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# Talk, talk, talk: teaching and learning in whole class discourse

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UK national initiatives in education, such as the National Literacy and Numeracy Strategies, have been implemented to improve learning and raise standards. These initiatives place considerable significance on whole class interactive teaching, and political rhetoric makes great play of this pedagogic strategy. Teachers have been encouraged to use up to 15 minutes of whole class teaching in literacy and numeracy as a key focus for developing pupil learning. This paper reports on a two-and-a-half-year research study which investigated the nature and quality of these discourse episodes through analysing how teachers use talk in these whole class teaching episodes to develop and build on pupils' learning. The study explored how teachers use questions, how they capitalize on pupils' prior knowledge and how they help pupils become independent learners. A particular focus of the paper is to illustrate how teacher discourse can variously support or impede pupil learning, and how cognitive or conceptual connections in pupils' learning are often ignored.

*Keywords: Classroom interaction; Participation; Prior knowledge; Questioning; Whole class teaching*

## Introduction

National politico-educational initiatives set in place in the late 1990s in the UK have established a renewed emphasis upon whole class teaching in the primary curriculum as part of a drive to raise standards of attainment. The advocacy of whole class teaching was prompted by international comparative research by Reynolds and Farrell (1996), who argued that whole class teaching combined with direct instruction was the driver for high educational achievement in those Asian countries which adopted it as standard practice. This, of course, was in spite of successive studies over several decades which had repeatedly demonstrated the strong tendency of teachers to dominate classroom talk scenarios (see Barnes, 1969; Galton *et al.*, 1980,

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1999a, b). More recently, Alexander (2004) has critiqued the Reynolds and Farrell research on the grounds that it draws inappropriate correlations between the pedagogic practice of whole class teaching and educational outcomes: 'direct instruction through whole class teaching is the commonest teaching approach world-wide so it is as strongly associated with low educational standards as with high' (Alexander, 2004, p. 17).

Despite the somewhat limited evidence of the effectiveness of increased whole class teaching upon educational standards, the National Literacy Strategy (NLS) and the National Numeracy Strategy (NNS) in the UK encouraged a major pedagogic shift in primary education from cross-curricular topic work frequently carried out in groups to a more subject-based curriculum with focused and purposeful whole class teaching preceding pair, group or individual work. Significant earlier research by Bennett *et al.* (1984) had revealed that so-called group work was, more often than not, little more than children physically organized in groups, but working as individuals. More recently, Haworth (1999) found that primary children working in groups discussing texts tended to adopt a discourse pattern which mirrored the teacher discourse pattern with which they were familiar: with the dialogue and discussion being closed down by an authoritarian speaker. And, of course, the studies highlighting teacher domination of classroom talk, noted above, predated the introduction of these national strategies. A desire to improve the quality of classroom interaction and its impact on learning is at the heart of these changes. The NLS argues that successful teaching is 'characterized by high quality oral work' and encourages teachers to develop interactions where 'pupils' contributions are encouraged, expected and extended' (DfEE, 1998). English *et al.* (2002) draw attention, nonetheless, to the conflict between this aspirational goal for high quality oral work, developing pupil learning, and the emphasis elsewhere in the strategies on focused learning objectives, pace and urgency.

In both national publicity and advisory documentation, the notion of interactive whole class teaching underpins these pedagogic changes in the primary curriculum. Alexander (2004) argues that 'interactive whole class teaching' has become a default term and I have argued elsewhere (Burns & Myhill, 2004) that the term is meaningless, as the act of teaching is always interactive in that it is a series of exchanges between teachers and pupils, or pupils and pupils. Indeed, in the context of looking at formative assessment, Black and Williams (1998) 'start from the self-evident proposition that teaching and learning have to be interactive' (p. 1). The difficulty is that 'interaction' is too all-encompassing a term and does not adequately describe or reflect the multifaceted ways in which talk can play out in the classroom. Perhaps most importantly, the term 'interaction' can include classroom talk which retains all the elements of teacher domination revealed in earlier studies. The teacher as orchestrator of talk opportunities is a familiar motif in the literature. The Bullock Report (DES, 1975) which, for the first time in the UK, signalled the central place of talk in a learning classroom nonetheless tended towards constructing the teacher's role as orchestrator of children's talk, describing a lesson as 'a verbal encounter through which the teacher draws information from the class, elaborates and generalizes it, and

produces a synthesis' (p. 141). Edwards and Westgate's research confirmed that interactions between teachers and children in which 'the teacher takes turns at will, allocates turns to others, determines topics, interrupts and re-allocates turns judged to be irrelevant to those topics' (p. 46) was indeed a common discourse pattern. Analysing interactions within the NLS, Haworth (2001) argues that in effect the teacher is positioned as the 'controller of the spoken word', whilst 'the learners remain in the shadows' (p. 14).

However, to enhance the role of talk in shaping and developing learning requires interaction patterns which reduce the teacher's role as orchestrator or controller of classroom talk, and instead reposition the teacher as an enabler of talk for thinking. Vygotsky's belief (1972) that language is fundamental to the process of learning and upon the complex interplay of thought and language in shaping meaning is at the heart of any consideration of how classroom talk promotes learning. Talk is both 'a medium for teaching and learning' and 'one of the materials from which a child constructs meaning' (Edwards & Mercer, 1987, p. 20): in other words, talk is not only a product which can be formally assessed (as in the English National Curriculum) but also a process, a tool for learning. Howe (1992) summarizes this potential under four headings: formulation—the way talk can crystallize thought and shape ideas; reformulation—the way talk can clarify and focus ideas; communication—the way talk can be used to interact with others and gain feedback; and reflection—the way talk can be used to reflect upon learning. Rogoff's notion of guided participation offers an alternative discourse framework in which children's interactions with others, including but not exclusively the teacher 'assists children in their development by guiding their participation in relevant activities, helping them to adapt their understanding to new situations' (1991, p. 191). In a similar vein, Mercer (2000) sees teachers potentially as 'discourse guides, guiding children (or other novices) into ways of using language for thinking collectively' (p. 170). More recently, and in response to concerns that the interactive whole class teaching recommended by UK national strategies was recreating teacher-dominated talk scenarios, Alexander (2004) has advocated the use of dialogic teaching which aims to be 'more consistently searching and more genuinely reciprocal and cumulative' than the 'question-answer-tell routines of so-called "interactive" teaching' (p. 1). Skidmore (2000), too, has signalled the value of more reciprocal forms of classroom dialogue which develop the individual reflective capacity of children. He distinguishes two types of teacher–pupil classroom discourse: 'pedagogical dialogue', which is a transmission model of teaching in which an expert in possession of knowledge instructs someone who is ignorant of it; and 'internally persuasive discourse', where it is the process of dialogue and discussion which is all-important, and where children are encouraged to adopt a range of speaking and listening roles.

Intrinsic to the thinking of those like Rogoff, Mercer and Alexander is a belief in the value of talk for learning. Alexander's comparisons of pedagogy in primary education across Europe (Alexander, 2000) found that in many European cultures talk is used considerably more as a basis for learning than in the UK and 'classroom talk is seen as mainly cognitive, whereas in England it tends to be seen as primarily social or affective' (Alexander, 2004, p. 15). In the US, some teachers have been successful in

establishing discourse patterns which deviate from traditional teacher-dominated interaction patterns (Many, 2002), and instead operate within socio-constructivist parameters, where teacher and child interactions actively develop learning. Significantly, Many reports that this type of scaffolded instruction clearly identifies the role of the teacher in the instructional setting, but also shows how teachers and children can be 'co-participants in negotiating meaning and in informing the nature of instructional conversations' (Many, 2002, p. 379). Likewise, in Australia, Geekie *et al.*'s (1999) research indicates the value gain for pupils' learning in literacy when teachers use talk explicitly to help children think, even in brief interactions.

In the context of socio-constructivist frameworks for learning, the goal of classroom talk, therefore, should be to scaffold pupils' learning sensitively so that they are supported in making meaning and understanding for themselves. Central to the principles of scaffolding, and all too often forgotten when the term 'scaffolding' is used, is the development of independence. The metaphor of the scaffold evokes two important notions: it is a temporary structure which should eventually be removed, and it is a supporting structure. In the classroom, effective scaffolding is characterized by the 'temporary, but essential, nature of the mentor's assistance as the learner advances in knowledge and understanding' (Maybin *et al.*, 1992, p. 186) where 'teachers lend their mental capacities to learners in order to support and shape learning' (Goodwin, 2001, p. 129). The outcome should be what Edwards and Mercer (1987) call 'principled understanding', where pupils understand underlying principles and generalizations rather than merely grasping superficial understandings of specific experiences. In this way talk can be used to promote genuine learning, rather than merely being used to parrot, mirror or recall what the teacher has said.

### The study

This paper reports on the principal outcomes of a two-and-a-half-year study, funded by the Economic and Social Research Council, investigating teacher discourse in whole class teaching, and how that talk supports pupil learning. The research began in 1999, not long after the introduction of the pedagogic changes in whole class teaching described above. The study, therefore, set out to explore the quality of learning evident in whole class teaching. The principal research question was: How do teachers use talk in whole class episodes to scaffold learning and develop understanding? The following six subsidiary research questions framed the research:

- How interactive are whole class episodes?
- How do teachers build on prior pupil knowledge?
- How do teachers use questions?
- How do pupils use questions?
- How is the handover to independence or 'critical moments' handled?
- What do teachers believe about talk as a tool for learning?

A fundamental principle underpinning this study was that of active and collaborative research involvement of teachers throughout all stages of the research. Three

headteachers from a 'family' of schools (cross-sector) were designated *key teacher-researchers* for the project and undertook a substantial proportion of the research themselves with the support of a research assistant and the project director. A further 12 teachers were designated *participant teacher-researchers*, and were involved in discussion of the findings and the preparation and evaluation of teaching materials. In addition, a cohort of *participant teachers* within the schools' family were identified, thus creating a research design founded upon conscious and consenting involvement of participant practitioners.

Thus the study involved firstly research, and secondly policy-making at school level as a consequence of the research, and dissemination to participants was a recurrent feature of the methodological structure. This is predicated upon an action research model (Carr & Kemmis, 1986; Gitlin, 1983) which involves a spiral of planning, action, investigation and evaluation. In this way theoretical understanding and practical application were brought together, and the outcomes of research were fed directly back to the participant communities. The project recognized that the school is a 'key site for educational action and policy-making' (Corson, 1999, p. 2) and acknowledged the emancipatory potential of critical reflection by teachers. Moreover, the project actively supported and built research capacity in the school site.

#### *Data sources*

Making judgements about the nature of learning promoted in whole class discourse is necessarily complex and in order to secure a rich data set for analysis, a multi-method data collection approach was adopted. A weakness of some previous studies (such as Barnes' analysis of teachers' questions in 1969 and Tough's 1977 analysis of children's functional linguistic range) has been the use of a single data set with no adequate exploration of the effect of context on discourse and no complementary data sets. Likewise, point in time data capture of teacher interactions as used in the ORACLE studies (Galton *et al.*, 1980, 1999a, b) has been criticized (Scarth & Hammersley, 1986) on the grounds of both validity and reliability, particularly because coders had to make instant categorization decisions about the interactions witnessed. This study sought to minimize the weaknesses of these previous studies by establishing a multi-dimensional picture of the episodes sampled from the researcher's perspective, the teacher's perspective, the pupil's perspective and a contextual perspective. The data comprise:

- Recording of whole class episodes: using video to capture pupil responses and non-verbal interactions, and a digital mini-recorder to capture the teacher's talk.
- Observation of sample pupils: using structured observation schedules to capture verbal and non-verbal responses.
- Post hoc stimulated recall teacher reflections: using the video recordings as a prompt for reflection to elicit teachers' conceptualizations about the role of talk in

developing learning and to elicit the teacher's own evaluation of the effectiveness of his/her talk in the episode observed.

- Post-observation pupil interviews: inviting the pupil to talk about the topic/concept being taught and using targeted questioning to attempt to establish the level of the pupil's understanding.
- Narrative description of context: written by the researcher to allow for consideration of contextual factors such as peer relationships, external influences such as interruptions and so on.

The sample comprised two cohorts, drawn from Year 2 in three first schools and Year 6 in three middle/primary schools. Eighteen whole class teaching episodes of approximately a quarter of an hour were video-recorded, capturing teaching in the NLS, the NNS, and a third curriculum area. Thus, a total of 54 teaching episodes were recorded. The episodes were recorded in sequences of three to allow comparisons and analysis of how the teacher built and developed understanding (mirroring Edwards and Mercer's methodology; see Edwards & Mercer, 1987) across three consecutive teaching inputs. In practice, with literacy and numeracy, this was usually three consecutive days, whereas in other curriculum areas the three episodes sometimes spanned a week. Each teacher involved in the study completed a post hoc reflection upon his/her use of talk, using the video and a series of prompts as stimulated recall.

### **The outcomes of the study**

The findings from this study suggest that, in general, teacher discourse in whole class teaching provided limited opportunities for pupil learning. A detailed outline of the methodological processes and outcomes of the research can be found in the official research report, *Developing learning through talk: research report* ([www.ex.ac.uk/~dmyhill/talk](http://www.ex.ac.uk/~dmyhill/talk)). The study indicates that, contrary to the advocacy of highly interactive teaching in the National Literacy and Numeracy Strategies, much whole class teaching involved relatively little interaction which supported and scaffolded children in their learning. Teacher talk dominated whole class teaching, and teacher-pupil interactions operated in highly conventional discourse patterns. The video data revealed that the dominant interaction pattern was teacher-child-teacher-child, and only rarely was this pattern disrupted: the child's answer served to end an interaction sequence, and rarely to begin or initiate it. There was very little talk initiated by the children in these episodes, and the framing of discourse appears to be predominantly structured upon a framework of teacher initiation and single pupil response. Teacher orchestration of classroom talk and interaction patterns which preserve the teacher's control of talk scenarios was the dominant pattern. This paper will explore this dominant pattern by describing the findings related to teachers' questioning, drawing on the video data; by outlining patterns of pupil participation by drawing on the classroom observation data; and by considering how teachers used pupils' prior knowledge, drawing on both the video data and the post hoc teacher reflections.



*Teachers' questioning*

For the purposes of the analysis, questions and statements were defined, not in terms of their grammatical form, but in terms of the nature of response given. In normal classroom interaction, some teacher questions are not inviting a spoken response but are rhetorical in that they require no answer (e.g., 'Shall we begin?'), or illocutionary in that they generate an action (e.g., 'Will you get your pens out, please?'). Accordingly, utterances which invited no spoken response from the pupils were classified as statements, and utterances which invited the pupils to make a spoken response were classified as questions. The video data was viewed, transcribed and analysed to provide an insight into the nature of teachers' questions and how they scaffolded children's learning. The categories for the coding of the questions were derived through an iterative process, in which the team of researchers coded the video data independently and then met to compare the categories which had been established. A phase of cross-validation then took place, where all researchers coded the same video data to ascertain inter-coder reliability before progressing to further data analysis. This cycle of independent coding, sharing emerging categories and cross-validation, occurred several times. The outcome of the data analysis was a classification of the questions used by the teachers both in terms of the *form* of the question (factual, procedural, speculative or process) and the *function* the question played in the context of the teaching episode. This aspect of the data analysis was important in providing a more three-dimensional picture of whole class interaction, although at the end of the research, the team remain uncertain about the appropriateness of the word 'form' to describe the four principal types of questions evident.

Initially, there had been no intention to code the data orthogonally in this way, but it became evident at an early stage of sharing categorization that the coding of questions by form alone was insufficient to describe the subtle complexities of the ways questions were used. So, for example, the three factual questions

- Is this active or passive?
- Why do plants have flowers?
- What else could I use to measure with?

were indeed all factual in that they were directed towards predetermined answers in the contexts from which they were drawn. However, they did not all function in the same way. The literacy question was straightforward factual elicitation, and the receipt of a correct answer would not necessarily illumine whether the child had understood the active and passive voice (indeed the answerer has a 50% chance of getting it right, regardless of their level of understanding). The science question was drawn from a lesson looking at seeds and was attempting to establish scientific understanding of reproduction in plants. However, the question was building on a teaching episode in which the pupils had been looking at different seeds from different plants, and was attempting to move their thinking forward by exploring connections between flowers and seeds. Finally, although the numeracy question about measurement tools was directed towards a specific set of possibilities which the teacher was about to



introduce, the framing of the question was inviting children to think about and reflect upon the strategies they were using to measure effectively. By looking closely at the function of the question within the context of the talk which framed it, the analysis addresses Edwards and Mercer's (1987) critique that too often discourse analysis of teacher interactions takes insufficient account of the context in which they were produced.

The final categorizations of the questions, then, were as outlined below.

### *Form of question*

Questions which invite a predetermined answer, such as:

- What is five plus five?
- Why do plants have flowers?
- What else could I use to measure ...?

Questions which invite a response with no predetermined answer, often opinions, hypotheses, imaginings, ideas:

- Anyone got any ideas what that could mean?
- Do you think zoos are a good idea?
- Anyone got any opinions about those three children?
- If I made the slope higher, what do you think might happen then?

Procedural: questions which relate to the organization and management of the lesson, such as:

- Can you all see?

Process: questions which invite children to articulate their understanding of learning processes/explain their thinking:

- How did you work that out?
- How do you know that?
- Can you explain why?

### *Function of question*

Class management:	Related to management of behaviour/tasks.
Factual elicitation:	Asking for recall of fact/information.
Cued elicitation:	Giving clues to answer.
Building on content:	Gathering information about the topic/theme.
Building on thinking:	Making children think about the ideas and concepts; this moves ideas forward, unlike the checking understanding which looks back at ideas already covered.
Recapping:	Recalling past lessons and work done in this lesson.

Practising skills:	Inviting children to rehearse, repeat or practise a strategy or grasp of understanding, e.g., how to divide by two or practising identifying verbs in writing.
Checking prior knowledge:	Checking child's knowledge and experience outside of school which might be relevant to lesson.
Developing vocabulary:	Testing/clarifying understanding of words.
Checking understanding:	Querying understanding and checking grasp of learning undertaken.
Developing reflection:	Inviting children to think about how they are learning and the strategies they are using.

The analysis revealed that, despite the advocacy of high quality oral interactions, teachers' questioning within the framework of new national educational initiatives remains heavily directed towards factual and closed responses, just as research predating these initiatives had found.

Over 60% of all questions asked are factual, that is, those which invite a predetermined answer. In other words, children are most likely to be engaged in interactions where they are required to supply an answer to a question to which the teacher already knows the acceptable response. The interaction sequence below is typical of this use of factual questions to elicit a predetermined answer. A Year 6 class are reading Roald Dahl's *Boy* and discussing the chapter they have just read. The teacher initiates a sequence by asking how Dahl expresses the significance of the event described, wanting the children to recall her previous advice to them to draw on their personal experiences. The first child thinks the teacher wants significant information from the text, but the teacher's follow-on question about what Dahl was 'using' triggers a different line of thought from Child 2, which Child 3 builds on. In each case, the teacher says 'yes' (though she means 'no') and asks another question to try and get the answer she is chasing. In the end, she terminates the sequence by telling them the

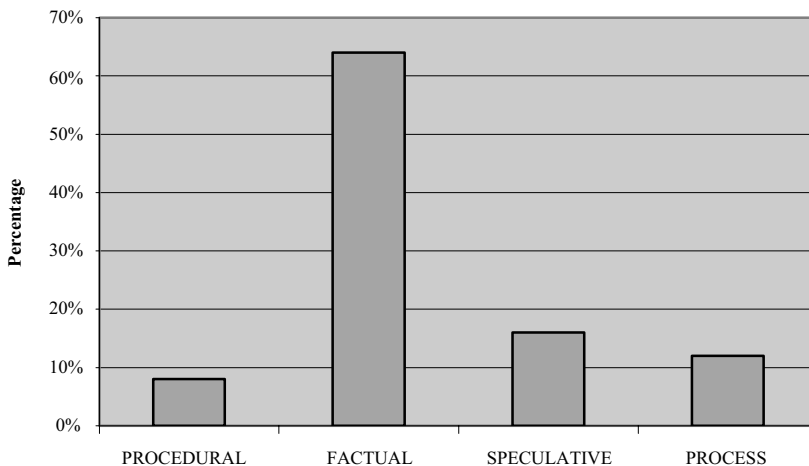


Figure 1. The categorization of questions by form

answer she was hoping to elicit, an answer which itself includes a string of questions which the children are not expected to answer.

- Teacher: ... as a writer, how did he get across the significance of that? [Children put their hands up and teacher points to children to answer.]
- Child 1: He said he was hungry and went to the sweet shop.
- Teacher: Yes, so what was he using?
- Child 2: Similes.
- Teacher: Yes, and?
- Child 3: Metaphors.
- Teacher: Well he was really building up a description, but how could he do it so well? He did it really well, didn't he? We read that and we were all really quite interested in what he was saying, and he did it really, really well, so how did he do it so well? What do you think I'm getting at? Would you think it would be fair to say that he was really passionate about that sweet shop? It was really crucially important. He really disliked the woman who owned it and all that came through because he felt it so strongly. Did you believe him? [Teacher gestures with her hands to the children.] Did you believe that it was really important to him? Yes. So it came across really well. Now, whenever you write a story I'm always telling you aren't I, to draw on your personal experiences. How many people have I said that to when you've been writing stories? [Children put their hands up in response.] I've said it to you Harry many times, as well you know. I've always said draw on your personal experiences, and why do I always encourage you to draw on your personal experiences? [Children put their hands up.] John?

In advance of viewing and reflecting upon their classroom talk, the teachers believed that they used questions for a range of purposes, from 'closed questions' which 'demand very specific answers' to 'open-ended questioning to get the ideas flowing and to encourage children to start off'. Two teachers claimed that they varied the questioning, with 'a variety of question types' or a 'variety of formats'. However, the example of variety given by one of the teachers indicates superficial alterations in syntactical structure of the question ('What is the active sentence? Give me the passive? Which one was that? Is that active or passive?') but no substantive difference in the kind of information required by the question, which remains factual in each permutation.

The analysis highlights clearly the relatively low number of questions related to higher order thinking. Speculative questions, which invite opinions, hypotheses and imaginings, or process questions, which invite children to articulate their understanding occupy a minority position in classroom discourse patterns. Speculative and process questions together totalled less than a third of all questions asked. Yet the teacher reflections upon their use of talk indicated that they were aware of the value of these higher order questions to promote thinking and problem-solving. One teacher said 'I build on their ideas by saying 'What would that mean? What does it do?', whilst another believed that 'by questioning how or why things work, children can develop their thinking and are not just trying to give the right answer'. The discrepancy between the value attributed to process and speculative questions and their lack of prominence in actual practice may be due to the prioritizing of teaching (delivery and content) over learning (understanding): when the teachers were

involved in reflecting on the implications of the data analysis, many expressed that they felt under pressure to cover teaching objectives and to achieve pre-specified goals and that this may have created the tendency towards more factual questioning. It is also significant that speculative and process questions give more ‘air time’ to the learners: the pattern presented by the data is very much of teacher-dominated talk, and the teachers felt reluctant to hand over their tight control to the children for fear of not covering what they needed to cover in the lesson.

The analysis of the questions according to their function in the context in which they were used painted a more textured picture of the nature of teachers’ questions. Once again, the emphasis upon eliciting closed responses is evident: factual elicitation, as a function of questions asked, is by far the most frequent occurrence.

However, the function category does reveal that there are more subtle nuances to teachers’ questioning than might be suggested by the predominance of questions which are factual. For example, a significant percentage of questions did build on thinking and did develop reflection on learning: taken together these two functions almost equal those questions that call for factual elicitation. The list of questions below are all taken from one teaching episode where the children are looking at a planning application and how it constructs an argument. All the questions are factual in the context in which they occur, often with only one possible answer—but in each case, the factual question is not simply seeking to elicit the predetermined response but is attempting to support children’s thinking about the construction of argument and to make connections between ideas and principles raised during the teaching episode.

### Factual questions: building on thinking

- Why is that a problem? Why do you think it is against?
- So why is that showing that it is against?
- Why does this sort of writing need to be concise?

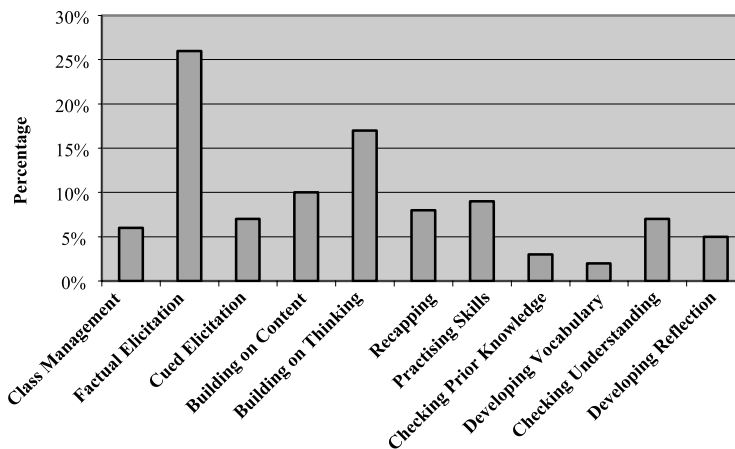


Figure 2. Categorization of the questions by function

- And what argument am I backing up?
- What does asking the reader a question make them do?
- What argument are they trying to back up?
- What technique have they used to support their argument?
- Can you see where I've done that? (used an example).
- Can you see an example of where I have done that? (used an expert).
- Or the other way we can back up?
- Why could that be used 'for'?
- Why do you think on the planning application it's important to have the description of what's happening?
- Can you see any differences between that and if somebody had written it perhaps in a story?

Overall, however, the evidence from the video analysis suggests a pattern of teaching that is principally transmissive, with the teacher imparting factual information and asking factual questions. This parallels the findings of successive studies of teachers' questioning (see Wragg, 1994, p. 137) which highlight the paucity of higher order questions and the dominance of factual questions in typical teacher discourse. However, this discourse pattern contributed to the pace of whole class teaching, an aspect of the NLS and NNS which has been emphasized in training and advisory documentation, because factual questions tend to require short, often one word answers. English *et al.* (2002) found that the average length of a pupil response in the literacy whole class teaching was three words: in this study, the average length of utterance was four words, corroborating the findings of English *et al.* The inter-relationship between length of pupil response and type of question is strong, and the predominance of factual questions means that there are few incidences of pupils' responses being 'extended' (DfES, 1998).

#### *Differential participation in interactions*

The notion of interactivity tends to be conceptualized in terms of the nature of the interactions of the teacher with the class, as described in the previous section. Indeed, English *et al.* (2002) suggest that interactivity can be measured by examining the ratio of statements to questions—the higher the ratio of questions to statements, the more interactive the teaching. This is, of course, predicated upon the principle that interactivity is determined by the number of opportunities children have to make a spoken contribution. However, a different or more comprehensive conceptualization of interactivity might consider not only the number of opportunities for pupils to contribute to classroom discourse, but also the extent of the involvement or participation of all the pupils in the class. In the TALK project, the classroom observation of a sample of pupils, stratified by gender and ability, was designed to explore this aspect of interactivity.

The teachers involved in the study expressed a strong belief that classroom interactions should be inclusive, involving as many pupils as possible. The phrases

'every child' or 'all children' recurred in the teacher reflections on participation, with the intention that talk would 'draw in all children' and 'keep the interest of the full range of ability'. One teacher noted that her questioning was 'aimed at all abilities and both boys and girls' so that all children were 'given the opportunity to take part'. This commitment to full participation was matched by a recognition that in practice not all children did become involved:

It is a large class of 34 ... I am aware that there are a few who do not contribute unless they are prompted and many would dominate the entire lesson with their responses. Using whiteboards helps to combat this but there is not much space for one each and there are still some who do not give much. They respond best to pacy lessons where a variety of teaching methods and visual aids are used.

Generally very well-behaved, very attentive and very cooperative. I am continuously aware of the 'fringe' children. The children who sit around the edges and appear to be listening and doing the right things but actually have little or no input unless questioned.

It is quite challenging to teach the class in whole class sessions because of the spectrum of ability ... there are some behaviour issues with children who find it hard to maintain concentration. I worry that when focusing on keeping some children's attention, I may be losing others and more able attention.

The proportion of children who contribute in these sessions has risen over the year, although some despite being focused and attentive still do not volunteer information readily.

The teachers' recognition of variable participation was corroborated by the video data. The responses captured on the observation schedule can be categorized in terms of interactions which are more positively conducive to learning and those which are less so. Putting a hand up, being willing to join in a collective response with peers, being invited to answer, asking questions and initiating talk are more likely to support the process of learning than being off-task or unsolicited shouting. The analysis highlights that the 'interactivity' of the whole class teaching episode varies for different groups within the class. The most significant differential participation was between children of differing ability. High achievers are more involved and participatory in these teaching episodes than low achieving peers: they voluntarily involve themselves in positive learning interactions such as putting hands up and joining in collective responses. In contrast, the low achievers are more likely to be engaged in more negative interactions such as being off-task.

There is also a strong relationship between gender and participation in interaction with the teacher, with girls being more inclined to offer a response, either through putting a hand up or through joining in a collective response. Boys, on the other hand, are more likely to be off-task. It is worth noting, however, that boys are also inclined to shout out, related to the task, and initiate talk, which may suggest that they are particularly resistant to teacher orchestration of classroom talk and are keen to take more ownership of the discourse.

The observation data indicates that the pattern of asking questions, soliciting volunteers through raised hands, and selecting someone to answer is the dominant

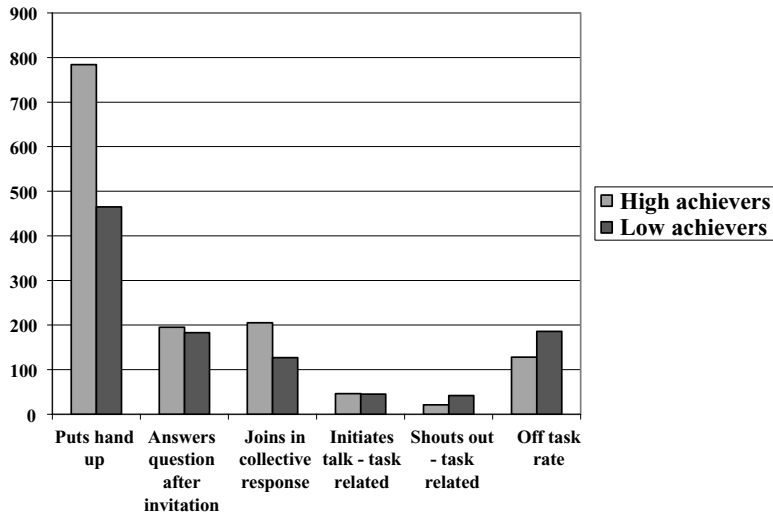


Figure 3. Pattern of interaction by achievement levels

shape of whole class discourse. This has consequences for the inclusivity of the interaction, as it is the teacher who initiates the hands-up response and it is the teacher who controls who is invited to respond. Figures 3 and 4 do suggest that at the point of selecting respondents the teachers are attempting to equalize opportunities to respond by both gender and ability, and this strategy reduces the impact of the higher volunteer rate of high achievers and girls. However, it does not address the non-participation of those who did not volunteer a response.

The data may also reflect greater enthusiasm and compliance on the part of the high achievers, as responses such as putting a hand up or joining in a collective response depend upon the individual being willing to engage in this way. To an

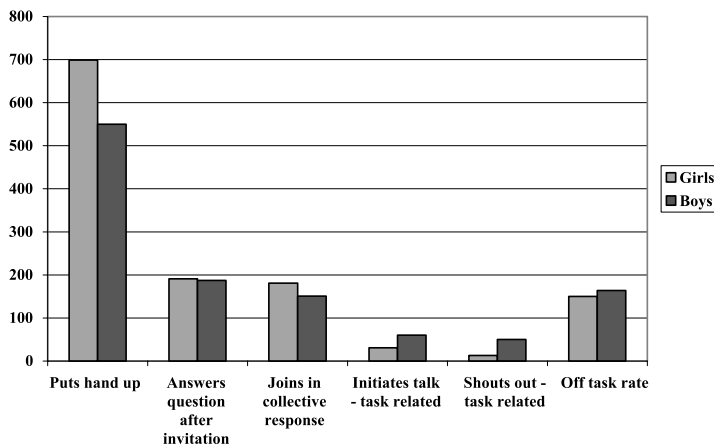


Figure 4. Pattern of interaction by gender



extent, this is rewarded by the teacher as high achievers and girls are marginally more likely to be invited to give an answer. Boys, on the other hand, may be less compliant with classroom conventions of turn-taking or signalling willingness to speak through hands up. Boys' propensity for unsolicited calling out contrasts with girls' greater willingness overall to join in a collective response, perhaps reinforcing the hypothesis that where girls are happy to have their responses orchestrated by the teachers, boys are less willing to conform.

Overall, then, analysis of pupil participation in interactions with the teacher during whole class teaching suggests that 'interactivity' is experienced differentially. This may mean that the learning benefits accrued from whole class teaching are differentially experienced by different groups within the class. Positive observable interaction behaviours, most likely to support learning, are engaged in most frequently by high achievers and girls, whereas being off-task is associated more strongly with under-achievers and boys. This finding parallels the findings of an earlier research study, specifically investigating boys' underachievement (Project JUDE: Myhill, 2002). In the light of national and international concerns (Weis, 1990; Ofsted, 1993; Evans, 1999; Collins *et al.*, 2000) about underachieving boys, the increase in whole class teaching initiated by the primary national strategies may be exacerbating the problem of boys' underachievement. The patterns of discourse in whole class teaching revealed here may be actively contributing to that underachievement.

#### *Use of prior knowledge to scaffold learning*

If whole class teaching is to be shaped so that the teacher is an expert guide who offers both challenge and support to learners and assists in the process of constructing new meanings and knowledge, then teachers' discourse needs to take account of the links between prior knowledge and new learning. The role of the teacher is to establish connections or relationships between ideas, and create learning contexts 'in which earlier experiences provide the foundations for making sense of later ones' (Mercer, 1995, p. 33). Mercer (2000, p. 21) noted that a necessary prerequisite for a learning conversation was 'enough prior shared knowledge to be able to achieve some initial joint understanding'. One important function, therefore, of whole class teaching is to enable connections to be made between the 'already known' and the 'new', and to acknowledge how what the child already knows might impact upon how he or she responds to new information or ideas.

The analysis of teachers' use of prior knowledge in the TALK project was derived from two principal data sources: the video recordings of the teaching episodes, and teachers' reflections on how they believed they used children's prior knowledge in the sequences recorded. The interviews with pupils after the lesson also provided some insight into the nature of their prior knowledge and how sometimes it resonated uncomfortably with the teachers' assumptions. In particular, the children's interviews provide evidence that what is taught is not necessarily what is learned, and that the connections between prior knowledge and new knowledge are not always those anticipated by the teacher. This triangulated focus on prior knowledge, viewed from

the learner's, the teacher's and the camera's perspective, has permitted an exploration of how teachers use whole class discourse to take account of and build on pupils' prior knowledge and experiences to help develop understanding of concepts being taught.

The analysis of the video data indicated that teachers' actual use of children's prior knowledge is minimal, with only 3% of questions and 3% of statements explicitly addressing prior knowledge. A further 8% of questions were categorized as 'recap-ping' questions, in which the teacher recalled ideas or concepts covered in previous lessons: these could be reasonably interpreted as relating to prior knowledge and are certainly an attempt to make connections between the 'already known' and the 'new'. However, the video data, particularly with the predominance of factual questioning noted earlier, suggests that the discourse pattern of whole class teaching is oriented more towards coverage and elicitation of facts, rather than the creation and co-construction of inter-connected learning (see Myhill & Brackley, 2004, for a more detailed analysis of this).

The teacher reflections confirm the relative dominance of curriculum coverage and factual elicitation, as their comments revealed that they conceptualize prior knowledge principally in terms of temporal curriculum relationships, rather than taking any cognizance of pupils' wider social and cultural learning experiences. Only one teacher explicitly believed that she based her whole class talk on her 'knowledge of the children, their place in the family and their previous experience'. Instead, when invited to reflect on how they used pupils' prior knowledge, the most common response was to use temporal terms such as *last week*, or *last term* and to note curriculum content covered in previous teaching which the present lesson related to. Typical reflections included:

Work in previous two years at school; previous cross curricular work;... work on tadpoles done in previous two weeks.

Building on lessons from last term; work on data handling in Year 5.

Year 5 work on area; Year 6 work.

We had previously explored bias and how it is necessary to see both sides. ... We had also spent some time exploring language and how the type of text governs the choice of vocabulary.

In previous lessons the children had worked on using interesting verbs. The previous week they had been using simple and complex sentences.

Given that the National Strategies for Literacy and Numeracy both outline in detail teaching objectives for each term of each year of the primary phase, the emphasis upon making links in curriculum coverage is perhaps not surprising. It is evident that the emphasis in training materials upon identifying learning objectives and the listing of termly teaching objectives has made teachers more conscious of how their planning meets curriculum imperatives. However, one positive feature of the teacher reflections is that this focus on curriculum coverage was frequently matched by a strong focus on children's learning. All the teachers had a strong sense of cognitive concepts and skills which they hoped would be addressed through the teaching, exemplified by the following teacher responses:

The difference between active and passive sentences.

The idea of force; that different surfaces have different amounts of friction; to know what a fair test is, and plan one ...; to make measurements of distance using standard and non-standard measurements.

Develop their skills to observe and compare ... make a link between the needs of the plant and animal worlds; that they can actively plant a seed and watch it grow ...; begin to develop a systematic approach to testing their ideas ...

I wanted the majority of children to be confident in sharing out, become more familiar with division.

I wanted the children to grasp that a good, effective and persuasive argument required: the use of facts and statistics, quotes from an important source or person; an ability to argue that something was fair or unfair, appealing to the audience's emotions.

Nonetheless, this emphasis upon cognitive and conceptual understanding in principle is not realized in the realities of practice revealed in the data. The low percentage of questions making links between prior knowledge and present learning and the relative paucity of process questions which give children opportunities to reflect and articulate their learning points to whole class discourse which is more oriented to teachers' curriculum delivery goals than to guiding pupils towards greater understanding.

The pupil interviews mirror the teachers' reflections and the video data in that they show clear awareness of curriculum content; however, they also reveal limitations in their understanding. When asked what they thought they had been learning in the lesson observed, children were often able to identify precisely what the learning focus had been, often using the language of the curriculum. So, for example, children knew that they were learning about:

- How to score into the tile and stuff, and using two different types of pencils.
- How to make up a persuasive letter.
- Different strategies of halving and multiplying by two.
- How to halve and double and what integers are.
- How to do formal writing properly and how to see other people's points of view from both points of the argument and how to argue what we believe in as well.
- How to put both points of view down to make a balanced discussion.

Thus, there was a close correspondence between what the children believed they had learned and the actual learning focus of the lesson: indeed the children sometimes used the identical phraseology that the teacher used. However, this synergy of learning focus between teachers and learners is not matched by understanding—when interviewers probed to explore whether children genuinely understood the principles and ideas underpinning these teaching and learning objectives, considerable evidence emerged of misunderstanding, perhaps not surprisingly, particularly amongst low achievers. In some cases the misunderstanding was directly related to children making connections between ideas introduced in the lesson and their own prior knowledge which established misconceptions unanticipated by the teacher. In a Year 6 literacy lesson, exploring the active and passive voice, all four pupils interviewed were clear

that they had been learning about the active and the passive. But children's existing semantic understanding of active as being associated with action, and with doing (compounded by the teacher's reference to active verbs in a previous lesson which were semantically active, rather than grammatically active) leads two of them to interpret the active voice incorrectly:

- Martha: When somebody's doing something you can write an active verb.  
 Tom: I think a passive describes what the thing that you are describing does and an active is describing what the person does.

The interview data indicated that most of the children were more likely to refer to school-based curriculum prior knowledge than to prior knowledge from personal experience, mirroring the teachers' descriptions of prior knowledge. The high achieving girl did so markedly more strongly than other groups. However, the low achieving boy was three times more likely to refer to prior knowledge from personal experience than the other three groups, and more likely to speak from personal experience than about school-based experiences. The nature of the low achieving boys' response to classroom learning suggests that he may be more inclined to learn by drawing on his own experiences and by reacting to learning introduced through personal and unconventional responses. It may be that he is less 'tuned in' to the culture of school and schooled ways of working than his peers, and particularly less so than the high achieving girl who appears to be more in harmony with the teacher than other groups. Like the teachers, she conceives of prior knowledge as predominantly about school experience, and she recalls more facts from the lesson and understands lesson purposes more clearly than others. It is possible that greater acknowledgement and use of prior knowledge derived from out-of-school contexts might scaffold and support underachieving boys' learning more effectively.

## Discussion

This paper, reporting principally on the analysis of classroom interactions, describes the impact of raising the profile of whole class teaching in the National Strategies for Literacy and Numeracy, with their corresponding emphasis on 'interactive' teaching upon talk for learning. The study's significance lies in its detailed contextualized exploration of talk and learning, investigated from multiple perspectives. It highlights how, despite explicit and high status educational initiatives which seek to improve the quality of teacher talk, the discourse patterns in whole class teaching remain very similar to previous studies.

One factor influencing this apparent resistance to change in the pattern of teachers' talk may be that teachers feel a need to be in control of the discourse. Earlier in this paper, the concept of teacher as orchestrator of talk was discussed, in particular how successive research studies had shown how teachers manipulated and managed talk scenarios. In his study of questioning in an early years setting, Allerton (1993) suggests that closed questioning 'allows the teacher to retain control of interactions' (1993, p. 48). By contrast, he found that children's responses to open questions were longer,

more divergent and more likely to be controlled by the child. One impact of national strategies which outline in detail curriculum objectives for each year of primary education is that teachers are very focused upon their teaching objectives for each lesson and are anxious to cover curriculum requirements. This can lead to a reluctance to relinquish control for fear that curriculum objectives are not met. Indeed one of the teachers on reflection on her own talk in whole class teaching recognized that her tight control did prevent the development of thinking: 'My talk is very structured and doesn't allow for the children to develop their individual understanding or ideas'.

In contrast, one of the critical moments recorded in a Year 6 literacy lesson demonstrated how it is possible to hand over control temporarily to allow pupils to explore their emerging thinking and understanding. In this lesson, the teacher was leading a discussion on capital punishment prior to writing a discursive essay and it became evident that the information she was giving them about capital punishment was provoking a strong response. Realizing this, the teacher switched from leading discussion from the front and gave them 'time out' in pairs to share their thoughts and responses to the topic: at this point the class become animated in their conversations with each other. The teacher then resumed the whole class discussion and retook control. Other critical moments observed in the research were those rare moments when the teacher–pupil–teacher pattern of discourse was broken by a sequence of pupil responses. These were very limited in number and none were extended sequences of child–child interactions, but they do represent moments when the teacher relaxes control and allows a dialogue to develop. In the sequence below, from a Year 6 numeracy lesson, the first child's answer to the mathematical problem posed by the teacher shows a misunderstanding of how to express answers in pounds and pence. The teacher's follow-up question probes the child to think about the accuracy of this response. The 'No' response triggers another child to offer an alternative solution which does use pounds and pence; this response prompts another child to offer a correction (though sadly a wrong correction!).

- Teacher: What if the bill is £46.25, what is the bill each?  
 Child: £23, 12.5.  
 Teacher: But if I said £23, 12.5, does that look right?  
 Child: No.  
 Child: Can you say £23. 12p remainder 1?  
 Child: Remainder 2 actually.

All too often, however, with the teacher in clear control of the talk domain, interaction is reduced to teacher talk with 'gaps into which the students can insert responses' (Francis, 2002, p. 29). As a consequence, whole class teaching is constructed principally around the teacher's agenda, and is more concerned with talk for teaching, than talk for learning.

Perhaps as a consequence of this desire to retain control, the question remains the principal initiator of a discourse sequence in the classroom, despite the considerable range of other verbal, non-verbal or paralinguistic forms which frequently initiate discourse in other social situations. The prevalence of factual questions in the teacher's questioning repertoire in this study mirrors the findings of a host of previous

studies (for example, Barnes, 1969; Dillon, 1988; Galton *et al.*, 1999b; Wragg & Brown, 2001). But in terms of promoting constructive environments for the co-construction of meaning or understanding, factual or closed questions often act as inhibitors which ‘generate relatively silent children’ (Wood, 1988, p. 143): the more questions teachers ask, the less children say. And in terms of a national strategy which seeks to ensure that ‘pupils’ contributions are encouraged, expected and extended’, the use of factual questions may encourage a response, but rarely extend it. Goodwin suggests that rather than asking so many questions, we should be inviting pupils to ‘tell us what they think’ (Goodwin, 2001, p. 71). Generating and extending pupil thinking, however, requires sensitive shaping of discourse and sensitive listening to pupils’ responses. In the critical moment outlined below, drawn from a Year 2 numeracy lesson, the teacher uses her interactions to co-construct understanding through her questioning of the pattern in the five times table. She opens the sequence by asking a process question which asks children to reflect upon their own thinking and understanding. She follows up Rosie’s answer with another question specifically directed at Rosie, drawing on their shared contextual knowledge of what they have been working on in the classroom. She then builds on Rosie’s improved answer by opening it up to others and again targets specific pupils for a response. When someone gives the fuller answer, she reiterates it to the whole class and uses non-verbal communication (scanning the class) to ascertain understanding.

- Teacher: Would anyone like to explain to me how they know their number is in the five times table? ....
- Child 1: If it’s in the five times table it means it’s like, the number.
- Teacher: Come on, Rosie, we were just doing it together just then.
- Child 1: If it’s in the fives times table, it always has a five in it.
- Teacher: [The teacher turns back to address the whole class.] Right, Rosie was almost there, when she said it’s *always* got a five on the end. She’s not quite there is she? Who can add just that little bit that she needs to make it quite right? Ryan? Sean? OK, don’t worry. Imogen? [Hand up.]
- Child 2: It’s either got 5 or a 0.
- Teacher: Or a 0. Well done, do you remember now ... it ends in a 5 or a 0, so if yours ended with a 5 or a 0 [glances around room] then you’re bound to be right. Well done. Very good. OK.

In a different context, Year 6 literacy, where the children were discussing naughty things they had done, one boy recalls how he once hit his brother over the head. When the teacher asks him why he did it, his first response is unextended and in many of the classroom interactions observed, this response would close the sequence. But the very simple strategy of asking a subsequent question which offers a possible reason evokes a more extended response, particularly given that the average utterance length of a pupil was four words.

- Teacher: Why did you do it?
- Child: I don’t know.
- Teacher: Did you do it to hurt him, had he made you cross?
- Child: No, he kept bugging me so he was walking along the garden and I lobbed it and it just bounced off the top of his head.



Wragg and Brown suggest that the planning of questioning might be a positive step forward: 'It may be that if we want to ask questions that get children to think, then we have to think about the questions we are going to ask them' (2001, p. 21). Not only is it important to consider carefully the initiating question in a sequence, but it is also important to consider how subsequent questioning can genuinely extend and support learning and understanding. The questioning strategies used by the teachers in the critical moments recorded above are relatively straightforward, yet they were not frequently observed, because the focus was more commonly upon correct answers, than upon thinking. Considering questioning in terms of 'the context and the nature of the topic during which questioning takes place, the demands questions place on pupils, the appropriateness of the language of questions to the individual or group concerned and the effect of questions on subsequent learning' (Wragg, 1994, p. 190) is more likely to lead to effective learning than concentrating on pace and rapid fire questioning sequences. The current educational initiatives in the UK foreground the importance of planning and clear teaching objectives: it might now be an opportune time to evaluate the relationship between planning and learning and whether if planning shifted from focusing on curriculum content to cognitive development there would be a greater impact on pupil learning.

Moreover, not only do whole class interactions appear to be characterized by teacher control and by curriculum content, but they may also be contributing to underachievement. The classroom observation data has demonstrated how interaction is experienced differentially by gender and by achievement groups, with the low achievers and the boys least likely to participate in positive interactions. The pupil interviews have also indicated that low achieving boys seem to draw on their out-of-school or personal experiences more frequently than girls. These findings suggest that adopting active pedagogic strategies to maximize participation of all pupils in whole class teaching, such as making greater use of a 'no hands up' policy, and explicitly framing questions to invite children to reflect upon or articulate their personal experiences might be a positive step to counter underachievement.

Perhaps most significantly, however, the research has demonstrated that the potential of teacher talk for developing pupil understanding or for exploring pupils' misconceptions has not yet been fully recognized. Although there is evidence in the analysis of questions that teachers attempt to scaffold learning by structuring questions and sequences of questions which build on thinking, these are still principally in the context of factual questions. Teacher talk is concerned, first and foremost, with curriculum delivery and with leading pupils to a predetermined destination. With this priority, opportunities for using teacher talk to support pupil learning in conceptual or cognitive terms, and in terms of connections 'between what is already known and new experience' (Edwards & Westgate, 1994, p. 6) are largely missed. The fundamental questions asked by Alexander, 'Do we provide the right kind of talk; and how can we strengthen its power to help children think and learn even more effectively than they do?' (Alexander, 2004, p. 6) remain as pertinent now as they have ever been.



## Notes on contributor

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