Subject knowledge and pedagogic knowledge: ingredients for good teaching? An English perspective.

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Abstract

The term 'pedagogy' has become a more commonly used word in English educational circles, but it is an under-used and partially misunderstood concept. It is the aim of this article to explore some of the factors that lead to effective classroom teaching. The medieval view of teaching was one where only subject knowledge was necessary, but the work of social constructivists has led to a more student-centred approach to teaching that depends largely on learners' activities and within which the pedagogical skills of the teacher can actively promote better learning.

One conceptualisation of teachers' knowledge is that teachers' knowledge is predominantly a 'craft knowledge' which is largely idiosyncratic and non-theoretical. Other conceptualisations suggest that teachers need a deep understanding of several different knowledge bases to develop sophisticated professional expertise. One pertinent issue is one of how teachers transform content expertise into forms that are pedagogically powerful and yet adaptive to the variety of student abilities and backgrounds. Another significant issue is one of reflection. The reflective process includes reviewing, reconstructing, re-enacting and critically analysing one's own teaching abilities and then grouping these reflected explanations into evidence of changes that need to be made to become a better teacher.

In summary, this article examines the importance of subject knowledge and its relationship to pedagogical knowledge. It explores teachers' tacit knowledge and teachers' expertise in transforming content knowledge into a form that is accessible to pupils.

Introduction

In the Nr. 3 (87) 2004 edition of *Edukacja*, I wrote about Creativity and its relevance to humanities education. In that article, I argued that strong subject knowledge was a pre-requisite to effective teaching. This article can be viewed as complementary for in it I explore notions of knowledge that are of relevance to secondary school teaching. I do not offer ontological or

epistemological discussions about the nature of knowledge but I focus on articulating the types of pedagogic knowledge used by teachers. The article takes the form of a critical review supported by case study exemplification.

McIntyre (1993) states that *theory* has been in danger of becoming a 'dirty word' in initial teacher education as initial teacher education courses have focused so much on the practical aspects of teaching. While the Inuit people of North America reportedly have some thirty words to describe snow (they need so many so as to enable them to describe the various conditions that they may encounter), when it comes to describing teaching and learning in the English language, there is a dearth of suitable vocabulary. The term 'pedagogy' has recently slipped into usage in England, but it is still an under-used and party misunderstood concept. Arguably pedagogy has been under-conceptualised, perhaps because teaching is under-valued but also perhaps because of the tacit nature of a teacher's expertise; there has been a lack of recognition of teacher knowledge and teacher expertise (Van Manen, 1999).

One problem is that there is no consensus in the literature of what expert teaching might be and the kinds of knowledge that teachers need to possess (Turner-Bisset, 2001). Ofsted[1] reports, for example, in discussing the quality of teaching, use terms such as 'competent', 'effective' and 'outstanding' to describe teachers' lessons. Ofsted inspectors follow a methodology that uses competency-based criteria for their assessment decisions and while there may be a fitness-for-purpose for its use in the Ofsted assessment framework, there are limitations to competency-based assessment (Wolf, 1995).

In trying to understand what Ofsted inspectors mean by 'competent', 'effective' and 'outstanding', one could start by inquiring as to what constitutes a good lesson. Does the lesson have to be relevant and worthwhile? Does the lesson have to be well-paced and engage students? Does the lesson have to cater for different student learning styles? Indeed one would imagine that a good lesson would have all of these qualities.

[1] The Office for Standards in Education is the inspection body of educational standards in England and Wales.

But how may one evaluate the effectiveness of the lesson? Does one focus on the teacher and what is taught, or on the learner and what is learnt? It seems logical to assume that there is a relationship between good teaching and effective learning and that an 'expert' teacher is someone who has proficiency in combining the subject content that he or she teaches with the needs of his or her pupils.

Cullingford (1995) offers five qualities of an effective teacher: integrity, learning, organisation, communication and humour. Kyriacou (1997, p120) offers ten characteristics of effective teaching:

- Clarity of the teachers' (sic) explanations and directions
- Establishing a task-orientated classroom environment
- Making use of a variety of learning activities
- Establishing and maintaining momentum and pace for the lesson
- Encouraging pupils' participation and getting all pupils involved
- Monitoring pupils' progress and attending quickly to pupils' needs
- Delivering a well-structured and well-organised lesson
- Providing pupils with positive and constructive feedback
- Ensuring coverage of the learning objectives
- Making good use of questioning techniques

The DfEE (2000) Hay McBer report identifies three groups of factors that influence pupil progress: teaching skills, professional characteristics and classroom climate. The report, however, makes no reference to the kinds of specialist knowledge that teachers may need and there appears to be an implication in the report that effective teaching can be assessed against predefined standards (i.e. those described in 'Qualifying to Teach', 2002).

Shulman and Shulman (2004) aver that teaching makes extraordinary performance demands of teachers, and Eraut (1994) states that effective teaching involves utilising a whole range of different types of knowledge and expertise. The knowledge that teachers need is multi-faceted and a teacher needs a deep understanding of several different knowledge bases together

with acquired professional expertise. Shulman (1987) suggests that there are seven such categories of knowledge bases: content knowledge; general pedagogical knowledge; curriculum knowledge; pedagogical content knowledge; knowledge of learners and their characteristics; knowledge of educational contexts and knowledge of educational ends. He identified pedagogical content knowledge as being of special interest: the blending of sound subject knowledge together with an understanding of pedagogy.

Knowledge for teaching

Lawlor (1990) describes the medieval view of teaching as one where only subject knowledge is necessary. i.e. where a deep knowledge of subject content is of primary importance. She adds that the university sector and the public school sector have subscribed to this conceptualisation until relatively recently. Bolhuis & Voeten (2004) argue that secondary school teachers have traditionally conceived subject matter as a static body of knowledge to be transmitted to students. When the teacher is 'imparting' such facts and procedures, then learning takes the form of passive absorption of knowledge. The work of social constructivists such as Piaget, Vygotsky and Bruner has led to a more student-centred approach to teaching that depends largely on learners' activities and within which the pedagogical skills of the teacher can actively promote better learning. This conceptualisation of teaching requires learners to be independent thinkers and to critically examine the procedure of knowledge construction. Classroom activities devised by teachers subscribing to a social-constructivist conceptualisation of teaching are more likely to require students' reasoning, discovery learning, problem-solving, data gathering, applying and communicating ideas.

Brown and McIntryre (1993) state that to be asked about the ordinary, everyday things that one does spontaneously, routinely and habitually in the classroom is to be presented with a very difficult task. They argue that teachers are unaccustomed to this, and that teachers find these the hardest to articulate and make explicit. Eraut (1994) states that technical knowledge can be written about and codified, but practical knowledge is learnt through

experience and may not be suitable for codification. Loughran et al. (2003) state that in the teaching profession it is rare for teachers to consider what they know about teaching in ways that may be documented. When teachers talk to colleagues, discussions tend to be anecdotal and knowledge of practice is implicitly embedded (ibid).

Another problem is that teachers' knowledge may be elusive because the research community does not yet have the necessary language to discuss that knowledge adequately. Loughran et al. (2003) argue that, to improve the quality of student learning, it is important to uncover teachers' pedagogical knowledge and to document it in such a way as to enable the transfer of knowledge to the benefit of the teaching community.

Eraut (1994, p60), with reference to teaching, states that: "theories may be acquired from many different sources, for example, pre-course experience, school experience, student colleagues, university teaching and reading". Eraut distinguishes theory as 'public' and 'private'. Public theory refers to available theories such as Piagetian theory or Vygotsky theory. Eraut avers that public theories may be discussed, criticized and written about by teachers without affecting their practice: "they may not ever get used" (p63).

Private theories, in contrast, are conceptualisations in people's minds which they use to interpret or explain their experiences. Teachers will theorise about their own classroom experiences, other teachers' classroom dynamics, other teachers' experiences, pupils' understandings and so on; this teacher-theorisation may or may not be explicit, but much of it will be tacit, as teachers are unable to articulate much of their theory. Tacit knowledge can be made explicit when either the person in question learns how to articulate it or if a colleague or researcher makes it explicit and receives the respondent's verification.

In looking at the classroom context of knowledge, Eraut (1994) argues that a teacher is not so much in a 'knowing' environment as in a 'doing' environment. While classroom research may describe and interpret teaching activities, one still has to acknowledge that seeing like an observer cannot be

the same as seeing like a teacher, for a teacher sees from within an action and not from outside it. Moreover, the classroom is an ordered environment in which norms and routines play an important part and teachers develop implicit theories of action in order to make their professional lives more manageable. In teaching, there are so many variables to take into account at once that teachers develop routines and decision-habits to keep their mental effort at a maintainable level.

Eraut goes on to state that this evolution and internalisation of a theory of action is one aspect of learning to become a teacher who can cope in busy classroom environments and that, while in other contexts there may be systems to validate knowledge (for example in academia the citing of others' work), in the classroom context the only significant validation of knowledge are the teachers themselves. This in itself is not a problem but, if teachers wish to improve their own practice, Eraut recommends that evaluatory systems should be used.

Eraut's argument contrasts sharply with Shulman's (2004, p324) who states that teachers are not always aware of their own performances: "The act of teaching itself demands so much attention and energy that it is difficult for any teacher, especially when under some pressure, to monitor his or her own performance with great accuracy". Shulman gives the example of a student teacher whom he had observed who had planned to develop students' thinking through Socratic dialogue. In the lesson he had answered most of his own questions with the students listening passively, yet his perception of the lesson afterwards was that he had engaged effectively with his class.

Eraut (1994) suggests that a useful perspective may come from looking at other performing occupations. Most performing occupations offer considerable opportunity to observe master-performers at work both before and after initial training. Even after a long period of technical training, developing one's own style takes time; and one needs to see a range of other performers in order to learn, experiment, reflect and create one's own interpretations. Why then, Eraut asks, do teachers not get these kinds of opportunities?

He suggests two factors that may be of relevance. Firstly, teachers' career structures do not stress quality of classroom performance; although many teachers are still personally motivated by the ideal of quality performance. Secondly, INSET has rarely been presented to, or perceived by, teachers as a natural and on-going activity that is designed to help one to become a better classroom practitioner.

Huberman (1983) conceptualises teachers' knowledge as craft knowledge, which he describes as largely idiosyncratic and non-theoretical. Some authors are disapproving of teachers in this respect; for example, Jackson (1968) criticises teachers because their language is conceptually simple, because they seem uninterested in causes or underlying patterns, because they prefer intuition to analysis, and because, in spite of their lack of analysis, teachers are opinionated. But Huberman is supportive of craft knowledge and argues that improvements in teaching come from tinkering rather than from systematic reflection. Kennedy (2002) argues that the acquisition of craft knowledge is motivated largely by dissatisfaction with events and a desire not to repeat the same mistakes again. However, if teachers routinely notice problems (in their classrooms) and generate ideas for how to handle these situations better in the future, then a great deal of learning could follow from the process of self-evaluation (Huberman, 1983).

Fenstermacher and Soltis (1998) categorized knowledge into formal and practical knowledge. They describe 'formal knowledge' as resulting from the process-product studies on effective teaching and 'practical knowledge' as the practical, personal, situated, local, relational and tacit knowledge. Fenstermacher and Soltis consider both kinds of knowledge as important in understanding how teachers learn to teach. Teachers will acquire systemic knowledge mainly through study at university, the reading of research articles, and the reading of professional journals. This knowledge tends to be theoretical, codified and abstract. In contrast to Eraut, Kennedy (2002) reports that many teachers are emotionally committed to what they had learnt in this way and that, as a source of ideas, systemic knowledge provides a unique contribution to teaching. Prescriptive knowledge is generally acquired

through institutional policies and is characterised by 'should' and 'ought' statements. Kennedy suggests that many teachers show a complacent acceptance of prescriptive knowledge. While they show a sense of responsibility to ensure that students learn whatever content is required of them so that they will be adequately prepared for public examinations, teachers do subvert public policy legislation by filtering the stated requirements through their own prior beliefs and values systems.

Each type of knowledge described above offers its own benefits to teachers and teachers need an understanding of all of them. Acquiring new ideas comes from many sources and a consideration of one kind of knowledge certainly does not invalidate other types.

Knowledge bases for teachers

Turner-Bisset (2001) states that teaching is not a matter of skill or competency alone as teachers need a deep understanding of several different knowledge bases to develop sophisticated professional expertise. Shulman (1986) argues that the literature on teaching focuses on management of classrooms, organisation of activities, allocation of time for activities, assessment, praise, and questioning technique whereas the consideration of lesson content is under-conceptualised. Goodson (1998) states that relationships within subject matter remain unexplored and under-theorised.

Shulman (1986a, 1986b, 1987) states his interest in questions teachers ask and the explanations they offer. He is interested in where teacher explanations come from and how teachers decide what to teach, how to represent what they teach, how teachers question students about subject content and how teachers deal with problems of pupils' misunderstandings. Shulman observes that new teachers begin with expertise in the content they teach and an important issue for him is the transition they make from expert student to novice teacher. Fuller and Bown (1975) articulated a three-stage model of student-teacher development. They aver that concerns of student teachers shift outward from an initial pre-occupation of self to a focus on tasks

and teaching situations, and finally to consideration of the impact of their teaching on pupils. However, subsequent studies have challenged this model of discrete stages (see Burden, 1990 and Guillaume & Rudney, 1993). These studies show that it is possible to discern a number of types of progression amongst beginning teachers and that there were no common starting points for all beginning teachers. Furthermore, beginning teachers showed different rates of development.

Nevertheless, the issue of transition remains and Shulman (1986) ponders how beginning teachers transform their content expertise into a form that secondary students can understand. For example, when faced with unclear texts from books, how does a beginning teacher generate new explanations, representations and clarifications? What are the sources of analogies, metaphors, examples and re-phrasings? How does the beginning teacher draw on expertise in the subject matter in the process of teaching? And what pedagogical prices are paid when a teacher's subject matter competence is itself compromised by deficiencies of prior education or ability? Shulman (1986a, 1986b, 1987) rejects the usual pedagogy-content dichotomy as ineffective and takes an in-depth look at content knowledge, which he breaks down into a number of constituent parts.

Subject content knowledge is concerned with the subject matter to be taught, and it encompasses what Bruner calls the structure of knowledge: the theories, principles and concepts of a particular discipline. It is concerned with the organisation of basic concepts (substantive structures) and the ways to validate them (synactic structures). Teachers must be able not only to define and explain the subject content that they are teaching to their pupils but also to explain why a particular proposition is deemed warranted and worth knowing (Shulman, 1986b).

General pedagogical knowledge is the generic knowledge about teaching gained from practice. The sort of knowledge to which Shulman is referring is knowledge of, for example, how to settle a class, how to attract and hold the attention of the class and how to manage educational resources. Much of general pedagogical knowledge appears to be procedural and learnt from

practice; yet it is also likely, given that it is grounded in practice, that general pedagogical knowledge is constructed from innumerable 'cases' of teaching, and has a substantive base (Turner-Bisset, 2001). It follows that an understanding of pupils' learning is a necessary requirement for good teaching to be possible and that consequently the expert teacher will have a pedagogical repertoire of teaching techniques.

Shulman (1986b) describes curriculum knowledge as the 'tools of the trade' of teachers. Curriculum knowledge is knowledge of the curriculum in its widest sense, of the whole curriculum laid down for pupils, the programmes of study, and the kinds of curriculum materials used to teach each subject. Curriculum materials from other subjects are included to enable creation of cross-curricular connections. Teachers should also be familiar with what has been studied previously and what will be studied in the future.

Shulman (1986a, 1986b, 1987) reports various studies showing that teachers possess high levels of pedagogical content knowledge. For Schulman, pedagogical content knowledge conceptualises teachers' expert knowledge and in a sense it is an amalgam of various teachers' expertises. Teachers construct versions of reality that fit the experience of the context. Pedagogical content knowledge is knowledge that is constructed from knowledge of environmental contexts, knowledge of students, knowledge of pedagogy and of subject matter. It is knowledge that has been specifically crafted by teachers for fitness of purpose. In the early days of one's teaching, a fundamental concern for a teacher is how to communicate one's own subject knowledge i.e. how can learners come to know and understand what the teacher knows and understands? The problem is one of representation: communicating concepts and processes of a subject discipline. For Schulman, representation is the process of turning subject knowledge into knowledge for teaching which lies at the intersection of subject knowledge, pedagogy and knowledge of one's students as learners.

Shulman (1986b) offers additional categories of knowledge bases that contribute to pedagogic content knowledge. Knowledge of learners includes general knowledge of what pupils of a certain age are like and specific,

context bound, knowledge of a group of learners, i.e. 'my class'. Knowledge of educational contexts is in the broadest sense knowledge of all settings where learning takes place. Teaching contexts may have a significant impact on teaching performance, and there are a range of contextual factors that affect teachers' development and classroom performance. These include the socio-economic level of the catchment area; the type and size of school; the class size; the amount and quality of support teachers and other colleagues give to each other; the feedback teachers receive on their performance; the quality of relationships in the school; and the expectations and attitudes of the headteacher.

There is a further aspect to teaching and that is its socio-moral element. Shulman (1986b) states that teachers have both short-term goals and long-term aims and that teachers should be explicit of the ethical and moral dimensions in their thinking and in their lesson planning.

Transformation

Shulman (1987) states that the key to characterising the knowledge base of teaching lies at the intersection of content and pedagogy in teachers' capacities to transform content knowledge into forms that are pedagogically powerful and yet adaptive to the variety of student abilities and backgrounds. Shulman describes five sub-processes in the transformation process: 'preparation', 'representation', 'instructional selections', 'adaptation' and 'tailoring of instructions'.

Preparation involves examining and critically interpreting resources that will be used in the lesson in terms of teachers' own understanding of the subject matter. Representation involves thinking through the key ideas of the lesson and identifying alternative ways of representing them to students. This includes analogies, metaphors, examples, narratives and simulations that can help to build a bridge between the teacher's comprehension and that desired for the students. 'Instructional selection' occurs when teachers draw upon a range of approaches for teaching and learning, such as Socratic dialogue,

discovery learning, project methods, learning outside classroom settings. Adaptation is the process of fitting the represented material to the characteristics of the students so as to reflect the characteristics of the students' learning styles. Tailoring of instruction entails fitting representations not only to particular students but also to a group of a particular size, disposition, receptivity, and interpersonal 'chemistry' (ibid).

Treagust and Harrison (1999) argue that expert explainers use imaginative and expressive devices to make sense of abstract, difficult and non-observable science concepts; in so doing they provide explanations that accommodate the explainer, the audience, the content and the context. Effective pedagogical explanations make use of language that makes sense to the audience by means of metaphors, analogies and stories. Russell and Shawl (1999) argue that teachers' knowledge is personal, context-rich and elusive.

Clearly, learning how to develop good representations is an important part of becoming an expert teacher. To illuminate my arguments with an example, I will now describe a lesson that I observed on human resource management (HRM) taught by a beginning teacher to a group of sixth formers studying for a vocational GCE. The beginning teacher, in an inner city Manchester Sixth-form College, had good classroom presence, made good use of space in the room and used question-answer teaching strategies effectively to develop the understanding of his students. His lesson was well paced and was broken up into a number of episodes so as to provide variety and to maintain the interest of his students. In one part of the lesson, he related the technical content of job specifications to his students in two ways – through a case study that they were using as part of their summative assessment and through examples of part-time jobs of his students - the teacher had taken the trouble to investigate these prior to the lesson.

Throughout the lesson, students were engaged, answered questions correctly and at the end of the lesson made presentations that appeared to be appropriately pitched and focused. I deemed the lesson as 'outstanding' using my observational criteria.

Now I would like to hypothesise for a moment. What if the same lesson were to be taught to a different group of students in the same school? Would it be as successful? What if the same lesson were to be taught to a group of highly academic students in an independent school?

Such a hypothesis makes no sense, for it is not possible to teach 'the same lesson' again. While the content of the lesson may be broadly the same, the success of the new lesson depends on the teacher's skill in relating the content knowledge to the values and experiences of the students in the class. This point emphasises the importance of the social context to learning, differentiates learning from teaching, and demonstrates how a teacher can transform subject content knowledge into a form accessible to his or her students.

Over time teachers will develop a repertoire of subject knowledge representations from outside sources and by their own creativity. As these representational repertoires develop, teachers have more options in connecting pupils with subject matter. This is an important part of learning to teach.

Reflection

The reflective process includes reviewing, reconstructing, re-enacting and critically analysing one's own teaching abilities and then grouping these reflected explanations into evidence of changes that need to be made to become a better teacher (Lave and Wenger, 1990). Reflection is widely recognised as a crucial element in the professional growth of teachers. It is assumed that reflection is intrinsically good and that reflective teachers will improve as teachers (Calderhead and Gates, 1993). McIntyre (1993) describes three levels of reflection: the technical, the practical and the critical. He suggests that in the early stages of their teaching practice, beginning teachers reflect mainly on the technical, for example in achieving certain goals such as the management of group work. The practical level is more

general and concerns articulating the development of one's own practice. Critical reflection concerns wider political, social, cultural and ethical issues and is, according to McIntyre, rarely practised even amongst experienced teachers.

Schon's (1983) argument is that professional expertise does not depend on the application of general theoretical knowledge but that what is important is experience-based knowledge. Schon distinguishes between knowing-in-action and reflection-in-action; if a teacher views reflection only as a means of judging his or her performance, then his/her prospects for improvement are somewhat stunted. If, on the other hand, he or she views reflection as a way of increasing his/her understanding of teaching and of themselves as a teacher then he/she will possess a powerful tool to help them improve (Schon, 1983, 1987).

Reflection *on teaching* focuses on what happens in a lesson and why it happens in that way. A teacher might focus on the way that a group of students seemed to struggle with an idea that he or she was trying to help them to understand. There are many different types of explanation that could be offered for this kind of problem: for example, teachers might explain it by arguing that the students had been ill-prepared or poorly motivated. Teachers might think that the students are simply 'weak students' and their failure to understand can be taken as evidence of their lack of ability. Alternatively teachers might look for explanations in the way that they taught the lesson. Teachers might think about the way they communicated ideas: for example, 'Was my presentation clear?' or 'Did I rush through the steps in the reasoning?'. Teachers might think about their assumptions about the readiness of the students to understand this idea. What was assumed about their previous thinking and their ability to process information that was presented to them? What was assumed about their prior experience and what opportunities were given to them to work out relationships between new and old information? Each of these questions focuses on what happened and why it happened. Some beginning teachers will tend to explain the problem in terms of the students' abilities, some will explain the problem in terms of their

communication of the idea and others will tend to explain the problem in terms of the assumptions they had made.

Reflection *on oneself* as a teacher begins when teachers ask themselves 'Why am I trying to explain what has happened in this way?'. Wood (1996) found that beginning teachers tended towards four different types of explanation that reflect different ways of conceptualising teaching:

- 'Teaching as imparting knowledge'; for example, one trainee described teaching as "…you get to transmit knowledge in a clear and logical way…".
- Describing teaching as 'preparing pupils to use knowledge'; for example, one trainee described what they tried to do as "…to adapt the knowledge that you have. In a sense try to extract it through the kids rather than giving it to them…".
- 'Providing opportunities for students to see the existence of different perspectives on a phenomenon'; for example, one trainee argued that "…having arguments in the lesson seems to make lot of sense…they were really having to think about it…" and another trainee referred to "…the teacher as the catalyst and pupils take it from there…the teacher starts something off and hopes the others will pick it up. Then it will evolve from there…the teacher can learn from the kids…".
- 'Preparing students to be reflective'; for example, one trainee described their teaching as "…pupils are given the opportunities to interpret their understanding rather than just relating it to very structured knowledge…" (ibid).

For Wood, these four categories form a hierarchy. Many beginning teachers begin with the first type of conception, focusing on imparting what they know. Moving on from this way of thinking is crucial to making progress during the PGCE[2] year.

[2] Post Graduate Certificate in Education. Most teachers in England will initially have passed a first degree in their specialist subject followed by a PGCE – a full-time, intensive one-year post graduate teaching course within their subject area.

It is my argument that it is more helpful to think of these different ways of thinking about teaching as a list of options rather than as a simple hierarchy. Developing as a teacher involves becoming more adept at recognising the circumstances in which it is better to think about one's teaching in one way rather than another. There are occasions when it is more appropriate to think of teaching principally in terms of communicating an idea clearly. There are other occasions when it is more appropriate to think of teaching as 'helping students to reflect on their understanding'.

Shulman and Shulman (2004) argue that critical reflections are at the heart of learning and that reflection is the key to teacher learning and development. In relation to reflective practice, Eraut (1994, p71) discusses beginning teachers' disposition to theorise: "If beginning teachers acquire and sustain this disposition they will go on developing their theorizing capacities throughout their teaching careers, they will be genuinely self-evaluative and they will continue to search for, invent and implement ideas. Without it they will become prisoners of their school experience".

Qualified teacher status

For beginning teachers to be awarded qualified teacher status in England and Wales, they must demonstrate a number of competences. These competences, know as *Standards,* are expressed in the DfES/TTA publication *Qualifying to Teach* (2002). The Standards are categorised into three sections: professional values and practice; knowledge and understanding; teaching. Professional values and practice refer to what Shulman (1986b) describes as the aims of teachers in relation to the ethical and moral dimensions in their thinking and in their lesson planning. For example, Standard 1.3 states that teachers should "demonstrate and promote the positive values, attitudes and behaviour that they expect from pupils" (p6).

In relation to the second category of Standards, knowledge and understanding, Tickle (2000) argues that the Standards (he refers to the previously published Standards from DfEE circular 4/98) are based on the

academic-vocational tradition, which asserts that teachers are the "substantial guardians and disseminators of cultural knowledge for new generations" (p40). For example, beginning teachers must show that they: "have a secure knowledge and understanding of the subject(s) they are trained to teach …at a standard equivalent to degree level" (Qualifying to Teach, 2002, p7).

Tickle (2000) points to a number of problems with this view of the role of subject knowledge. He suggests that the subject-expert is still "defined within western traditions of nationalism, rationalism, and vocationalism", and argues that even if this view of the teacher is sufficient for developed nations in the twenty-first century, current models of teacher education make it hard for students to achieve the "depth and range of expertise and the flexibility to handle multiple contents at both personal and pedagogical levels" (p41).

He suggests that, in the light of lack of expertise, three routes are followed. First, teachers may feel a sense of inadequacy, self-doubt and guilt and seek to develop coping strategies for compliance with curriculum content requirements. Secondly, teachers may acknowledge their deficiencies, and embark on a learning agenda that seeks to secure greater knowledge and expertise. Thirdly, teachers may develop attitudes of enquiry and openness centred on the diversity and dynamic of knowledge, its multiple cultural foundations, and its essential conventions and mysteries. It is perhaps this third route that represents an excitement about teaching and learning.

Part 3 of the TTA Standards refer to 'teaching' and I have reproduced a selection for consideration in Table 1.

Table1 Extracts from the Standards for Qualified Teacher Status in relation to setting objectives and planning lessons

3.1.1	They set challenging teaching and learning objectives which are relevant to all pupils in their classes. They base these on their knowledge of: the pupils: • evidence of their past and current achievement • the expected standards for pupils of the relevant age range • the range and content of work relevant to pupils in that age range.
3.1.2	They use these teaching and learning objectives to plan lessons, and sequences of lessons, showing how they will assess pupils' learning. They take account of and support pupils' varying needs so that girls and boys, from all ethnic groups, can make good progress.
3.3.3	They teach clearly structured lessons or sequences of work which interest and motivate pupils and which: • make learning objectives clear to pupils • employ interactive teaching methods and collaborative group work • promote active and independent learning that enables pupils to think for themselves, and to plan and manage their own learning.

I will now consider the application of the Standards in Table1 through a case study (Figure 1). This case study is provided by Rob Randall from the London Oratory School in West London. Although there are plenty of opportunities to observe what teachers do, it is less easy to infer the reasoning that underpins their practice. The lesson is an AS level economics lesson on 'Elasticity of Demand' and the principles are applicable to teaching other aspects of business and economics at other levels.

Figure 1: An example of a teacher's lesson planning

Lesson Objectives

"The Edexcel specification states that pupils should be able to *'define measure and interpret price elasticity of supply; price, income and cross elasticity of demand.'* In writing this account I have tried to capture my thought processes as I planned, delivered and evaluated a lesson on the topic of elasticity.

Reference is sometimes made to the 'heartbeat' of a lesson. I take this to suggest a sequence of learning in which discussion is followed by teacher-centred activities, pupil-centred activities and then a plenary (usually through a question and answer session). Whilst it is very helpful to think of each lesson in chunks like this, I worry that this can lead to overlooking the bigger picture in which students are able to build up a holistic understanding of the subject, relating different parts of the specification and developing their ability to analyse and evaluate. The constant dilemma of

covering content through a teacher-centred approach versus helping students to develop their own integrated understanding of the subject is one which plagues much of my planning.

Price elasticity of demand is a topic which regularly appears in examination questions. To emphasise its importance I often tell my pupils that it is used to test their powers of analysis and evaluation and can often be used in a wide variety of circumstances. I set myself objectives based upon what I want the pupils to learn. These are quite broad and based upon the course specification: 1) Pupils should be able to define and measure price elasticity of demand and 2) Pupils should be able to interpret price elasticity of demand and explain its significance in relation to consumers, producers and the government.

Lesson Organisation

Having established my objectives I begin every topic or lesson by letting the pupils know the intended aims by either verbal or written communication. I feel this is important to ensure the pupils themselves know the focus of their own learning. I often begin a lesson with a 'way-in' that introduces a topic by arousing students' interest. Price elasticity of demand has many practical applications and I often start by asking one student about their buying habits to highlight how their demand for a product would be affected by its price.

When first qualified I would have approached this topic in a very teacher-centred manner. I provided the students with definitions, calculations and diagrams via a handout which I worked through with the class answering any questions. I was preoccupied with ensuring that students had 'covered the topic' in sufficient depth to answer examination questions. Over time my approach has changed as I realised that this strategy does not maintain students' interest and this leads to failing to achieve the learning objectives. It took me a few years but I have realised that the teacher does not have to be talking for the students to be learning and that if you provide the framework the students can take responsibility for their own learning.

If they are to take responsibility they must have got feedback on their progress. I have got into the habit of building into my lesson plans a quick re-cap at the beginning of the lesson on the key ideas covered in the previous lesson and a five minute review at the end of a lesson on the work we have covered. Within the topic of elasticity this may take the form of a question and answer session on definitions. I might ask 'Is a product with a PED of -1.5 elastic or inelastic?' This also gives me an opportunity to focus on the quiet members of the group.

Another form of assessment to test the learning of pupils is the use of homework to examine knowledge and understanding of a particular topic. There are a number of textbooks which include a whole range of data response questions, but in the past I often used examination papers in an attempt to get the students accustomed to the examination format and type of questions. The students themselves are also very inquisitive to see the structure of the paper they will be taking. The one problem I find with setting examination questions for homework is that students will often spend a couple of hours in an effort to get the best possible grade. I would prefer them to spend 30 minutes (in the case of a data response question on elasticity) to develop their time management techniques. I now very rarely set examination

questions for homework. Instead I give these questions as timed exercises within the classroom (student-centred strategy) and then with the use of discussion, the examination mark scheme and the students' self assessment as methods of improving performance.

Writing about my lesson planning has prompted me to wonder whether I should consider an alternative technique in which I give the students different products with different price elasticities of demand. I could then structure the lesson around supporting students' enquiry into the reasons for these differences in elasticity and the significance of the differences for each market."

(Davies and Brant, 2006)

Rob refers to the specification when deciding his lesson objectives which are written in terms of the achievement that he wants students to demonstrate. So he is clearly taking into account the expected achievements for students of this age range and ability. He also discusses the implications of his objectives for his style of lesson. He describes how his lesson objectives require him to design a lesson that gives students the opportunity to develop the analytical evaluation skills required by his lesson objectives. In fact, he goes beyond this by commenting on the need to think holistically about his objectives for students, rather than restricting his vision to a single lesson (QTS Standard 3.1.1). He comments on how he will assess students' learning and he refers to some advantages and disadvantages of the alternatives between which he is choosing (QTS Standard 3.1.2). He has also structured the lesson in a way that tries to make the learning objectives clear to students and which engages them in purposeful ways to develop their understanding (QTS Standard 3.1.3).

Discussion

There is a growing literature that recognises the expert knowledge that teachers bring, in engendering students' learning for understanding rather than passive learning for recall of propositional knowledge (Loughran et al. 2003). Despite the recognition of the link between teaching and learning, teaching itself is often undervalued and other professionals often do not understand much of the knowledge on which teachers draw. The research

community does not articulate or document this knowledge well, partly because this knowledge tends to be tacit in nature and it is often difficult to make this explicit.

Loughran et al. (2003) articulate a number of issues when attempting to document teachers' expertise. First, the problematic nature of seeing knowledge in practice; secondly, the working life of most teachers does not systematically include times for connecting with advances in the knowledge base of their own profession; thirdly, the social culture of teachers does not create an expectation to discuss practice in ways that demonstrate such knowledge; and finally, teachers do not necessary take their own knowledge seriously, leaving it untapped and known only to the beholder.

Cochran-Smith and Lytle (1999) argue that what is needed is clearer understanding about the definitions of knowledge and of how that knowledge may be expressed. Mitchell (1999) points to the problem of communicating research findings to teachers, as most teachers do not read academic journals. Conceptualising teacher-knowledge as having elements of craft, science and art, Mitchell refers to the apparent conflict between what beginning teachers are told at university and the teacher-culture that views teaching solely as a craft. He reports that teachers are suspicious of grounding practice in empirical research and he argues that what is missing in the literature is the craft knowledge needed to make academic knowledge work and the classroom wisdom that is needed to make any intervention or change work. He argues that improving classroom practice requires both craft (i.e. practice-based knowledge) and science (i.e. research-based knowledge), but that the complexity of the classroom means that there are elements of art (i.e. natural flair) needed too. Some aspects of teaching are highly creative and cannot be taught in advance and Mitchell argues that there may be a fine line between lessons that are perceived as intriguing and inspiring and those perceived as boring and confusing.

There is an old adage that one never really learns something until one has to teach it. Through teaching whatever the concept or idea may be in question, one has to struggle to find out what the concept really means and how to deal

with the questions and problems that are likely to arise. This 'struggle' is a necessary and important element in the work of teachers, especially at the lesson-planning stage. But understanding subject 'content' is only part of the story. Teachers need to transform subject content knowledge in a way that makes it interesting and comprehensible to their students and in a sense this is the 'bread and butter' of teaching. Much of this expert pedagogical subject knowledge that teachers possess is tacit and it is thus a challenge for teachers and researchers to make it explicit and consequently in a form that is transferable, so that other teachers may learn from their more experienced colleagues. The concept of an expert-teacher knowledge base is one that has not been fully articulated in the research literature and therefore one that warrants further research and investigation.

While consistent within a social constructivist framework, the concept of an expert teacher knowledge base does not imply a style or recommended approach to a teacher's repertoire of approaches. Rather it suggests optimism, in the sense that teachers can make a difference in the pace and progress of their students' learning.

For the secondary school teacher, the challenge is an interesting one since pupils' thinking is directly shaped by their experiences of life, but only in so far as this experience has influenced their perceptions of the world. Pupils' learning is also shaped by the perceptions they have developed as a result of their experience of learning. Good teaching is not simply a matter of 'building on' these prior perceptions because new ideas must be embedded in pupils' thinking if they are to become part of the way they see the world. This may require getting pupils to recognise the limitations of their current thinking. In teaching business studies for example, the challenge is to get students to see business not just from the point of view of a consumer but also from the point of view of other stakeholders, thus enabling them to develop a different view that replaces what was there before. Teaching which does not *change* what students think is unlikely to have a lasting impact.

For me, the challenge is in getting beginning teachers to change *their* ways of thinking about teaching and learning. Beginning teachers come on the PGCE

with many preconceptions and experiences of learning. I believe that good teacher education is not just about building on these prior learning experiences but getting beginning teachers to recognise the limitations of their current thinking. An example of this may be to get beginning teachers to see the lesson from the point of view of pupils' learning outcomes rather than content which is to be covered. Teacher education which does not change what beginning teachers think is unlikely to have a lasting impact.

References

Bolhuis, S and Voeten, J (2004) Teachers' conceptions of student learning and own learning in *Teachers and Teaching*, Vol. 10 No. 1, pp 77-98

Brown, S and McIntryre, D (1993) *Making Sense of Teaching*, Buckingham: Open University Press

Burden, P (1990) Teacher development in Houston, W (Ed) *Handbook for Research on Teacher Education*, Basingstoke: Macmillan

Burn, K, Hagger, H, Mutton, T and Everton, T (2003) The complex development of student-teachers' thinking in *Teachers and Teaching: theory and practice*, Vol 9 No 4, pp 309-331

Calderhead, J and Gates, P (1993) *Conceptualising Reflection in Teacher Development*, London: Falmer Press

Cochran-Smith, M and Lytle, S (1999) Relationships of Knowledge and Practice: Teacher Learning in Communities, in Iran-Nejad, A and Pearson, P (Eds) Review of Research in Education, No. 24, Washington DC American Education Research Association, pp 249-305

Cullingford (1995) *The Effective Teacher*, London: Cassell

Davies, P and Brant, J (2006) *Teaching School Subjects 11-19: Business, Economics and Enterprise*, London: Routledge Falmer.

DfEE (2000) *Hay McBer Report*, London: DfEE

DfES/TTA (2002) *Qualifying to Teach*, London: Teacher Training Agency

Eraut, M (1994) *Developing Professional Knowledge and Competence*, London: Falmer Press

Fenstermarcher, G and Soltis, J (1998) *Approaches to Teaching*, London: Teachers' College Press

Fuller, F and Bown, O (1975) Becoming a Teacher in Ryan, K (Ed) *Teacher Education: the seventy-fourth yearbook of the national society for the study of education*. Chicago: University of Chicago Press

Goodson, I (1998) *Subject Knowledge: Readings for the Study of School Subjects*, London: Falmer Press

Guillaume, A and Rudney, G (1993) Student Teachers' growth towards Independence: an analysis of their changing concerns, in *Teaching and Teacher Education*, Vol 9, pp 65-80

Huberman, M (1983) Recipes for busy kitchens, in *Knowledge: Creation, Diffusion, Utilisation*, Vol. 4, No. 4, pp 478-510

Jackson, P (1968) *Life in classrooms*, New York: Holt, Rinehart and Winston

Kennedy, M (2002) Teaching and Knowledge in *Theory and Practice*, Vol. 8 No. 3/4, pp355-370

Kyriacou, C (1997) *Effective Teaching in Schools: Theory and Practice*, Cheltenham: Stanley Thornes

Lave, J. and Wenger, E. (1990). *Situated Learning: Legitimate Peripheral Participation*, Cambridge: Cambridge University Press

Lawlor, S (1990) *Teachers Mistaught: Training in Theories or Education in Subjects,* London: Centre for Policy Studies

Loughran, J, Mitchell, I and Mitchell, J (2003) Attempting to Document Teachers' Professional Knowledge in the *Journal of Qualitative Studies in Education*, Vol. 16 No. 6, pp 855-873

McIntyre, D (1993) Theory, Theorizing and Reflection in Initial Teacher Education in Calderhead, J and Gates, P (ed) *Conceptualising Reflection in Teacher Development*, London: Falmer Press pp39-52

Mitchell, I (1999) Bridging the Gulf between Research and Practice in Loughran, J (ed) *Researching Teaching: Methodologies and Practices for Understanding Pedagogy*, London: Falmer Press pp 44-65

Russell, T and Shawl, B (1999) Discovering our Professional Knowledge as Teachers: Critical Dialogues about Learning from Experience in Loughran, J (ed) *Researching Teaching: Methodologies and Practices for Understanding Pedagogy*, London: Falmer Press pp 132-152

Ryle, G (1949) *The Concept of Mind*, London: Hutchinson

Schon, D (1983) *The Reflective Practitioner: How Professionals Think in Action*, New York: Basic Books

Schon, D. (1987) *Educating the Reflective Practitioner: Towards a New Design for Teaching and Learning in the Professions*, San Francisco: Jossey-Bass

Schwarb, J (1964) The Structure of the Disciplines: Meanings and Significances in Ford, G and Pugno, L (eds) *The structure of knowledge and the curriculum*, Chicago: Rand McNally pp 6-30

Shulman, L (1986a). Paradigms and research programmes in the study of teaching: a contemporary perspective, in Wittrock, M (Ed.), Handbook of Research On Teaching, New York: Macmillan, pp 505-526

Shulman, L. (1986b). *Those who understand: knowledge growth in teaching* in *Educational Researcher*, Vol.15, No.2, pp 4-14

Shulman, L. (1987). Knowledge and teaching: foundations of the new reform in *Harvard Educational Review*, Vol.57, No.1, pp 1-22

Shulman, L. (2004) *The Wisdom of Practice: Essays on Teaching, Learning and Learning to Teach*, San Francisco: Jossey-Bass

Shulman, S and Shulman, J (2004) How and What Teachers Learn: a shifting perspective in *Journal of Curriculum Studies* Vol. 36, No. 2, pp 257-271

Tickle, L. (2000) *Teacher Induction: The way ahead*, Buckingham: Open University Press

Treagust, D and Harrison, A (1999) The Genesis of Effective Scientific Explanations for the Classroom in Loughran, J (ed) *Researching Teaching: Methodologies and Practices for Understanding Pedagogy*, London: Falmer Press pp 28-43

Turner-Bisset, R (2001) *Expert Teaching*, London: David Fulton

Van Manen, M (1999) The Language of Pedagogy and the Primacy of Student Experience in Loughran, J (ed) *Researching Teaching: Methodologies and practices for understanding pedagogy*, London: Falmer Press pp 13-27

Wood, K (1996) The Teacher as a Learner in S. Hodkinson and M. Jephcote (eds) *Teaching Economics and Business*, London: Heinemann, pp 285-303

Wolf, A (1995) *Competency Based Assessment*, Buckingham: Open University Press