficult to change teaching styles to suit the needs of the pupils'.

Some knowledge was identified as important after student teachers realised that they needed it in practice. For example, Ruth (November) 'became aware of the importance of a strong knowledge and understanding in order to adapt swiftly to situations and think on the spot'. From her early teaching episodes Jane (January) identified the importance of class management and organisation, which would mean working on getting the full attention of the group and not trying to talk over pupils; 'This is important because if full attention is gained from the start, pupils will hopefully understand the learning objectives and the task involved much quicker, therefore allowing more time to complete the task'. Alex (February) reported 'The knowledge I should have developed would be more to do with SEN and EAL (English as an additional language)'. For Sharon's mentor 'the realisation that just because you play a sport yourself does not mean you will be able to teach it or have the drills necessary to teach it' was important for student teachers to develop.

What knowledge do student teachers develop on, and what do they perceive they still need to develop at the end of, their PGCE course?

Not surprisingly, the knowledge that student physical education teachers did develop on the course was related closely to what knowledge they and their mentors identified as being important to develop. It focused mainly on practical knowledge relating both to the activities in the curriculum and the pedagogy, particularly what knowledge student teachers perceived they needed for teaching in schools. This, in turn, was related to concerns and to confidence about teaching.

For example, Sharon (interview) perceived all student teachers had developed their knowledge of dance and gymnastics to what she described as a minimum level during the course. Keith (interview) identified activities which he had taught in school as those in which his knowledge had developed the most. He felt that by being 'thrown in at the deep end' teaching rugby to an able class helped to develop his knowledge in an activity in which he perceived he was weak. Jane (May) had little knowledge of basketball and other games such as netball, hockey and volleyball prior to starting the course, therefore knowledge developed prior to school placement gave her confidence to teach these activities.

Student teachers suggested that they did not need to develop knowledge to teach activities in which they already had prior knowledge and experience. For example, Jane (interview) identified strengths in swimming, outdoor and adventurous activities, tennis and badminton, therefore was not concerned that she did not teach them on school placement. Keith reported that he did not need to develop knowledge for teaching any activity in which he had a good background; he taught his strength (swimming) a lot on first school placement, even though he did not need to develop this area of his teaching.

The focus on developing knowledge in areas in which student teachers perceive weaknesses and are therefore concerned about, and relying on existing knowledge in areas perceived as strengths, is clarified by Alex (November). He says he needed the basics for teaching GCSE and A level theory as he did not do these whilst at school. Although theory sessions at university were useful to him he also had to do his own research to develop his knowledge, as he did for activities in which he had little knowledge prior to the course. The reason for not having to develop knowledge in activities in which he had knowledge was that 'his vast experience as a coach paid dividends' in his school placement.

Student teachers also identified that on the course they had developed pedagogical knowledge such as class management and organisation, discipline and strategies for dealing with this, keeping pupils on task, gaining attention, use of voice. Some knowledge that student teachers develop is also, to some extent, based on individual interests. For example, Jane (November) identified the opportunity to increase her knowledge and understanding of how physical

education can be linked with other aspects of a child's personal development. 'One topic which has caught my interest is that of citizenship and how this can be linked with physical education'.

Student teachers recognised that they will continue learning once they qualify as a teacher and identified several areas in need of further development. For some student teachers not teaching, or spending limited time teaching, a specific activity or skill in school was perceived as an issue. For example, for Ruth (interview) 'Gymnastics and dance and things I haven't taught before, like volleyball. I haven't covered badminton or basketball, so that's an obvious weakness… and activities that I am weak in are a struggle [and still need to be developed]'. For Sharon (interview) 'Gymnastics, as a result of not teaching it'. For Keith (interview) it was cricket and athletics, as he only spent four weeks in school on summer activities. Lesley (May) felt she was at a disadvantage applying for jobs because she had not taught all areas of activity in the NCPE and therefore had not developed her knowledge in these areas. In order to overcome this lack of knowledge about a specific activity, in her interview she explained, in relation to gymnastics; 'half is I need to get on a course and the other half is to get in front of a class of 30 and teach it'.

Other areas in which the need for further development was identified included theory lessons for GCSE and A level. Part of the difficulty identified by Jane (May) was that she was not aware of the pupils' progress through the syllabus and had difficulty seeing where her lessons were headed. For Lesley (interview), 'It can be difficult to plan for different ability levels of pupils because it takes a while to get used to pupils and their abilities so you cannot relate the tasks to the pupils' levels'. Other areas for development included pedagogical knowledge such as organisation, assessment and differentiation. For example, for Sharon (May) 'knowledge should be developed in assessing pupils; looking at what is the best environment for them to excel in. It has not been developed in school because they only assess at the end of term [when I was not there]'. Jane (interview) talked about finding it 'difficult to assess and teach at the same time'. ICT was also mentioned as needing further development. As with knowledge about specific activities, the major reason was not developing this skill whilst on school placement.

Keith (interview) suggested that some areas in which he needed further development (behaviour management and class control) were related to trusting that he knew what he wanted to happen in the lesson and had the knowledge to make it happen; 'in other words, it is a confidence issue'.

However, despite recognising they still had things to learn, some student teachers felt that they had stopped learning on their course. Ruth (April) summed this up when she stated 'I do now feel as though I am going through the motions and looking forward to teaching my own pupils in my own job'.

Discussion

This study looked at knowledge student physical education teachers develop on their one-year PGCE course. Responses from student teachers and mentors in relation to knowledge important to develop, knowledge actually

developed, as well as knowledge they perceive they still need to develop at the end of their course, focused on specific knowledge to apply in the immediate practical teaching situation. Generic knowledge about teaching areas of activity was not identified and a broader range of knowledge or a theoretical underpinning was given lower priority. This suggests that student teachers and mentors perceive that student teachers need knowledge and understanding about a specific activity they are teaching rather than generic knowledge that they can transfer from one activity to another similar activity or which will enable them to consider the issue in a broader context.

Knowledge of material taught in school (referred to as content knowledge or subject knowledge); and pedagogical knowledge were prioritised. Thus, these student teachers and mentors have a restricted view of knowledge for teaching when compared to the seven knowledge bases identified by Shulman (1986; 1987) as the minimum knowledge for teaching and in relation to the three standards student teachers must demonstrate they know, understand and are able to do to qualify as a teacher in England.

There may be several reasons for this restricted view of knowledge for teaching. Knowledge identified as a requirement to pass a course and qualify as a teacher is likely to be prioritised; aspects of knowledge identified in two of the three standards to qualify as a teacher in England, knowledge and understanding and teaching, were prioritised by these student teachers. The third Standard, professional values and practice, may not have been prioritised because it is harder to know how to develop and to assess. By prioritising the knowledge identified in the knowledge and understanding and teaching standards student teachers inevitably focus on the practical knowledge they need for their immediate work in schools. This focus was reinforced by their mentors.

This relates to the reports by both student teachers and mentors that student teachers needed knowledge about the physical education curriculum as taught in most schools. This suggests that student teachers and mentors accept the physical education curriculum taught in schools and do not question or critique it. This contributes to what several authors have suggested is little change in the teaching of physical education (for example, Curtner-Smith, 1999; Evans et. al., 1997; Laws and Aldridge, 1995; Penney and Harris, 1998). One consequence of this can be illustrated in relation to dance and gymnastics. As results show, many student physical education teachers enter PGCE courses with little background in dance and gymnastics (see also Capel and Katene, 2000; Gower and Capel, 2004; Ofsted, 1999). They develop what one student teacher described as a minimum level of knowledge in these areas in the university-based work. When they go on school placement many mentors prioritise knowledge of games. Further, the timetable, and hence the classes they teach, are likely to be dominated by games. Thus, student teachers are likely to prioritise knowledge of games, both because it is prioritised by their mentors and because it enables them to demonstrate they are able to meet many of the Standards to qualify as a teacher. Teaching unfamiliar material (such as dance and gymnastics) is difficult, therefore unless student teachers receive

very good support from their mentors, they are likely to resort to tactics that enable them to 'survive', including repeating what they have been taught in university or command style teaching. This supports findings of research by Graber (1995: 164) that "When student teachers have limited subject matter knowledge and are unfamiliar with the details of particular activities, they will be unable to make informed choices about how to teach that subject matter". If their experiences of teaching the activity are not good, student teachers are likely to remain low in confidence, focusing on themselves and the material rather than on pupils' learning. They may also try to avoid teaching this activity again. Thus, there is a downward spiral in teaching activities such as dance and gymnastics.

This may be one contributor to the predominance in physical education in England of the traditional, multi-activity curriculum based on the acquisition and performance of skills organised mostly around team games, with a limited range of teaching styles being used for delivering this content (Curtner-Smith, 1999; Green, 1998; Kirk and Kinchin, 2003; Mawer, 1999; Penney and Evans, 1999). This traditional content and teaching approaches contribute to the alienation of many young people from physical activity, partly because the physical education taught in schools does not allow young people to participate in the types of sport, exercise and physical recreation experienced outside school and 'the form of learning represented in school may have little transfer value to related situations outside school. This is problematic if the aim of school physical education is to prepare pupils to pursue an active lifestyle in adulthood' (Kirk and Macdonald, 1998: 381).

The focus on knowledge for teaching in a specific situation has been described by Rossi and Cassidy (1999: 189) as technical learning and 'whilst this learning is important, it is sometimes elevated to a significance perhaps out of proportion with its functional utility and reduces the teacher to little more than a technician'. Thus, although it is important for student teachers to develop their practical knowledge in order to gain confidence in teaching, it is also important that they develop a broader knowledge base for teaching. This requires developing more general knowledge but equally importantly developing skills such as the ability to reflect, analyse, critique. Rossi and Cassidy (1999) stress the importance of teacher educators in the development of student teachers' ability critically to evaluate the conventions and routines they have absorbed during their own education and while on school placement in their ITE course. This requires student teachers to challenge some of the curriculum models they have encountered through the process of critical analysis. However, in order to reach this level of conceptual awareness, student teachers need to understand, for example, the unique experiences each NCPE area of activity can offer pupils, and to have considered what the overall aims of physical education are and how it can contribute to a pupil's personal, social, moral, spiritual and cultural development. Such an approach would enable these student teachers to develop into what Rossi and Cassidy (1999) called 'knowledgeable teachers': teachers who place pupils' learning at the heart of their teaching; are clear about the aims and purposes of physical education and are able to plan their content and teaching approaches to enable them to work towards achieving those aims; who pay as much attention to why they are teaching specific

content, using specific teaching approaches as to how they are teaching; and are able to challenge both their own and others' beliefs and practices and the status quo in order to make physical education more relevant to young people.

This study suggests several lines for further research. Knowledge identified as important to develop is likely to be what is prioritised in learning and, unsurprisingly, what knowledge was developed was very similar. If the subject is going to develop so that it is relevant to today's youngsters, further research is needed on how to extend the range of knowledge developed beyond knowledge for the immediate practical situation currently prioritised by student teachers and mentors, including other knowledge bases identified by Shulman (1987) and others and knowledge in relation to professional practice and values, generally included in broader underpinning university-based work. Further research is also needed into how student teachers and mentors can be challenged to develop knowledge in activities in which they perceive student teachers already have good knowledge, so that they consider whether their knowledge and particularly their teaching (or coaching) style is appropriate for the pupils they are teaching. Thus, research is needed on how knowledge is developed and on how university and school-based staff can support the development of knowledgeable teachers rather than knowledge for teaching, which may be interpreted in a restricted way. Without doing this, it is likely that they will teach in the way their mentors teach and/or they were taught.

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