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The role of powerful pedagogical strategies in curriculum development

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ABSTRACT

Despite the frenetic pace of curriculum change in England and Wales it is highly questionable to what extent classrooms have changed since the inception of the National Curriculum, as little attention has been paid to teacher development. This article describes a human-scale approach to professional and curriculum development that relies upon powerful pedagogical strategies. The characteristics and popularity of these strategies are described. The model developed in the study of *Effective Teachers of Numeracy* (Askew *et al*., 1997) is used to explain how the use of the strategies can lead to professional and curriculum development. Particular attention is paid, through the reflective accounts of teachers who have used the strategies, to the role of pupil response in accelerating change. Finally the article discusses the way in which the strategies accord with much of what is known about how teachers plan.

KEY WORDS

curriculum; change; pedagogy; thinking; response; feedback.

INTRODUCTION

Since the inception of the National Curriculum there has been a bewildering pace of change in the statutory curriculum in England and Wales, as expressed in Key Stage (KS) 1–3 Programmes of Study and General Certificate of Secondary Education (GCSE) syllabuses. How paradoxical, therefore, that most available evidence about the effects of this turbulence is that, in terms

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of classroom experience, little has changed for pupils (Ford *et al*., 1998; Brown *et al*., 2000). Two significant factors can be identified which may account for this.

One such factor, professional development, is relatively well documented. There is the much-quoted notion that there is no curriculum development without teacher development. Further, Joyce, Calhoun and Hopkins (1997), drawing on evidence from both sides of the Atlantic, conclude that the main reason for the failure of programmes intended to eradicate the educational disadvantages of poverty is the failure to support them with adequate professional development. The second factor, what may be called the unit of change, is the subject of this article. By unit of change we mean a practical and manageable step that can be undertaken by professional teachers in the course of their work. There has been a general failure to recognize the importance of what teachers believe and how they think, plan and respond to their classroom experiences. We will argue that curriculum change will be accelerated if powerful pedagogical strategies (PPS) are used as a stepping stone or manageable unit of change.

THE NEWCASTLE EXPERIENCE

This article is prompted by what we will term the 'Newcastle Experience'. About eight years ago, staff involved in an initial teacher education programme offering a Postgraduate Certificate in Education (PGCE) at Newcastle University started gathering and generating generic, flexible and creative strategies for making lessons more challenging. One example of such a strategy is *Odd One Out*. Teachers present pupils with three ideas either as words, pictures or symbols, such as a picture of a hen, a frog and a duck. Pupils then choose an 'odd one out' and give a reason. A typical response might be that the frog is the odd one out because it does not have feathers, or is not a bird, or is an amphibian, depending on their knowledge and understanding of classification in science (for further details of the application of this strategy in secondary geography see Leat (1998), or for its application in primary mathematics and science see Higgins (2001). The interest in such strategies was spurred by the fact that many postgraduate secondary trainee teachers came to adopt patterns of teaching based on teacher exposition, textbooks and worksheets. Some of the trainees found these dissatisfying and PGCE staff sought to support them in extending their repertoire of teaching approaches. The use of these strategies as support for changing patterns of interaction in classrooms was refined in the light of our emerging familiarity with concepts derived from cognitive acceleration (Adey and Shayer, 1994); instrumental enrichment (Feuerstein, 1980); philosophy for children (Lipman, 1991); 'probes' for understanding

(White and Gunstone, 1992); reciprocal teaching (Palincsar and Brown, 1984); scaffolding (Wood and Wood, 1996); research on talk (Edwards and Westgate, 1987); social constructivism, self-theories (Dweck, 1999); and collaborative group work (Webb and Farrivar, 1994). This work became a significant part of a course on 'Teaching Thinking' (TT) open to all PGCE students and valued by PGCE staff as a means by which students could put into practice or 'enact' findings from educational research (Higgins and Moseley, 2001).

As these students took up posts in local schools they continued using these strategies, with a number of effects. First, some of these newly qualified teachers sparked interest in their departments which was sometimes reinforced by subsequent trainee students on teaching placement. In a few cases this led to an interest by senior management. Second, in some subjects teachers were drawn together in subject networks by university tutors and/or advisers. This was strongest in the humanities. It was not a relentlessly increasing snowball, but a very gradual accretion of expertise and interest.

In parallel, the university started offering masters course modules and responding to a demand from across the country for local education authority-based courses in TT, the centrepiece of which were the PPS. Some schools also sought this INSET for their whole staff. Both the demand for and the provision of courses also grew in the primary sector (Higgins, 2001).

There has been a further phase of this activity that might be described as the development of school and education authority (LEA) networks. A group of six secondary schools in partnership with Newcastle University and their three education authorities were funded by the Teacher Training Agency as the North East School Based Research Consortium (NESBRC). One LEA, Northumberland, set up its own Thinking Skills in the Humanities Network and organized an outposted masters course. Two more LEAs have followed this pattern and one of the local Education Action Zones has made this approach to TT one of their themes. This activity has meshed with published interventions such as Cognitive Acceleration through Science Education (CASE) and the mathematics equivalent (CAME), both at authority and school level. The National Union of Teachers committed funding to a series of successful teacher research scholarships in teaching thinking supported by Newcastle University (Tough and Brunger, 2001) and a significant number of successful applications have been made to the Department for Education and Employment's Best Practice Research Scholarship scheme using PPS as their focus, again supported by Newcastle staff. PPS are now being tried in Norway and Hong Kong, as part of projects to develop metacognitive approaches by pupils, thereby indicating an international potential. A last indication of the attraction of PPS to teachers is a recently held national conference on TT in the humanities subjects where three-quarters of the twenty-four workshops were fronted by classroom teachers,

demonstrating their growing expertise. PPS seem to have a power and appeal that is worthy of study.

CHARACTERISTICS OF POWERFUL PEDAGOGICAL STRATEGIES (PPS)

PPS (Leat, 1998) are difficult to define. They are teaching strategies, which allow teachers to experiment with the parameters of learning environments. They tend to exhibit the following characteristics:

1 They represent a manageable unit of change. Current curriculum development tends to be manifested through curriculum packages, bundled in a folder, a box or ring binder, typified by the training materials for primary teaching produced by the National Literacy and Numeracy Strategies. In terms of scale the 'pack' is large and is designed to transform a whole subject. The size has a number of implications. First, a large package is difficult to get to grips with, there are few handholds, and it is alienating. Second, the package tends to come with prepared materials and teachers' notes, which instruct or advise on how lessons should proceed. They are stamped with authority, either governmental or from research findings. They do not invite adaptation. This creates the expectation that the teacher's task is to master or perhaps cope with the delivery of the materials. There may be covert and overt messages about the dangers of digressing, as the OFSTED inspection regime has fostered a climate of compliance. We suggest, however, that teachers' professional development may be better facilitated through smaller, human scale, units of change. PPS allow teachers to change one lesson. This can encourage an important feeling of control (Higgins and Leat, 1997).
2 PPS are flexible. They can be adapted to a wide spectrum of age ranges, abilities and subject matter. To provide an illustration of the flexibility, we refer to the use of PPS by Newcastle University secondary PGCE students in their main teaching practice in the year 1999–2000. The sample of students had all taken a special study on teaching thinking, which offers a range of strategies for them to use. Fifty-one students wrote reflective assignments on their experiences of using one or more of these strategies during their school placement. Table 1 provides some details of the number of students in each subject who reported on their use of each strategy. Some students used more strategies than they reported on and we have not included strategies that were used by students of only one subject. However, the table provides some certainty that subject teachers from a wide range of subjects can use some of these strategies. So, for example, student teachers in five subjects used the 'Taboo' strategy, in which pupils

Table 1 The range of use of PPS by a sample of trainee teachers

Subject	*Taboo*	*Living graph*	*Story-telling*	*Maps from memory*	*Odd one out*	*Mystery*	*Classif-ication*	*Lifelines*
English	2	0	0	0	1	1	1	3
Geography	2	2	1	5	4	5	3	0
History	4	9	4	3	3	3	5	4
Maths	3	0	0	0	1	0	1	0
MFL	0	0	0	2	1	1	1	1
RE	0	0	1	0	0	3	1	2
Science	2	0	0	1	0	0	0	0

have to define words or concepts without using certain proscribed terms, thus extending their vocabulary and demonstrating their understanding of key ideas.

Furthermore the North East School Based Research Consortium (NESBRC), funded by the Teacher Training Agency, has subject networks exploring the use of strategies in geography, history, mathematics, religious education, modern foreign languages and English and a growing network in art. The flexibility is further illustrated by the fact that a particular strategy exemplar, a 'mystery' about earthquakes (SCAA, 1996), has been used authentically with a Y7 class and a group of Her Majesty's Inspectors.

3 PPS tasks have no single correct solution: they are open-ended and encourage a variety of working methods and reasoning. To give an example, Appendix 1 gives an outline of the strategy called 'Making Animals' (Nichols and Kinninment, 2001). Pupils are asked to select six adaptive characteristics to make a carnivore for a niche in the Arctic tundra. Not only are the animals and the reasoning behind them very varied, but so are the general strategies from which they emerge. Some pupils systematically eliminate until six characteristics remain. Some focus on the environment and concentrate on what would 'work' in such conditions. Some think of a real animal and work backwards. Any of the above can include careful thinking about the extent the chosen six characteristics are compatible, demonstrating an appreciation of whole–part relationships. On a different plane, a fortune line or 'Lifeline' (White and Gunstone, 1992) could present ten episodes from an act in *Romeo and Juliet*. For each episode, students are asked to plot the emotion (happiness to sadness) of a character or characters on a vertical scale, thus charting their intertwining and changing emotions through the act as events unfold. There is no correct answer to this task: it calls for interpretation. Thus PPS legitimize

the opinion of all pupils, as all that is required is a reason. Their answers or solutions are either justified by their reasoning or by their preference for a certain way of handling or processing information. However, it is important to appreciate that while there may not be right answers there are probably better answers. Good thinking is the goal, but reasoning is generally respected.

4 In a sense PPS are a template for reconfiguring the role of subject knowledge. The National Curriculum in England and Wales has encouraged a view of subjects as bodies of knowledge to be learned, perhaps as a reaction to the perceived progressivism of the 1960s and early 1970s (Brown, 1999), and perhaps influenced by prevailing educational theorizing characterized by Hirst's forms of knowledge which closely mapped onto subject domains (Peters, 1975). One of the consequences of this is less of a focus on pedagogy (Alexander, 1999). Learning, as viewed from a constructivist perspective, however, requires that learners use what they already know to grapple with new information and scenarios. PPS fulfil this function of juxtaposing the known with the new. Subject knowledge, therefore, is extended from something to be mastered to become the stimulus to reasoning. To pursue one of the examples above, locating the emotional state of Romeo requires the use of one's knowledge of the play and his character. In the 'Making Animals' exercise, pupils have to use their knowledge of Arctic ecology and climate (much of it from outside school) to reason their way to their six choices. From this reasoning may emerge patterns and second-order concepts, which bring pupils much closer to being initiated as participants in the discipline, rather than its victims. To use Black and Dockrell's (1980) terminology, there is a shift in emphasis from modular learning outcomes to background outcomes, which are at the heart of subjects.

5 PPS encourage talk. As the tasks often contain ambiguity, they present information in a way that demands interpretation, clarification, connecting, hypothesizing and evaluating, which are the kinds of talk that are prized for their role in helping pupils jointly construct understanding. Wegerif (2000) has described how developing pupils' capacity to engage in reasoned debate, or dialogical reasoning, has led to better results on Raven's tests of general reasoning. The process of discussing with others, and considering alternative points of view, it is argued, becomes internalized as inner speech. Thus working in and as groups is an essential ingredient of the use of PPS, as is whole-class discussion to compare solutions and reasons from different groups (Pressley, Harris and Marks, 1992).

6 As the above factors give some reasonable expectation that PPS can provide a rich learning context, they can be used as a springboard to reflect upon in a class debriefing discussion (Leat and Kinninment, 2000). If there have

been cognitive and social processes at work, so these processes and information sources can be talked about. It is through such a process that metacognitive awareness might be achieved (Flavell, 1976). Secondary teachers are generally separated by their subjects; it is where their identity and expertise is held to reside. As PPS can be used in a variety of subject settings, they can help in the development of an awareness about and a language for describing learning, which is conspicuously missing from a subject-based NC. Teachers can compare response and performance to the same strategy, such as classifying, used in different subjects. If pursued, this encourages the development of diagnostic and formative assessment (Leat and McGrane, 2000), because it is more apparent how well individual pupils are processing information and reasoning on a broad front.

AN EXPLANATORY MODEL

One way to explore the role of PPS is through the model of development (see Figure 1) presented in the Effective Teachers of Numeracy Report (Askew *et al*., 1997). The report outlines a view of teacher development in which the interplay of pedagogical content knowledge (PCK), beliefs, classroom practice and pupil response can account for the development of more effective pedagogy. The model was successfully utilized in development projects using ICT to improve pupils' performance in literacy and numeracy (Moseley *et al*., 1999). PCK is presented as knowledge of pupils' learning, knowledge of approaches and knowledge of the subject. PPS are approaches. Change can be initiated in any sector of the model. For example, a teacher may go on a course and be introduced to a new approach, which they then try in the classroom with a positive response from pupils. This, in turn, reinforces that classroom practice with consequent effects on their understanding of the nature of their subject and beliefs about teaching. Alternatively, a pupil may surprise a teacher with some comment or piece of work which may become a growth point for change within the framework of the model. What is significant about the model is its explicitness about the connections between knowledge, practice, pupils, beliefs and the process of professional learning and development. Professional development and meaningful curriculum development are harnessed together, but PPS can provide a significant catalytic impetus. The processes of action research and reflection can help fuel this model (Higgins and Moseley, 2001).

One of the most critical characteristics of PPS in relation to teacher development is the scale of engagement over which the teacher has some control. At the micro-scale an individual teacher can just try one strategy with one class using an existing exemplar. Progressively the individual can scale up their engagement with more strategies and adding to their impact by

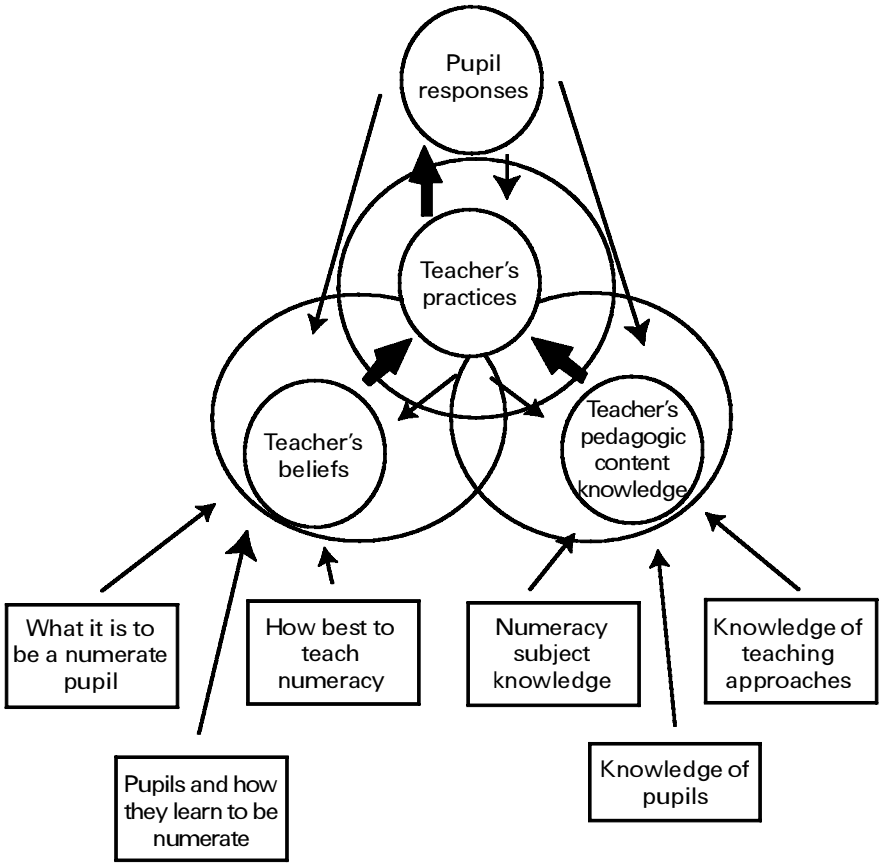

Figure 1 The development of teachers' expertise (based on the model in Askew *et al*., 1997)

developing more skilful practice through debriefing to exploit their potential. At the medium scale, perhaps a department or primary school builds a number of strategies into schemes of work to allow a more consistent targeting of curriculum objectives. At the macro-scale networks of teachers create knowledge collaboratively through the sharing of pertinent craft skills, action research outcomes and research literature which throws light on their endeavours.

This variation in scale has a number of dimensions:

- the coherence of the curriculum change;
- the extent to which the change is embedded into school documentation, such as school development or improvement plans or curriculum aims and schemes;
- the extent to which formal development resources are committed by schools or departments;
- the effect on teachers' beliefs and practices;
- the degree of adjustment in the structuring of their subject knowledge.

Where the unit of change is small, we believe that there is far more professional space for the teacher to explore. Michael Huberman (1992) introduced the term 'tinkering' to describe what experienced teachers do as they engage in cycles of experimentation to improve their routines in their teaching repertoire. David Hargreaves has highlighted the term in his advocacy of knowledge creating schools in which the tinkering process would be more systematic, more collective and more systematically managed. Hargreaves argues (1999: 131) that tinkering 'is embedded in the process of professional knowledge creation, since this is the means of testing and modifying an initial "good idea" into something worth subjecting to more systematic validation'. All curriculum change can be regarded as an experiment. In large-scale innovation the variable being tested is the intervention – the teacher and classroom are seen as fixed. Through innovation based on PPS, the teacher can manipulate the ecology of the classroom through a process of informed and conscious trial and error. Instead of being the subject of change, they can choose to be the object or agent of change. This process is admirably suited to action research and builds on the legacy of Lawrence Stenhouse. Such an approach to change helps to redress the balance between power and responsibility, because in the current climate in England and Wales they are not in equilibrium (Marshall and Ball, 1999).

THE IMPORTANCE OF PUPIL RESPONSE

In our work with teachers using PPS it has become apparent that feedback from pupils or pupil response is the most critical factor driving the change process. Teachers are highly sensitive to this feedback from pupils. Brown and McIntyre (1993) developed the concept of Normal Desirable States (NDS) to describe the optimum classroom climate through which teachers judged whether a lesson was going well. Classrooms are highly unpredictable and volatile environments and part of the process of learning to teach is to establish routines that reduce the surprises and challenges. In embarking on change teachers are taking a risk by giving up some of their ability to predict and control. To continue with the experiment they need the pupil response

(feedback) to be in some way positive. If it is not, they may be inclined to default to their previous mode of working (Leat, 1999). This is as much an emotional process as it is cognitive. It is a fundamental human need to get feedback which is consistent with our self-theories.

The following quotes come from the reflective assignments outlined earlier and teachers' reflective diaries. They confirm the importance of pupil response to teachers. Some of these quotes give a strong sense of the impact the pupil response is having on plans for future practice and beliefs. Each one is accompanied by some cautious commentary.

'The pupils were staggered at the fact that they had more than one chance to come up with an answer. . . . They were even liberated. . . . I just had to harness this opportunity.' (History)
Commentary: It is pupils' response to the openness and ambiguity of the task that captures the teacher's attention here. As pupils discern that they can reason their way to alternative solutions they are described as 'liberated'. Significantly, the teacher signals the need for a response in practice to 'harness this opportunity'.

'Pupils gave answers in vocabulary that peers understood – the fundamental difference is the freedom to discuss. . . . The children found the lessons entertaining and engaging.' (Maths)
Commentary: The grit here for the teacher is the vocabulary that pupils develop to construct their own understanding in discussion. The teacher appears to be moved by the fact that pupils are motivated and engaged, which might lead one to speculate that enjoyment is a construct used by this teacher to evaluate lessons.

'As one walked around the room one could hear the various reasons behind ideas as well as other members of the group questioning each others' responses and thinking.' (RE)
Commentary: What has captured attention here is the quality of the dialogue between pupils. Reciprocal questioning promotes high quality talk and interaction. It is interesting too that the teacher has begun to eavesdrop on discussions rather than to intrude. This practice places one in a much stronger position for debriefing as one can call on groups to contribute their reasoning to a whole class forum.

'One of the most notable and pleasing features . . . was the number of pupils that commented upon the fact that they were encouraged to listen and value other people's opinions. Some of the pupils commented that this had made them change their own way of thinking . . . writing was detailed, emotional and analytical.' (History)
Commentary: This account shows linkage between picking up on pupils' comments on listening to others, a feature of dialogical

reasoning, to some changes in ideas and leading ultimately to impressive writing. One can speculate that this realization would be a growth point in this teacher's thinking and practice.

'De-motivated pupils miraculously transformed into pupils showing superb skills in explaining, listening to one another, efficient teamwork and using higher order skills, such as classification/selection of material. It has shown me that all pupils, whatever their level of ability or interest, can become involved and enthused as a whole class and subsequently provide a classroom environment in which good, active learning is taking place.' (Geography)
Commentary: There is a rush of response in this extract. There is a strong suggestion that the transformation of pupil response that this teacher experienced is leading to a change of beliefs which will interact with their pedagogical knowledge.

'For the first time at —, pupils questioned me about an issue. This is something that just doesn't happen here. [There is] a tradition of what pupils are told is right, and they must learn this, not necessarily understand. . . . It really promotes pupil confidence . . . pupils were no longer asking me "is this right?" [They are] learning to have confidence in their answers, and learning to have their own opinions.' (Geography)
Commentary: A change in the pattern of talk or discourse has struck home for this teacher. Teachers normally dominate and control whole-class talk through asking questions, but here pupils are reversing the flow, which in the teacher's judgement is promoting their self-confidence and perhaps their self-concept.

'The response was certainly positive and they felt that it helped them listen carefully to others. One pupils said that it was more tiring than a normal lesson because he felt that the responsibility rested on him to make sure that he did not let his group down.' (MFL)
Commentary: Listening is a key requirement of language learning. Not only has the teacher seen an improvement but she has had her eyes opened to one avenue to encourage this, namely collective responsibility.

Bramald, Hardman, Leat and McManus (1993), in analysing the experiences of trainee teachers, recorded through a self-report technique, found that a teacher's thought was most often stimulated by pupil behaviour and more commonly this was aberrant or unwanted behaviour. Pupil response captures the attention – it is how teachers judge the success or otherwise of a lesson. Therefore forms of tinkering which spark a change in response in pupils are likely to be most powerful in fuelling the ecology of change. Many teachers have aspirations to help pupils become motivated, independent learners and PPS help move them in that direction.

LINKING PPS TO TEACHERS' PLANNING

It was earlier suggested that reform processes have generally failed to recognize the importance of what teachers believe and how they think, plan and respond to their classroom experiences (Brown *et al*., 2000). There is strong evidence from the US that much teacher planning has activities as the principal unit of construction (Zahorik, 1975; Yinger, 1986; Shavelson and Stern, 1981). Sardo Brown (1990) also emphasized that planning is underwritten by beliefs and the desire to maintain order. Leinhardt and Greeno (1986) stress the importance of routines and structures that are scripted and known by teachers and pupils. Routines are important because classrooms are complex and unpredictable places and routines seem to make them more manageable.

On this side of the Atlantic, Cortazzi (1991) found, however, that perceptions of children's interest was a critical factor in planning. Tann (1994), in researching novice teachers, found that they had three overwhelming concerns: fears for their own survival regarding control and discipline; concerns about planning and organization; and a need for reassurance and practical guidance. In short, they need activities, advice on how to use them and routines. They wanted to be liked and in charge, they wanted things to go well (Oberski *et al*., 1999). Some of the more successful novice teachers moved on to develop a need to know more about what makes pupils learn and how to motivate them. They were moving towards building up generalized frameworks of understanding around fundamental concepts, which could be transferred to other classroom situations. There are recurring themes here – the need for control balanced by generating positive response, activities at the heart of planning and the desire by some teachers to explore the learning potential of stimulating activities. PPS are very well placed to take this agenda forward by providing a catalytic structure that promotes effective classroom interaction and pupil talk.

TRANSFORMING TEACHING AND LEARNING

The UK's Department for Education and Skills (DfES) is embarking on a Key Stage 3 programme, to accompany the National Literacy and Numeracy Strategies. The programme is, at the time of writing, called Teaching and Learning in Foundation Subjects (TLF) and it includes a strand related to teaching thinking.

PPS could be one of the building blocks of the implementation of this programme. They provide a means by which teachers can experiment with their teaching in a structured, supported and focused manner. PPS are accompanied by suggested routines based on the experiences of other teachers. They offer immense scope for individual teachers to further expand their

value in relation to managing group work and co-operative work, developing formative assessment (including peer and self-assessment) and creative use of ICT. Most importantly, they give teachers a real measure of control in their professional lives, an important antidote to the centralized curriculum.

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