What does research say about teacher learning and teacher knowledge?: Implications for professional development in South Africa

Carol Bertram

Abstract

There have been a huge number of professional development initiatives for teachers in South Africa over the past two decades, and yet we have seen little change in the quality of education in the country. The reasons for this are very complex, encompassing the social and material conditions in which teachers work, the ongoing legacy of apartheid in the form of disorganised and dysfunctional schools and the radical nature of the recent curriculum reforms. This paper aims to add to these explanations, by arguing that in order to be more effective, professional development initiatives need to take much greater cognisance of the kinds of teacher knowledge that teachers need to acquire and the various ways in which they acquire these different types of knowledge. My starting point is that teachers' core instructional work is the practice of organising systematic learning (Morrow, 2007), and thus developing this practice this should be one of the goals of professional development initiatives. My aim is to bring together some key literature and research on teacher learning and teacher knowledge to engage with the question: In what ways and in what spaces do teachers learn and acquire different kinds of knowledge that are necessary in order to organise systematic learning? What is the implication of this for the practice of professional teacher development in the context of South Africa? The purpose is to develop more nuanced and complex understandings of teacher learning and teacher knowledge, which will then impact on the ways in which we design and deliver teacher development programmes.

Introduction

Despite a huge investment in teacher development workshops and formal upgrading courses, there has been little evidence of accompanying improvement in the quality of formal schooling in South Africa over the past 15 years. While there is certainly no simple reason for this situation, I believe

that thinking more clearly about what research tells us about teacher knowledge and teacher learning may provide some principles which could inform better practice in professional development.

There is a large amount of literature on the key areas of teacher learning, professional development, and teacher knowledge but as Wilson and Berne (1998) noted some years ago, they remain largely separate from each other. The concepts of teacher development, teacher learning and teacher knowledge are also contested, and there is not one universally accepted way of understanding them (Evans, 2002).

Following Morrow (2007), this paper starts with the assumption that the essence of teachers' work is to organise systematic learning, thus that one of key purposes of professional development initiatives should be to develop teachers' competence in the professional practice of organising systematic learning. Morrow uses the phrase 'systematic learning' to emphasise that teaching is not about transmitting bits of information, but is a practice that "centres around the design of learning programmes that foster the gradual development of competences that cannot be learned in an instant" (2007, p.107). I argue that one of the reasons for the lack of impact of many professional development initiatives is that they are not clearly focused on developing this professional practice, and often appear not to be informed by research on teacher knowledge and teacher learning. In the first section, I analyse the literature on teacher knowledge in order to present a model of what kind of teacher knowledge is needed in order to engage with the professional practice of organising systematic learning. The second section engages with theories of teacher learning which inform how teachers might acquire this knowledge. The final section brings these two fields together and explores the implications for professional development practice in South Africa.

Teacher development in South Africa

It is a truism to say that professional development efforts should bring about teacher learning, but simply because a teacher attends a workshop, it does not necessarily mean that she has learnt new knowledge or that her practice has been changed. The impact of teacher development initiatives on improving the overall quality of education in South Africa is not encouraging. Welch (2002) notes that despite a huge effort put into teacher upgrading in the 1970s and

early 1980s, there was very little noticeable difference in learner achievement nor the overall quality of education. The post-apartheid Department of Education has sponsored teachers to improve their formal qualifications such as the National Professional Diploma in Education (NPDE) and the Advanced Certificate in Education (ACE) and has invested a huge budget into workshops for the new curriculum reform, but at a systemic level there is little change in the quality of learning.

Most South African learners perform poorly on national and international learner tests (Fleisch, 2007). There are a range of complex reasons for the under-achievement of South African children. One set of reasons is located at the macro societal level where the poverty, malnutrition, unemployment and high HIV/AIDS rates in many communities have a very strong correlation with poor learner achievement (Fleisch, 2007). Another set of reasons is located at the school level. Soudien (2007) argues that it is in fact the legacy of apartheid that plays a major role in the ineffectiveness of the education system, as many schools are not ordered organisations where teachers are present and time is effectively used (Taylor, 2009). The material and social conditions in which many teachers work simply do not support quality learning (Shalem and Hoadley, 2007). Another set of reasons is located at the classroom level where research shows that many teachers do not induct their learners systematically into school knowledge (Hoadley, 2007).

There are a number of reasons why teacher development initiatives don't always translate into better classroom practice. It may be because the nature of the new pedagogy required by curriculum reforms makes it impossible to implement in under-resourced conditions (Johnson, Monk and Hodges, 2000) or that it is simply too difficult for individual teachers to change their practice without the support of colleagues and those in management positions in the school (Brodie, Lelliot and Davis, 2002; Grant, 2008). It may be that teachers simply don't see a need to change their practice (Blignaut, 2006). Shalem (2010) argues that it is in fact the design of the curriculum that is problematic, as teachers have not been able to use the outcomes-based curriculum to organise systematic learning in their classrooms because it does not make the disciplinary base explicit.

While acknowledging these other factors as important, I argue that many teacher development initiatives in fact do not lead to teacher learning and improved practices because they do not have as their explicit purpose the development of professional practice of organising systematic learning, and

because they are not informed by an understanding of what knowledge teachers require and how they might best acquire this. In the following section I engage with the literature on what it is that teachers need to know in order to engage in the professional practice of teaching i.e. organising systematic learning.

Research on teacher knowledge

Shulman (1986) was the first researcher to describe a knowledge base for teachers or to answer the question: what is it that teachers need to know? Jones and Straker (2006) describe Shulman's model of teacher knowledge as comprising four domains. These are: content knowledge (the knowledge of the subject content that needs to be taught); general pedagogical knowledge (knowledge of different teaching strategies, classroom management strategies, assessment strategies etc.); context knowledge (knowing about the background of the learners, knowing the organisational culture of the school etc.) and pedagogical content knowledge (PCK is understood as the way in which a teacher recontextualises her content knowledge so that it can be understood by the learner). In a similar vein, Zeidler (2002) argues that within science education reform, the three anchoring points have been teachers' subject matter knowledge (SMK), pedagogical knowledge (PK) and pedagogical content knowledge (PCK).

In terms of *content knowledge*, it appears that what is really important for teachers is a deep understanding of the fundamental concepts in their disciplines, and not just having a huge collection of facts of the subject. It is this understanding of fundamental concepts and how these concepts are related and organised that enables teachers to use their subject matter knowledge for teaching. Having a major in your subject does not necessarily lead to this kind of disciplinary knowledge, as a study in the US showed that teachers who had a major in their subject were often no more able than other teachers to explain fundamental concepts in their discipline (Kennedy, 1991).

Shulman was the first researcher to coin the term *pedagogical content knowledge (PCK)* which he described as "the blending of content and pedagogy into an understanding of how particular topics, problems or issues are organised, represented and adapted to the diverse interests and abilities of learners, and presented for instruction" (1987, p.127). Essentially he understood PCK as how the teacher transforms or recontextualises he content knowledge so that it can be understood by the particular learners in her

classroom. There has been a great deal of research interest in this concept over the past two decades. Turner-Bisset (1999) built on Shulman's model by suggesting that in fact all forms of teacher knowledge (such as content knowledge, pedagogical knowledge) are sets within the larger set which is PCK. However this does not enhance our understanding of PCK and Turner-Bisset seems to have rather fragmented the concept than strengthened it (Ellis, 2009). Hashweh (2008) suggests that PCK should be viewed as a collection of teacher pedagogical constructions. In a review of the literature on competent beginning teaching, Reynolds (1992) labels PCK as 'content-specific pedagogy' which she places at the overlap of three kinds of teacher understanding: general subjects/liberal arts, general principles of teaching and learning, and subject content knowledge.

It becomes clear that PCK is a contested term, and that there is no accepted clarity as to exactly what it means. However, there is general agreement that teachers need more than just a deep knowledge of their discipline. Adler, Slonimsky and Reed (2002) argue that teachers' broad and deep knowledge of the subject is necessary but not sufficient. This subject knowledge needs to be transformed into "sequenced, graded and developmental/progressive tasks for learners, learning and assessment" (p.139). In order to do this, teachers need pedagogic knowledge and knowledge of the curriculum in their subject area. They also need to know how learners come to know a specific subject and how the context in which they are teaching shapes the teaching and learning of their subject. Adler *et al.* (2002) describe this integration of disciplinary and pedagogical knowledge as 'conceptual knowledge-in-practice' (which is a concept very similar to PCK). This knowledge-in-practice is clearly linked to the teaching of a specific subject, and should not be construed as a generic activity (Rusznyak, 2010).

General pedagogical knowledge is also a complex set, which includes knowledge of classroom organisation and management, different teaching strategies or methods, assessment strategies as well as understanding classroom communication and discourses (Morine-Dershimer and Kent, 1999). They suggest that there is an important interplay between general pedagogical knowledge, which emerges from research, and personal pedagogical knowledge which is "fuelled by personal beliefs and personal practical experience" (1999, p.22).

Thus from Shulman's initial work and the work of those who have followed, we see that teachers draw on deep disciplinary knowledge, general and

personal pedagogical knowledge and pedagogical content knowledge (the knowledge that integrates the first two types, and is discipline specific). Shulman's knowledge domains are largely propositional and he has been critiqued for not taking into account the inter-relationship between theory and practice (Jones and Straker, 2006) . He does not engage sufficiently with teachers' practical or professional knowledge, but seems to present a model where different kinds of propositional teacher knowledge simply 'add up to' a good teacher. However, a key concern in the area of teacher education and teacher learning is the relationship between propositional knowledge (sometimes called 'theory') and practical knowledge and it is to this relationship that I now turn.

Propositional and practical knowledge

To shift the lens on teacher knowledge away from Shulman's categories, Knight (2002) suggests a more generic way of understanding knowledge: *procedural or practical* knowledge which comprises both behavioural and cognitive skills, and *declarative, propositional or higher-order* knowledge, which includes facts, abstract knowledge of ideas and principles, and is mainly about sense-making and meaning. Practical knowledge is primarily about learning to do (Knight 2002). These are generic ways of understanding knowledge that have been explored by Ryle (1971) through the ideas of knowing 'how' and knowing 'what' as well as by curriculum theorists like Schwab (1978). Gamble (2009) describes knowing how as 'procedural knowledge' and knowing what as 'principled knowledge'.

Another way of describing propositional knowledge is 'codified' knowledge while practical knowledge can also be known as 'context-specific knowledge'(Wilson and Demetriou, 2007). This practical knowledge is difficult to make explicit or to represent in a textual fom because it is largely acquired informally through participation in social activities. Wilson and Demetriou suggest that codified knowledge is learned through formal learning, and practical knowledge is learned through informal learning. Similarly, Samuel (2009) describes these two types of knowledge as public propositional knowledge, which constitutes theories about learning, sociology of education, policy etc, and as craft knowledge which is implicit, undeclared and gleaned from "the habits of rituals and routines that characterise school spaces" (p.745).

Kelly (2006) uses a different set of terms to describe these same concepts. He calls propositional knowledge 'knowledge-of-practice' and he calls practical knowledge 'knowledge-in-practice', which is tacit knowledge grounded in professional activity and cannot be easily articulated. Such knowledge can only be created by practitioners in the context of their practice. In the same way as Morrow and Eraut do, Kelly suggests that teachers in the classroom draw on both knowledge-in-practice and knowledge-of-practice. These two kinds of knowledge cannot be understood or learned independently of each other. Morrow (2007) argues that practical knowledge must be informed by understanding. He argues that theory and practice are internally related to each other, and that in practice teachers must draw from **both** academic and technical knowledge. Developing professional knowledge draws together both propositional and practical knowledge (Eraut, 2000; Morrow, 2007). Professional practice does make use of technical knowledge, but it always involves more – it also requires judgement-in-practice.

A different kind of discourse around teacher knowledge is that which focuses more on teachers' personal knowledge. Connelly and Clandinin (2000) argue that much teacher education focuses on teacher education 'by injection' where the focus is on giving student teachers the kind of knowledge that they need to become teachers. This is often a strong focus on knowledge-of-practice or propositional knowledge. In contrast, they suggest a model that they call teacher education 'as reconstruction' which suggests that teacher knowledge grows by composing and recomposing the knowledge that teachers already have. This focus is more on knowledge-in-practice and on personal knowledge.

There is much research that shows that what teachers do in their classrooms is not only a result of their propositional and practical knowledge, but also of their 'ontological commitments' or personal knowledge (Desforges, 1995; Gudmunsdottir, 1991; Morine-Dershimer and Kent, 1999; Pithouse, Mitchell and Weber, 2009). These are deep-seated beliefs about the nature of disciplinary knowledge, the purpose of schooling, the role of the teacher, and the role of the learners, many of which are developed as a result of the teacher's own schooling experiences and their family and cultural norms (Allender and Allender, 2006; O'Sullivan, 2004; Samuel, 2008). When these beliefs conflict with what research shows are good teaching practices (for example, that learners need to engage meaningfully with new material in order to gain understanding, and not just memorise it) then this personal existing knowledge has to shift, which is often a long term process. Thus it becomes
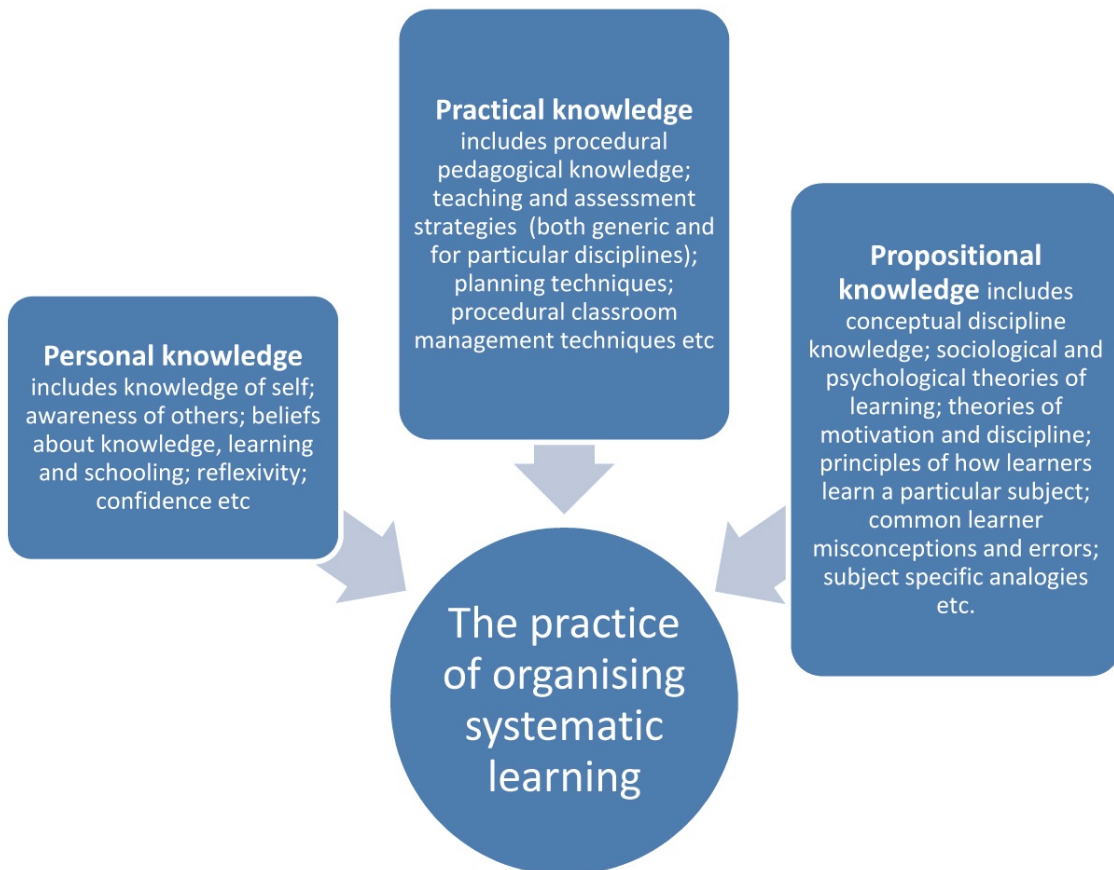
clear that learning to be a teacher and developing the practice of organising systematic learning is a complex issue that involves the development of propositional knowledge, practical knowledge and personal knowledge, and that this learning also often involves the disruption of existing knowledge.

In the following figure, I represent how we might understand the relationship between content knowledge, pedagogical knowledge, PCK and context knowledge and the three broad categories of practical, propositional and personal knowledge. The figure illustrates how the different types of knowledge are necessary for the professional practice of organising systematic learning. This figure draws on and extends the work of Wilson and Demetriou (2007). My understanding is that PCK has a place in both the practical and the propositional domain. In this figure, I place PCK that could be understood as propositional in the propositional domain (for example, an understanding of how learners of different ages learn a particular subject; the particular explanations and analogies which are useful to use; the common errors of understanding that students make in a particular subject), and I place PCK that could be understood as practical in the practical domain (for example, the use of specific pedagogic strategies to teach concepts in a particular subject, and of assessment strategies that are particular to a specific subject).

Figure 1: Mapping the relationship between different kinds of teacher knowledge

Practical knowledge
includes procedural pedagogical knowledge; teaching and assessment strategies (both generic and for particular disciplines); planning techniques; procedural classroom management techniques etc

Propositional knowledge includes conceptual discipline knowledge; sociological and psychological theories of learning; theories of motivation and discipline; principles of how learners learn a particular subject; common learner misconceptions and errors; subject specific analogies etc.

Personal knowledge includes knowledge of self; awareness of others; beliefs about knowledge, learning and schooling; reflexivity; confidence etc

The practice of organising systematic learning

Even as I have been discussing different ways of describing teacher professional knowledge, the question of teacher learning is always implicitly present. How in fact do teachers acquire and learn these different types of teacher knowledge? In the second section, I review the literature on teacher learning, with the purpose of clarifying what kinds of knowledge may be learnt best in particular kinds of ways, and in particular spaces. Wilson and Demetriou (2007) and Knight (2002) argue that propositional and practical knowledge are 'acquired, renewed and modified in different ways', therefore it is important that teachers engage in a range of different learning experiences.

Teacher learning

In their examination of research on teacher professional development, Wilson and Berne (1998) suggest that what we 'know' about teacher learning is rather puzzling. To some extent this is due to the "scattered and serendipitous nature of teachers' learning" (p.173), which is both formal and informal, planned and unplanned, voluntary and compulsory (Fraser, Kennedy, Reid and Mckinney, 2007). Perhaps the most precise thing that researchers can say about teacher learning is that teachers learn in a range of different ways. According to Reid's quadrants of teacher learning, opportunities may be analysed as either formal or non-formal and planned or incidental (Fraser *et al.,* 2007). Fraser *et al.* (2007, p.157) suggest that "teachers' professional learning can be seen as the processes that result in specific changes in the professional knowledge, skills, attitudes, beliefs or action of teachers".

There are at least two different theories or perspectives on teacher learning, which are underpinned by different assumptions. Kelly (2006) argues that a socio-cultural approach to teacher learning assumes that teacher expertise is closely linked to the context in which it is practised, that learning takes place in a community of practice where teachers learn the ways of knowing and thinking that define their school circumstances, and that teacher identities are significant. He contrasts this with a cognitive approach to teacher learning which advocates a view of teacher expertise located in individuals' minds, and separates the acquisition of knowledge, skills and understanding from their practice. The view of teacher development being located in schools within communities of practice is underpinned by a broader understanding of situative learning (Putnam and Borko, 2000). Borko (2004) writes that situative theorists conceptualise learning as taking place in a range of different contexts, where learning is understood both as a process of active individual construction and a process of learning through participation in social practices.

Thus it is probably more useful to work with an approach which acknowledges that teachers learn *both* by acquiring knowledge and skills as individuals *and* by developing their competence in communities of practice. Learning has both individual and socio-cultural features (Cobb, 1994, cited by Borko, 2004). Research seems to show that learning is partly context-dependent *and* partly context-independent; that *both* concrete, practical instruction and abstract, decontextualised instruction can support learning and that sometimes abstract learning is transferred to practice, and sometimes it is not (Anderson, Reder and Simon, 1996).

The main approach to teacher learning has been to use formal workshops or courses, generally underpinned by a cognitive perspective of learning. The understanding is that teachers would unproblematically transfer their workshop learning to their classroom practice. However, in the last two decades there have been growing critiques of one-off workshops for teachers (Adey, with Hewitt, Hewitt and Landau, 2004; Knight, 2002), mostly because the kind of transfer expected seldom takes place. At a time of education reform, one-off workshops which focus on a particular new policy tend to dominate professional development. Lieberman and Pointer Mace (2008) suggest that this is happening in the United States with the *No Child Left Behind* policy, and it has been true in South Africa also. Teachers are often offered 'one size fits all' workshops where they are told how to implement the new policy and follow the official requirements, rather than engaging in more conceptual issues such as the philosophies of pedagogy and knowledge that underpin the new curriculum (Bantwini, 2009; Pithouse, 2001).

This is not to say that formal professional development initiatives like workshops or university courses cannot provide meaningful learning opportunities for teachers. Ball and Cohen (1999) show that the more effective professional development interventions are those that include clear examples of the new assessment and pedagogies to be learnt (using direct modelling or video footage) and that give teachers the opportunity to practice these new processes with their learners under supportive supervision. It is important that teachers observe good practice, produce their own teaching activities and then allow other colleagues or experts to observe and critique their productions (Shalem, 2003). These kinds of meaningful learning opportunities are labour intensive, and thus expensive, and also require learning and support over a sustained period of time.

In contrast to the focus on formal learning opportunities that usually take place outside of the school, a number of researchers call for professional development that is school-based, where teachers are active through experimentation, inquiry, writing, dialogue and questioning, that encourages collaboration and teachers working together, focuses on student learning, takes place over time and provides follow-up support, mentoring and coaching in teachers' classrooms (Lieberman and Pointer Mace, 2008; Shulman and Shulman, 2004). Lieberman and Pointer Mace (2010) suggest that teachers learn best when they are members of a learning community, provided there are supportive working relationships. They subscribe to Wenger's (1998) theory that most people learn in 'communities of practice' where learning happens

through experience and practice. Many studies seem to use the term
'community of practice' fairly loosely, whereas it is important to recognise
that Wenger's model describes very specific characteristics which may in fact
not be present in all professional learning communities.

The literature advocating teacher learning in communities of practice and
within their own school contexts emerges from industrialised countries such as
the United States (Lieberman and Pointer Mace, 2008) and the United
Kingdom (Knight, 2002). However, there are some South African examples of
programmes (often linked to universities) which have been located within a
situative perspective of teacher learning and which focus on creating teachers'
communities of practice (Graven, 2002; Maistry, 2008). Both studies suggest
that it is important that there is an expert to lead the community initially,
which Wenger's model does not include. Maistry believes that Wenger's
model "marginalizes the role of teaching as a fundamental process that
produces learning" (2008, p.142).

Thus we need a conceptual understanding of teacher learning that can describe
both social learning in a community (which often focuses on identity) and
individual learning, and which also makes clear what kind of knowledge is
learnt in these different ways. Borko (2004) likens this to how multifocal
contact lenses work. Researchers need to use both a psychological conceptual
framework (a near vision prescription) to focus on the individual teacher as
well as a socio-cultural conceptual framework (a distance vision prescription)
to focus on the professional development community. When planning for
teacher development, providers need to ask: What knowledge do teachers
learn tacitly through practice; what knowledge do they learn through expert
instruction and what knowledge do they learn through learning communities
based in schools? The next section addresses the relationship between teacher
knowledge and teacher learning in more detail.

Thinking about the relationship between teacher knowledge and teacher learning

Propositional knowledge, especially deep conceptual disciplinary knowledge,
generally needs to be learnt in formal, quite structured ways, usually led by an
expert who can organise the knowledge systematically and can make the
conceptual connections clear. When a teacher has a strong network of deep
conceptual disciplinary knowledge, then she should be easily able to access

new knowledge on her own through reading books, teacher journals, textbooks or websites. This new knowledge can be brought into the already existing disciplinary schema. Then new knowledge that is introduced into an official curriculum should not pose an insurmountable challenge. Henze, Van Driel, and Verloop (2009) show how experienced science teachers in the Netherlands mostly used individual learning strategies like reading when faced with curriculum reform.

Teachers need more than deep disciplinary knowledge, they also need conceptual knowledge for teaching which is much more than just subject knowledge, as teachers will not automatically make a transfer of their own subject knowledge into their classroom teaching (Adler *et al*., 2002). Starting with developing teachers' strong conceptual disciplinary knowledge is necessary, as long as it is acknowledged that teachers *also* need PCK, which is to learn how to make their own disciplinary knowledge accessible to learners. The development of pedagogical content knowledge is complex as it has both propositional and practical elements, which need to be brought together in professional practice. This needs to be supported by effective school-based mentoring and a supportive school learning environment.

Teachers' understanding of propositional knowledge (such as subject knowledge, sociological and psychological theories of learning, philosophical thinking about the purpose of schooling) can be developed by explicit teaching, and practical knowledge can also be modelled in formal situations. However, knowledge-in-practice is best developed and practiced in the school setting. In order to develop both competence and confidence, teachers need to practice new pedagogies and assessment methods and use new kinds of resources, in collegial environments with supportive colleagues and experts. Practical knowledge is often learnt informally, from observing colleagues, or by asking colleagues what methods they use for classroom management, or what resources they use to teach a particular concept, for example. However we know that this kind of apprenticeship model of learning to teach can also be conservative in that it can sustain the status quo (Morrow, 2007), and does not *necessarily* lead to the development of effective teaching. "Experience is neutral to learning" (Desforges, 1995, p.397) and to ensure that teaching experience leads to productive learning usually requires good mentors and a well-functioning school.

The following example shows how different types of knowledge can be learned in different ways. If a Grade 10 teacher has to teach a new topic in the

history curriculum which she knows nothing about, such as the independence of a particular African country, this is essentially propositional knowledge which can be learned by reading books, textbooks or websites on the topic (Henze *et al*., 2009). The teacher could also attend a workshop where this knowledge is explained. However, this individual learning presupposes that the teacher *already* has a clear understanding of the principles which underpin the study of history (such as the importance of chronology, cause and effect); has a conceptual schema of the process of colonisation in Africa and other parts of the world, and is able to fit the new knowledge into this existing schema.

Knowledge of how best to teach this new topic (pedagogic content knowledge) could come from talking to other teachers who have taught the topic before, from a textbook or other resource materials, by observing a colleague teaching the topic, and also relies on existing knowledge about the learners and what they might find difficult about the topic. The way in which the teacher actually teaches this topic is also informed by her own understanding of the purpose of teaching history and of the nature of the discipline. Teachers' value orientations to their subject matter influence their choice of content, resources and their pedagogical strategies (Gudmunsdottir, 1991). These value orientations, or ontological beliefs about the world and about the nature of knowledge are deeply ingrained in all of us, and are very difficult to change. Certainly they will not be changed through one workshop, and may possibly start to shift if teachers can see colleagues teaching in different ways, can engage in critical conversations about the nature of the discipline, and can learn in a nurturing collegial environment with other teachers who are exploring the same ideas.

Implications for professional development in South Africa

Over the past 15 years in South Africa, professional development for teachers has been strongly linked to curriculum reform. The Department of Education has run thousands of workshops which focus on how to teach the new curriculum, which started out as Curriculum 2005 in 1997, shifted to the National Curriculum Statements in 2002 and is now in its third iteration, called the Curriculum and Assessment Policy Statements. Bantwini (2009) describes a typical process of Continuing Professional Development (CPD) that was used by a district in the Eastern Cape, a rural province in South

Africa. The teaching strategy used at the workshops was reading through policy documents followed by discussion. There were some workshops that focused on the content and the curriculum documents of the Learning Areas, but these were not specialised regarding subject or grade. There were no follow-up classroom visits to support and monitor teachers' implementation. The school-based component of the district CPD programme was for monitoring, rather than for classroom-based support and coaching. Bantwini (2009) suggests that teachers were not implementing the new curriculum in their classrooms due to lack of support from the district officials. The purpose of the monitoring was to check that teachers were writing lessons plans and that the lesson plans were written using the correct format. It seems that the process was a technical one, and was not viewed by teachers as a supportive process, but rather an accountability exercise.

The workshops described by Bantwini appear to have focused on the propositional knowledge of the curriculum document, not on disciplinary content knowledge, PCK or generic pedagogic knowledge. They did not focus on practical knowledge, either through modelling new practices or by learning how to actually develop new teaching practices and did not appear to give teachers the opportunity to engage actively and thoughtfully with the reforms. In the light of this, it is not unexpected that teachers' struggled to make any meaningful change to their classroom practice.

Adey (2004) argues that the starting point for any successful professional development process is the nature of the intervention, which must be underpinned by evidence that it actually works to enhance the quality of student learning. From Bantwini's study, it appears that the purpose of CPD implemented by the Department of Education is that teachers should learn to implement the curriculum. The logic appears to be that the implementation of the curriculum will automatically lead to improved learning and better quality education. Ideologically it was imperative that this be the case, as the new curriculum was elevated to the level of 'scripture' (Morrow, 2000), particularly in the years 1997–2002. However, we have no real evidence to show that 'correct' implementation of the curriculum will lead to improved learning. The principles which underpin the National Curriculum Statements of learner-centredness, of integrated knowledge and of teaching to explicit learning outcomes (Department of Education, 2000) may or may not lead to improved learning, depending on the home learning background of the learners, the context of the school and the expertise of the teacher in making reasoned judgments about how and when to employ these principles.

South African teacher development has been hampered both by the frequency of the curriculum reform as well as inappropriate models of teacher development. The latest curriculum implementation review of 2009 points to the failure of teacher development initiatives (Department of Education, 2009), just as the Review of C2005 in 2000 (Department of Education, 2000) did, and states that the current initiatives are too generic and superficial. It suggests that teachers' actual needs must be identified through non-judgemental classroom observation, and then addressed, and supported by post-training classroom monitoring, support and mentoring. It recommends that training needs to be targeted and subject-specific. There is a growing acknowledgement that CPD workshops should not focus narrowly on how to implement a particular curriculum document (which will change again), but rather on more generalisable and principled knowledge, such as disciplinary knowledge, pedagogical knowledge and PCK.

The radical nature of the curriculum reform has lead many teachers to adopt the outward forms of the reform, such as arranging desks in groups, and allowing lots of group discussions, rather than its substance, which may be described as designing meaningful learning tasks for learners that build on their current knowledge and develop a conceptual understanding of the discipline (Brodie *et al*., 2002; Mattson and Harley, 2003). This is unsurprising since to fully work with the reality of integrated knowledge and progressive pedagogy requires a deep disciplinary knowledge, a particular understanding of learning as well as a particular teacher identity (Baxen and Soudien, 1999). The new Curriculum and Assessment Policy Statements have dispensed with outcomes and assessment standards and have foregrounded the progression and sequencing of the knowledge to be understood in each grade. Thus the radical reforms of earlier versions of the curriculum have been tempered.

I believe that the implications of understanding the connection between teacher knowledge and teacher learning would mean a better understanding of the strengths and limitations of both formal teacher workshops/short courses and of school based professional learning communities. Workshops can be appropriate for teaching propositional knowledge, and for modelling different pedagogic strategies. When the purpose of workshops is for teachers to acquire disciplinary knowledge, there should be differentiation between teachers with different levels of subject content knowledge so their needs can be met. Treating teachers as homogenous in terms of the subject content and PCK that they have does not lead to meaningful learning opportunities for all.

'Content knowledge' workshops should focus on developing teachers' deep knowledge of the organisation and structure of the discipline, not simply on knowing lots of facts about the discipline. Developing this kind of deep knowledge takes time, and cannot possibly be achieved in even a series of short workshops, but generally would need to take place over a year or two. Propositional PCK can also be acquired through workshops, for example knowledge about how learners come to know their specific subject; knowledge about how children learn to read, developmental phases of reading and writing and the specific kinds of errors and misconceptions learners may have about particular concepts at particular developmental periods. It can be made explicit how the curriculum knowledge in that subject should be sequenced so that learning progression is clear and logical. It is possible that workshops show teachers how to organise systematic learning in their particular subject, at their particular grade.

The practice of the organisation of systematic learning only be fully realised in practice. Workshops can model new practices, but learning needs to be supported through expert and collegial mentoring in classrooms. This process takes a long time, and is highly dependent on the kind of school context in which the teacher is situated. Johnson, Monk and Hodges (2000) critique current northern/western ideas about teacher development because they ignore the vital role played by the environmental constraints of poorly resourced schools and the normative behavior of the school in constraining how teachers select their pedagogical strategies. Shifting teachers' ontological beliefs and values about the nature of knowledge, the purpose of schooling, and the role of the teacher and the learner is an even lengthier project. This kind of deep re-learning takes years, and is probably best nurtured through sustained formal learning (such as a university programme), through being part of a community of practice which is exploring these kinds of new ideas and which has the input of an expert to support and mentor. However, realistically there are few schools in South Africa that provide this kind of supportive learning environment, and currently district officials are not playing a school-based mentoring role (Bantwini, 2011).

The Department of Education has set up clusters of schools where teachers from different schools work together in subject groupings and the new Integrated Strategic Plan (Department of Basic Education and Department of Higher Education and Training, 2011) envisions the establishment of professional learning communities (PLCs) in schools. However, there is not much research at present to show how these kind of communities work and to

what extent teachers learn from them, especially given Maistry's (2008) finding that teacher communities need a subject knowledge expert. A recent study of five economics teachers in poorly resourced schools showed that they did learn from the subject cluster meetings because the subject advisor was seen as an expert (Zulu, 2010). We need more evidence to know what kind of teacher learning takes place in these groups of teachers.

Conclusion

This paper has argued that for more productive teacher development, we need to be more explicit about what kind of teacher knowledge is developed in what kind of learning spaces. It has argued that one of the purposes of professional development initiatives is to develop teachers' capacity to organise systematic learning in their classrooms, and has described the kinds of teacher knowledge that underpins this practice. We need to be realistic about what kind of teacher learning can take place in workshops. Propositional knowledge (such as the development of deep conceptual knowledge) can be developed in formal workshops, but will require an expert who structures the learning process in a coherent series of learning experiences. Propositional knowledge can also be learnt by individuals through reading books, teacher journals or the internet. Knowledge-in-practice is developed through participation, by actually practicing a new teaching or assessment strategy in the presence of a supportive colleague, usually in the school situation. This kind of practical learning is enhanced when a teacher is part of a supportive community of practice where teachers are committed to learning from one another in informal ways. In many schools there is the need for an expert to be part of this community of learning.

References

Adey, P., with Hewitt, G., Hewitt, J. and Landau, N. 2004. *The professional development of teachers: practice and theory*. Dordrecht: Kluwer Academic Publishers.

Adler, J., Slonimsky, L. and Reed, Y. 2002. Subject-focused INSET and teachers' conceptual knowledge-in-practice. In Adler, J. and Reed, Y. (Eds), *Challenges of teacher development. An investigation of take-up in South Africa.* Pretoria: Van Schaik, pp.135–152.

Allender, D. and Allender, J. 2006. *How did our early education determine who we are as teachers?* Paper presented at the 6th International conference on S-Step. Collaboration and community: pushing the boundaries.

Anderson, J.R., Reder, L.M. and Simon, H.A. 1996. Situated learning and education. *Educational Researcher,* 25(4): pp.5–11.

Ball, D. and Cohen, D.K. 1999. Developing practice, developing practitioners towards a practice-based theory of professional education. In Darling-Hammond, L. and Sykes, G. (Eds), *Teaching as the learning profession: handbook of policy and practice*. San Francisco: Jossey-Bass Publishers.

Bantwini, B.D. 2009. District professional development models as a way to introduce primary-school teachers to natural science curriculum reforms in one district in South Africa. *Journal of Education for Teaching,* 35(2): pp.169–182.

Bantwini, B.D. 2011. District officials' assumptions about teacher learning and change: hindering factors to curriculum reform implementation in South Africa. *International Journal of Education,* 3(1): pp.1–25.

Baxen, J. and Soudien, C. 1999. Outcomes-based education: teacher identity and the politics of participation. In Jansen, J.D. and Christie, P. (Eds), *Changing curriculum: studies on outcomes-based education in South Africa*. Cape Town: Juta and Co Ltd, pp.133–144.

Blignaut, S. 2006. The policy-practice dichotomy: can we straddle the divide? *Perspectives in Education,* 25(4): pp.49–61.

Borko, H. 2004. Professional development and teacher learning: mapping the terrain. *Educational Researcher,* 33(8): pp.3–15.

Brodie, K., Lelliot, A. and Davis, H. 2002. Forms and substance in learner-centred teaching: teachers' take-up from an in-service programme in South Africa. *Teaching and teacher education,* 18: pp.541–559.

Connelly, F. M. and Clandinin, D.J. 2000. Teacher education – a question of teacher knowledge. In Scott, A. and Freeman-Moir, J. (Eds), *Tomorrow's teachers. International and critical perspectives on teacher education*. New Zealand: Canterbury University Press, pp.89–105.

Department of Basic Education and Department of Higher Education and Training. 2011. *Integrated strategic planning framework for teacher education and development in South Africa 2011–2015.*

Department of Education. 2000. *A South African curriculum for the twenty-first century: Report of the Review Committee on Curriculum 2005*. Pretoria: Department of Education.

Department of Education. 2009. *Report of the Task Team for the Review of the Implementation of the National Curriculum Statement. Final Report. Presented to the Minister of Education, Ms. Angela Motshekga.* Pretoria: Department of Education.

Desforges, C. 1995. How does experience affect theoretical knowledge for teaching? *Learning and Instruction,* 5: pp.385–400.

Ellis, V. 2009. *Subject knowledge and teacher education*. New York: Continuum.

Eraut, M. 2000. Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology,* 70: pp.113–136.

Evans, L. 2002. What is teacher development? *Oxford Review of Education,* 28(1): pp.123–127.

Fleisch, B. 2007. *Primary education in crisis. Why South African schoolchildren underachieve in reading and mathematics*. Cape Town: Juta and Co.

Fraser, C., Kennedy, A., Reid, L. and Mckinney, S. 2007. Teachers' continuing professional development: contested concepts, understandings and models. *Journal of In-service Education,* 33(2): pp.153–169.

Gamble, J. 2009. *The relation between knowledge and practice in curriculum and assessment. A concept paper commissioned by Umalusi.* Pretoria: Umalusi.

Grant, C. 2008. 'We did not put our pieces together': exploring a professional development initiative through a distributed leadership lens . *Journal of Education,* 44: pp.85–107.

Graven, M. 2002. *Mathematics teacher learning, communities of practice and the centrality of confidence.* University of the Witwatersrand, Johannesburg.

Gudmunsdottir, S. 1991. Values in pedagogical content knowledge. *Journal of Teacher Education,* 41(3): pp.44–52.

Hashweh, M.Z. 2005. Teacher pedagogical constructions: a reconfiguration of pedagogical content knowledge. *Teachers and Teaching: theory and practice*, 11(3): pp.273–292.

Henze, I., Van Driel, J.H. and Verloop, N. 2009. Experienced science teachers' learning in the context of educational innovation. *Journal of Teacher Education,* 60(2): pp.184–199.

Hoadley, U. 2007. The reproduction of social class inequalities through mathematics pedagogies in South African primary schools. *Journal of Curriculum Studies*, 39(6): pp.679–706.

Johnson, S., Monk, M. and Hodges, M. 2000. Teacher development and change in South Africa: a critique of the appropriateness of transfer of northern/western practice. *Compare,* 30(2): pp.179–192.

Jones, M. and Straker, K. 2006. What informs mentors' practice when working with trainees and newly qualified teachers? An investigation into mentors' professional knowledge base. *Journal of Education for Teaching,* 32(2): pp.165–184.

Kelly, P. 2006. What is teacher learning? A socio-cultural perspective. *Oxford Review of Education,* 32(4): pp.505–519.

Kennedy, M.M. 1991. Some surprising findings on how teachers learn to teach. *Educational Leadership* (November): pp.14–17.

Knight, P. 2002. A systemic approach to professional development: learning as practice. *Teaching and teacher education,* 18, pp.229–241.

Lieberman, A. and Pointer Mace, D.H. 2008. Teacher learning: the key to educational reform. *Journal of Teacher Education,* 59(3): pp.226–234.

Lieberman, A. and Pointer Mace, D.H. 2010. Making practice public: teacher learning in the 21st century. *Journal of Teacher Education,* 61(1–2): pp.77–88.

Maistry, S. 2008. Transcending traditional boundaries for teacher professional development: exploring a community of practice approach to CPD. *Journal of Education,* 43, pp.127–153.

Mattson, E. and Harley, K. 2003. Teacher identities and strategic mimicry in the policy/practice gap. In Lewin, K., Samuel, M. and Sayed, Y. (Eds), *Changing patterns of teacher education in South Africa. Policy, practice and prospects*. Johannesburg: Heinemann, pp.284–305.

Morine-Dershimer, G. and Kent, T. 1999. The complex nature and sources of teachers' pedagogical knowledge. In Gess-Newsome, T. and Lederman, N.G. (Eds), *Examining pedagogic content knowledge*. Dordrecht: Kluwer Academic Publishers, pp.21–50.

Morrow, W. 2000. Scripture and practices. *Perspectives in Education,* 19(1): pp.87–106.

Morrow, W. 2007. *Learning to teach in South Africa*. Pretoria: HSRC Press.

O'Sullivan, M. 2004. The reconceptualisation of learner-centred approaches: a Namibian case study. *International Journal of Education Development,* 24: pp.585–602.

Pithouse, K. 2001. Adapt or die? A teacher's evaluation of a curriculum 2005 'Re-training' workshop. *Perspectives in Education,* 19(1): pp.154–158.

Pithouse, K., Mitchell, C. and Weber, S. 2009. Self-study in teaching and teacher development: a call to action. *Educational Action Research,* 17(1): pp.43–62.

Putnam, R.T. and Borko, H. 2000. What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher,* 29(1): pp.4–15.

Reynolds, A. 1992. What is competent beginning teaching? *Review of Educational Research,* 62(1): pp.1–35.

Rusznyak, L. 2010. Seeking substance in student teaching. In Shalem, Y. and Pendlebury, S. (Eds), *Retrieving teaching. Critical issues in curriculum, pedagogy and learning.* Cape Town: Juta and Co., pp.117–129.

Ryle, G. 1971. Teaching and training *Collected Papers Vol 2.* London: Hutchinson.

Samuel, M. 2008. Accountability to whom? For what? Teacher identity and the Force Field Model of teacher development. *Perspectives in Education,* 26(2): pp.3–16.

Samuel, M. 2009. Beyond the Garden of Eden: deep teacher professional development. *South African Journal of Higher Education,* 23(4): pp.739–761.

Schwab, J.J. 1978. Education and the structure of the disciplines. In Levit, M. (Ed.), *Curriculum*. Urbana: University of Illinois Press, pp.229–274.

Shalem, Y. 2003. Do we have a theory of change? Calling change models to account. *Perspectives in Education,* 21(1): pp.29–49.

Shalem, Y. 2010. How does the form of curriculum affect systematic learning? In Shalem, Y. and Pendlebury, S. (Eds), *Retrieving teaching. Critical issues in curriculum, pedagogy and learning*. Cape Town: Juta and Co., pp.87–100.

Shalem, Y. and Hoadley, U. 2007. *Political economy of teachers (low) morale.* Paper presented at the Kenton Education Association Conference, Pumula Beach Hotel, 25–28 October.

Shulman, L.S. 1986. Those who understand: knowledge growth in teaching. *Educational Researcher,* 15(2): pp.4–14.

Shulman, L.S. 1987. Knowledge and teaching: foundations of the new reform. In Hartley, D. and Whitehead, M. (Eds), *Teacher education. Major themes in education. Volume III Curriculum and change*. London and New York: Routledge, pp.119–145.

Shulman, L.S. and Shulman, J.H. 2004. How and what teachers learn: a shifting perspective. *Journal of Curriculum Studies,* 36(2): pp.257–271.

Soudien, C. 2007. The 'A' factor: coming to terms with the question of legacy in South African education. *International Journal of Education Development,* 27: pp.182–193.

Taylor, N. 2009. The state of South African schools Part 1: Time and regulation of consciousness. *Journal of Education,* 46: pp.9–32.

Turner-Bisset, R. 1999. The knowledge bases of the expert teacher. *British Educational Research Journal*, 25(1): pp.39–55.

Welch, T. 2002. Teacher education in South Africa before, during and after apartheid: an overview. In Adler, J. and Reed, Y. (Eds), *Challenges of teacher development. An investigation of take-up in South Africa*. Pretoria: Van Schaik, pp.17–35.

Wenger, E. 1998. *Communities of practice: learning meaning and identity*. New York: Cambridge University Press.

Wilson, E. and Demetriou, H. 2007. New teacher learning: substantive knowledge and contextual factors. *The Curriculum Journal,* 18(3): pp.213–229.

Wilson, S.M. and Berne, J. 1998. Teacher learning and the acquisition of professional knowledge: an examination of research on contemporary professional development. *Review of Research in Education,* 24: pp.173–209.

Zeidler, D.L. 2002. Dancing with maggots and saints: visions for subject matter knowledge, pedagogical knowledge and pedagogical content knowledge in science teacher education reform. *Journal of Science Teacher Education,* 13(1): pp.27–42.

Zulu, B. 2010. *Teacher learning in the context of educational reform: a study of economics teachers*. University of KwaZulu-Natal, Pietermaritzburg.

Carol Bertram
Faculty of Education
University of KwaZulu-Natal

bertramc@ukzn.ac.za