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ABSTRACT

This paper reports findings from the Study of Primary Interactive Teaching (SPRINT) project in England, which examined teachers' understanding and use of interactive teaching as a characteristic of successful teaching in the National Literacy Strategy. Fifteen teachers of children aged 5-11 years became focus teachers and participated in a process of video simulated reflective dialogue (VSRD) with a higher education based research partner. Fifteen comparison teachers were videotaped doing interactive teaching in the literacy hour but did not participate in the VSRDs. Semi-structured interviews, held with every teacher before and after a 6- to 8-month fieldwork period, were analyzed to show teachers' changing conceptions of interactive teaching. The Concerns-Based Adoption Model was used to measure teachers' concerns about interactive teaching. Systematic observations were made on the video data. Results revealed few differences between the focus and comparison groups. Results provide significant evidence that while teachers have increased levels of interactivity by increasing the frequency of their questions, they still spend over half of their time giving information and telling children what to do. The results reveal a curriculum by cognitive demand interaction which raises questions about cognitive challenge for children age 5-7 in the literacy hour, and for children age 8-11 in other curriculum areas. (Contains 29 references.) (SM)

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Abstract

This paper reports the methods and findings of the Study of Primary Interactive Teaching (SPRINT) project in England, which set out to determine teachers' understanding and use of 'interactive teaching' as a characteristic of 'successful teaching' in the National Literacy Strategy. Fifteen teachers of children aged 5 through 11 years became focus teachers and participated in a process of video stimulated reflective dialogue (VSRD) with a higher education based research partner. Fifteen 'comparison' teachers, each in the same school as a focus teacher, were videoed doing interactive teaching in the Literacy hour but did not participate in the VSRDs. Semi-structured interviews, held with every teacher before and after a 6 – 8 month field work period, were analysed to show teachers' changing conceptualisations if interactive teaching. In addition the Concerns-Based Adoption Model was used to measure teachers concerns about interactive teaching. Systematic observations were made on the video data. The results revealed few differences between the focus and comparison groups. They provide, however, significant evidence that whilst teachers have increased levels of interactivity by increasing the frequency of their questions, they teachers still spend over half of the time giving information and telling children what to do. The results reveal a curriculum by cognitive demand interaction which raises serious issues about cognitive challenge for children aged 5 to 7 years in the literacy hour, and for children aged 8 to 11 in other curriculum areas.

Key words: interactive teaching; teacher-pupil interaction; cognitive demand; video stimulated reflective practice

Introduction

'Interactive teaching' is advocated by the English National Literacy Strategy (NLS) framework document (DfEE, 1998:8) as one of five characteristics of 'successful teaching'. Despite the virtually obligatory implementation of the NLS in elementary schools in England since September 1998, there has been little accessible information for teachers on the meaning or method(s) of 'interactive teaching'. According to the NLS 'Framework for Teaching', teaching is interactive when 'pupils' contributions are encouraged, expected and extended'. The parallel requirement, however, for successful teaching also to be 'well-paced' with a 'sense of urgency' would seem to limit the possibilities for 'extended' pupil contributions. The adoption of 'whole class interactive teaching' had been recommended two years earlier by Reynolds and

Farrell (1996) as a potential remedy for the poor performance of English students in international comparisons of educational achievement. The present study set out to investigate elementary school teachers' interpretations of the term, and to observe their implementation of these interpretations in classroom practice during the Literacy Hour and in other curriculum areas. This paper will provide some background information about interactive teaching and the NLS. It will report the main findings of the 'Study of Primary Interactive Teaching (SPRINT) project, including a typology of interactive teaching derived from the teachers' definitions, and the concerns and practice of interactive teaching demonstrated by the participating teachers. .

Background

The evidence from over 20 years' of observational research on classroom interaction in English schools for children aged five to 11 years indicates the degree of challenge involved in achieving a shift towards interactive teaching. In the USA, the quest began early in the 20th century and was furthered, in particular, by Flanders who sought to increase the frequency of pupil initiated teacher-pupil interaction in the classroom by means of systematic analysis of interaction categories, and the process of 'micro-teaching' (e.g. Flanders, 1970). The SPRINT research, reported here, has parallels with Flanders' work but used video, observation-based feedback and and personal reflection on practice or 'video stimulated reflective dialogue' (VSRD) in place of microteaching.

Regardless of any formal definition of interactive teaching, if we accept the notion that it is likely to involve a high proportion of opportunities for children to answer questions and talk with their teachers, then the weight of evidence, from both quantitative and qualitative approaches to the study of classroom processes in England was discouraging. Galton et al. (1980) in the first large scale process-product study of teacher-pupil interaction in elementary school classes had reported that the supposed,

> 'questing, exploratory character of the individual child's activity; the stress on discovery methods, ... while the teacher was seen as stimulating this activity by probing, questioning, guiding – leading the child from behind .. (p,157)

was not occurring in practice. Instead, Galton et al., found that,

> Individualized teaching (or interaction) .... is overwhelmingly factual and managerial. Such probing and questioning as does take place is to be found largely in the whole class teaching situation, one generally to be avoided, according to Plowden...' (p. 157)

Arguably Galton et al. (1980) might be responsible for the 1990s's recommendations for the adoption of whole class interactive teaching, since they continued,

> Far from utilizing probing, higher order type questions and statements with individuals, teachers in practice utilize this approach largely in the whole-class teaching situation, the technique specifically discouraged by Plowden. ... ...All teachers, of whatever style... ... use higher order questioning more in the whole class situation than when interacting with individuals. (p.158)

Whilst the NLS Framework adopted the notion of whole class organisation, however, it failed to transfer Galton et al.'s definitions of higher order interactions. At about the same period, Stubbs (1976) and Barnes (1976) were carrying out research on communication in the classroom. Using qualitative methodology they showed also that teacher questions of a type not found in normal conversation, dominated the discourse and that pupils rarely initiated exchanges or asked questions of their own. Barnes recognised the conflict for teachers between the need to promote learning and the need to maintain control, but saw the way forward as being through genuine pupil discussion in groups, enabling them to create meanings for themselves. A decade later, in the 1980s however, Edwards and Mercer's (1987) recorded and analysed classroom discourse in classes looking for evidence of 'Bruner's (1986:163) 'notion of culture (and therefore education) as a forum in which teacher and pupils engage in a negotiation of shared meaning'. They observed lessons 'characterised by exploration and discovery, joint activity and talk, scaffolded learning, and an educational ideology not far removed from Bruner's own' (p163) but still found that teachers continued to exercise close control over the nature and direction of classroom talk.

By the mid-1990s, and after the establishment of a national curriculum in England, Galton et al. (1999), found that the nature of teacher-pupil interaction had worsened. Whilst teachers were asking more questions than they had in the 1970s, the concomitant increase in statements outstripped the rate of rise in questions such that the ratio of questions to statements in teacher talk was worse than that of the '70s. . In other words, teacher talk was more likely to suppress than engender interactivity. Since the introduction of the NLS. Mroz et al., (2000) have found that

even 'effective' teachers of literacy had not broken the mould of IRF dominated interaction. Alexander's (2000) 'five cultures' research shows also the persistence of this pattern of classroom interaction in England.

The concept of 'interactive teaching' came to the fore, however, around 1996 when there was a , growing concern that many 'Pacific Rim' countries were producing higher levels of classroom achievement than the UK, Reynolds and Farrell (1996; Reynolds 1998) proposed that one reason for this was the widespread use in the Pacific Rim of whole-class interactive teaching. This was elaborated into three phases in which teachers would,

- start with a problem and develop solutions and concepts through a series of graded questions to the whole class;
- use rapid question and answer sessions to assess pupils' knowledge;
- conduct teacher-led discussion involving slower-paced, 'higher order' questioning designed to promote higher levels of pupil thinking.

The emphasis here was almost entirely on teacher questions, and an emphasis taken up by Muijs and Reynolds (2001) who give advice on mixing different types of questions, or on what to do if a pupil answers a question incorrectly, for example. Although they include a brief section on discussion, with advice about how to keep it focused on the teacher's objectives, interactive teaching is identified almost exclusively with teacher questions. Issues related to meta-cognitive development in pupils (and teachers) appear to be regularly disregarded. Whilst this information might have been useful, however, it was not made widely available to teachers through the NLS documentation.

The National Literacy Strategy and interactive teaching

Despite the evidence from the 1970s and 80s, interactive teaching was espoused by the NLS . It was attempting to introduce interactive teaching, simply by telling teachers, in the most prescriptive government document on teaching ever to be delivered, essentially, 'to their doorsteps', that it was a facet of successful teaching. The National Literacy Strategy Framework for Teaching (DfEE 1998) set out the format and detailed semester-by-semester objectives of the 'Literacy Hour' which would be implemented in the vast majority of elementary school classrooms throughout England. Though not mandatory, the NLS was strongly recommended:

> Our presumption will be that the approach to teaching we set out, based on the NLP (National Literacy Project), will be adopted by every school unless a school can demonstrate, through its literacy action plan and schemes of work and its performance in NC Key Stage tests, that the approach it has adopted is at least as effective. (DfEE 1997:19)

Given this background, the present project sought to find out how teachers themselves defined 'interactive teaching' and whether they could demonstrate corresponding practice in the Literacy Hour. Beyond this, and by means of an innovative process of 'video–stimulated reflective dialogue' between teacher and a higher education research partner, the project investigated whether teachers would be able to refine and develop their practice.

Thus, the SPRINT (Study of Primary Interactive Teaching) project aimed to:

- construct a typology of interactive teaching derived from practising teachers' definitions
- examine teachers' concerns about 'interactive teaching' in the absence of relevant training
- find out whether elementary teachers' implementation of interactive teaching in the Literacy Hour, differed from pre-NLS classroom interaction
- evaluate the process of 'video-stimulated reflective dialogue' (VSRD) as a means to enhance teachers' reflection on, and develop of, their interactive teaching practice.

In effect the research examined the thesis that review and reflection on practice in the light of video evidence with a sophisticated partner, would facilitate teachers' articulation of their conceptualisations of interactive teaching and enable them to refine their practice of it.

Video-Stimulated Reflective Dialogue (VSRD) : theoretical justification and procedure

The video–stimulated reflective dialogue (VSRD) was the main vehicle for pedagogical development. The theoretical justification for its use derived from Schon (1983). It involved 'systematic inquiry into ... practice ... to deepen one's understanding of it' (Lucas, 1991: 84). The principle behind the researcher-practitioner partnership was that it would to engender the complementary exchange of skills and knowledge. In addition to intellectual support, however, teachers need emotional support in the *work* of developing or changing their practice (Hargreaves and Fullan, 1995) and Day (1999) suggested that those leading change must ensure that

participants have, not only intellectual and emotional but also practical support. These were inherent embedded aspects of the VSRD process, as the VSRD provided opportunity for teachers to feel the 'sense of ownership and of collective responsibility for continuing and enhancing NLS' recognised as necessary by Earl et al., (2000; 2001:5). Through the VSRD, therefore, SPRINT teachers had the opportunity both to deconstruct their practice and then to engage in the process of reconstruction of meanings with a supportive research partner. Since professional reflection is likely to benefit from a clearly defined focus and criteria for making judgements if understanding is to be achieved, the project's explicit focus on interactive teaching provided a platform for discussion, analysis and interpretation. Significantly, Bullough and Gitlin (1991) identify the need for practitioners to talk about practice in order to enhance understanding of it, not just at a polite conversational level but within deeper, focused discourse, underpinned by mutual respect and characterised by a willingness to tolerate differences in opinion and values.

VSRD Procedure

The 15 focus teachers were videoed teaching in the Literacy hour at the beginning and end of the six – eight month fieldwork period. They were videoed also teaching another curriculum area of their own choice which they deemed one in which they used interactive teaching. The first 'other curriculum area' video was recorded at the beginning of the fieldwork , and the second about half way through. The teachers took the videos home after the sessions and were asked to view the video independently, to consider the questions in the Reflective Dialogue framework (see below) in relation to the video, and to select a 20 minute section which best demonstrated their interactive teaching. A Reflective Dialogue framework of questions was given to each teacher to stimulate professional reflection on practice. This included 40 questions divided into six sections including, for example, intentions (e.g. what were your intentions/aims/purposes in using this strategy?), self awareness (What were you thinking/feeling in this moment?), perceptual awareness (what do you notice now that you weren't aware of during the lesson?) and practical reflection (What assumptions are you making about teaching and learning?). The teachers controlled the co-viewing of the video with their research partner, stopping it at points regarded as significant. The teacher also chose a small number of the reflective questions for discussion. By the end of the Reflective Dialogue, up to three action points for development before the next video session would be suggested , ideally by the teacher, and agreed, as foci for the next VSRD.

The VSRDs thus sought to put teachers in charge of the reflective process and to give them the opportunity to articulate their theories of interactive teaching. Despite some initial unease, all

teachers considered that the VSRDs were worthwhile, and endorsed their effectiveness in enhancing critical awareness. Some planned to adopt similar procedures as a school-based professional development tool. (Moyles et al. (in press)

The SPRINT Project : context, design and methodology

The project began in October 1999 and ran until May 2001, and involved teacher training tutors and experienced researchers in the North East, and the East Midlands of England, the regions surrounding the two participating universities.

The design was essentially a pre-test and post-test design involving 15 'focus' teachers who participated in three VSRD sessions, and 15 comparison teachers who underwent the same pre- and post- questionnaires, interviews and being videoed but did not engage in reflective dialogues. The teachers were from a convenience sample of 15 schools involved in partnership with participating universities or recommended local authority advisers. Ten schools were in the East Midlands and five in Northern England. Head-teachers nominated staff who might participate but final decisions rested with the teachers themselves. One 'focus' and one 'comparison' who taught children of similar age within the five- to eleven-year–old (Grades 1 – 6) age range were involved from each school.

The pre and post intervention measures included :

- semi-structured interviews to elicit teachers' initial and final definitions of interactive teaching
- the 35 item Stages of Concern questionnaire from the Concerns-based Adoption Model (CBAM) (e.g. Hall and Hord 1984)
- systematic observation, using an adapted version of the ORACLE teacher record (Galton et al., 1980; 1999) of interactive teaching in the literacy hour.

Instruments

The project adopted the Concerns-based Adoption Model (CBAM: Hall and Hord 1984) Stages of Concern (SoC) 35 item questionnaire, and asked teachers about their Levels of use of interactive teaching in the initial and final interviews. The CBAM sets out a progressive series of Statements of Concern about an innovation, in this case interactive teaching. It was used in recognition of the emotional pressure placed on teachers when they are asked to take on or develop particular teaching styles, or oter innovations. As Hargreaves and Fullan (1995) have

pointed out, the emotional effects of innovation adoption are often overlooked in educational research.

Observation

After each VSRD the teachers returned the videotape to the researcher. The 20 minutre sections of video selected by the teachers, were coded using the ORACLE Teacher Record as developed by Boydell and used by Galton et al. (1980) and Galton et al. (1999). Two researchers were trained as observers and carried out all the video coding. Codes for interaction and teacher audience were recorded every 25 seconds. Long pupil utterances of over 10 words, and those between 4 and 10 words) were noted, and any specific NLS strategies activities (such as the use of phoneme fans or whiteboards) were noted. An overall reliability of 0.73 was obtained, over 10 trials with inter-observer agreements ranging from 0.5 at the first attempt, to 0.9 in later trials.

Analysis of the qualitative data took a grounded approach using *in vivo* terminology facilitated by NUD*IST software. The CBAM questionnaire data were subjected to factor analysis, whilst the various mean concerns ratings and observation frequencies were compared by Student's 't' and chi-square tests.

Results

Teachers' understanding of interactive teaching

One principal aim of the research had been to find out how teachers defined interactive teaching and to construct 'an accessible model of the skills involved'. However, it was soon evident that such an aim was overly simplistic as teachers offered a variety of different conceptualisations of interactive teaching, with different purposes and contexts deemed appropriate. Ultimately a typology of interactive teaching emerged together with the conditions, constraints and purposes for each type. The constituent elements, and the typology were discussed with the teachers in workshops in each region.

The typology includes nine main types of interactive teaching, as shown in Table 1.

TABLE 1: A typology of interactive teaching constructs ABOUT HERE

Within this typology, the first five types were regarded as 'surface' forms of interactive teaching, associated by some teachers with 'gimmicky' techniques within the NLS. The last four types,

however, represent a deeper level of engagement with the purposes of interactive teaching, to probe pupils' understanding, to try to ensure reciprocal interaction and the co- construction of meaning, or to enable children to consider or articulate their own thinking strategies. The ninth type, 'Attention to pupils' social and emotional needs or skills', however, was used in both surface and deep senses and so straddles the surface-deep distinction. Teachers used it in a 'surface' sense when they were referring to their concern that children experienced success and enjoyment, but also engaged in complex processes of decision making when considering individual children's needs for experiences which would support, or not undermine, their self-esteem. These decisions might lead to different courses of action for different children, or different courses of action for the same child in different contexts.

Several conditions which influenced the construction and application of the various types emerged from the discourse with the teachers, such as their attitudes to the NLS (11 teachers expressed some negative attitudes to the NLS, but all teachers were positive about interactive teaching). The teachers were grouped according to their conceptualisations of interactive teaching, and how these changed during the course of the project. Just over a third for example, referred largely to 'surface' types of interactive teaching, and appeared to be content to use the techniques suggested in the NLS Framework for Teaching and subsequent documentation. Several were convinced of the effectiveness of their interactive teaching and felt further need to no reflect on its fundamental purposes or implications. On the other hand, nearly a quarter of the 30 teachers made substantive shifts in their conceptualisations of interactive teaching, and acknowledged their debt to the reflective dialogue process for enabling them extensively to examine their views. At least one fifth of the sample developed more concern with the 'deeper principles' of interactive teaching. The emphasis on 'surface' features of interactive teaching suggests that if one of the aspirations of the NLS is to enhance pupil thinking (Reynolds 1996; Beard 1999), teachers need to address the 'deeper', less explicit aspects of interactive practice directly, by making reflective links between their own principles of practice, theory and knowledge. As we shall see below, this might apply in particular when teachers are teaching in the Literacy Hour with the five to seven age range.

Teachers Concerns about the innovation

The teachers' pre-test concerns about interactive teaching were factor analysed and the optimal solution was an oblique five factor structure which slightly differed from, but had clear parallels

with, CBAM's seven Stages of Concern. Just three items (12, 13, 35) remained unallocated. This 'English' five factor structure offered a more authentic representation of the English teachers' concerns and the five scales based on these factors were adopted for the remainder of the analyses. The five scales, the variance extracted by each on and a characterisic item are shown in Table 2. There were no differences on any of the scales between the two groups in their initial or final concerns. Within group differences, however, were found. The reductions in the focus teachers' concerns about two scales, 'Lack of information' and 'Conflicting demands' were significant (paired t test; $p < .05$). There were no significant changes amongst the comparison teachers, although they too became much less concerned about their lack of knowledge of interactive teaching. Figure 1 shows the changes within each group, but illustrates also the similarities between them.

Table 2 Characteristics of the five SPRINT Scales of concern HERE

There was considerable variation amongst the teachers in the degree to which they changed their concerns' ratings during the project. Some, notably some more experienced and highly competent teachers, hardly changed their ratings at all. This was particularly the case where the teacher was focusing on the 'surface' aspects of interactive teaching such as those using types in the first four rows of the typology in Table 1. Others made major shifts particularly in reducing concern about practical issues or 'Conflicting Demands' but increasing their 'Professional Adoption' concerns about more advanced strategic aspects of interactive teaching, and its impact on children. The original CBAM Stages of Concern includes a Stage labelled 'Consequence concerns' which focuses on the impact of any imnnovation on the chidren. This did not emerge from the SPRINT data, nor was it represented in the unallocated items. Instead, concerns about the effects on the children were dostributed across the scales, but were associated most closely with Professional Adoption, Collegial Development' and 'Critical Concern'. It is suggested that for teachers in England, the last decade has witnessed such a rate of innovation that concern about the effects on children has become a constant anxiety.

Figure 1 about here

Moving on to the 'Collegial Development' scale, we found a notable increase in the Comparison Teachers concerns. This was quite likely to be a by-product of the research design, in which one teacher in each school was focusing on interactive teaching whereas another was simply being videoed and interviewed. From the outset however it was agreed that the teachers could talk to each other about interactive teaching, just as they might any other aspect of in-service training, or innovative pedagogy. One relevant issue here, as regards the use of an innovation adoption measure, was that many of the teachers said that whilst they had little or no formal knowledge aboiut interactive teaching, they felt that it was basically 'good practice'. In other words, they appealed to their craft knowledge and expertise. If this was a real rather than a perceived state of affairs, however, we might expect the research on interaction from prevoius decades, as reported earlier, to have had different results.

Observations of interactive teaching

The observations of the teachers' implementations of interactive teaching were based on systematic coding, every 25 seconds, of the 20 minutes of video selected by the teachers as best demonstrating their interactive teaching. No differences were found between the observations of the focus and comparison groups in their teaching of the literacy hour at end of the project. This was disappointing but several explanations are offered below. It justified, however, the pooling of the data from both groups of teachers in order to obtain a larger sample for the examination of 'interactive teaching' in the Literacy Hour. Detailed reporting of the observation results will appear in Moyles et al., (in press) but here we will focus on teachers' questions.

The most salient finding concerning teacher-pupil interaction was the massive increase in the frequency of questions, and in the ratio of questions to statements. The frequency of observations of questions had almost doubled compared with pre NLS English lessons, whilst the mean percentage frequency of statements had fallen slightly. Statements, however, were still the dominant form, and accounted for over 50 per cent of all observations. The increase in questions and the improved question to statement ratio are clear indications that there were more opportunities for children to speak since questions were coded according to the pupils' answers. If there was no response , or not enough time for a response, then a teacher's 'question' would be coded as a statement. In other words when asked to select the most interactive teaching, the teachers selected sections with frequent pupil responses. This does not tell us, however, whether

these responses were 'extended'. This might depend on the nature of the questions and whether these were likely to promote higher order thinking, such as that involved in reasoning, hypothesising, analysing or predicting.

Figure 2: Teacher –pupil interaction in 1976, 1996 and during the Literacy Hour. HERE

Analysis of the data in terms of the cognitive demand of the questions and the two key stages (Key Stage 1 (KS1) ages 5-7 ; Key Stage 2 (KS2) ages 8 – 11) brought a second, worrying, finding to light. This was the very high frequency of observations of lower order, factual recall questions by the KS1 teachers, whilst KS2 teachers used an unexpectedly high percentage of more demanding questions i.e those which a child answered with some explanation, reasoning, prediction or ideas, compared with observations made using the same observation system just prior to the introduction of the NLS

Figure 3 : Question types in Key Stage 2 English and the Literacy Hour at Key Stages 1 and 2 - about here

Earlier in the paper we described the typology of teachers conceptualisations of 'interactive teaching' and divided it into surface and deep types of interactive teaching. The major differences found between the teachers of the older and younger children suggests that perhaps the teachers of the younger children tended to use more of the surface types of interactive teaching. In other words they were keen to engage pupils' attention, ensure broad participation, and foster pupils social and emotional well-being. To do this they needed to use short interactions so that many children would have an opportunity to answer a question. Many of them introduced games and quizzes, or used amusing puppets to both entertain and teach. At Key Stage 2 however, with the 8 to 11 year old children, the teachers were perhaps more likely to ask probing questions to 'seek meanings, construct knowledge and so on. For example, they would ask children to say how an author had created a particular mood, or to predict what a character would do next, or suggest ideas to build up an image in a poem. It could be argued of course that if questions were coded according to the children's answers, then the younger children simply tended to give factual answers whereas the older ones offered reasons.

We were able to test this, however, by looking at the interactions in other curriculum areas selected by the teachers as their favoured curriculum areas for the use of interactive teaching. The results are shown in Figure 4. Significant interactions were found between age range, curriculum area and cognitive demand. Quite clearly at KS1, teachers used more lower order questions in the literacy hour and fewer higher order questions. In the other curriculum areas, such as science, history, mathematics, the reverse was true : higher order questions were more prevalent than lower order questions, and the overall rate of questioning was less inflated, suggesting, possibly, a slower pace of interaction. At KS2, however, whilst the high rates of higher cognitive demand questions might be a cause for celebration, the reduced level of these questions in other curriculum areas is a cause for concern.

Figure 4: Interactions between age range , curriculum area and cognitive demand.
About here

In search of an explanation for these significant interactions, we turned back to the NLS Framework for Teaching. This document lists the objectives for each term, in each main strand of the literacy strategy (namely word- level, sentence-level and text-level work). Taking the word level work, as the level most likely to yield higher order question we compared the verbs in the objectives. For Year 1 (6 year olds), term 1 there was a high proportion of verbs such as 'identify', 'collect', use' and 'practise'. 'Explain', discuss' and 'compare' tended to be buried in the second part of the objective if they were there at all. At Key Stage 2 however, Year 5 (10 year olds) term 1, the objectives begin with verbs such as 'discuss', 'investigate', 'explore'. In other words, the Year 5 objectives seem to have greater cognitive demand built into them. Given that the KS1 children can provide higher order answers to questions in curriculum areas such as science, history and mathematics, we must ask whether this preponderance of factual recall questions in what amounts to a full school day every week (5 hours) be justified?

The failure to obtain observational evidence of major differences in practice between the focus and comparison teachers therefore might result from the mix of KS1 and KS2 teachers, who were about equally distributed between the two groups. In effect their differential practice might have been cancelling out distinctive practice, with the results that overall a very high percentage of questions was observed. The quest for an effect in terms of teachers encouraging pupils to make

'extended responses' was probably obscured by the high levels of lower order questions amongst the KS1 teachers. Our observations of sustained interactions, lasting, uninterrupted with the same child or small group for over 25 seconds, and pupil utterances longer than 10 words were extremely rare, both occurring in less than 5 per cent of interactions. Thus, despite the increase in higher order question sat KS2, the children were still responding in relatively few words and were not engaging in long interactions with teachers, in which the teacher might probe and challenge their thinking .

The majority of teachers, however, made some alterations in their definitions and reported use of interactive teaching and attributed these to

- having read more NLS literature;
- the maturation of pupils during the project

More than half the teachers also felt that the experience of reflecting on the videos caused them to make more substantive shifts in practice and in some cases their schools were proposing to adopt the VSRD process for school based staff development.

Conclusions and potential impact

The SPRINT study has revealed the complexity of elementary teachers' understanding and use of 'interactive teaching' and produced a typology derived from teachers' words. In addition the changes in teacher-pupil interaction since the introduction of the literacy hour suggest that the pace and intensity of interaction have increased, and that teaching may be more interactive because of the relative increase of questions to statements. The greater emphasis on surface aspects of interactive teaching, particularly in the Key Stage 1 classes, suggests that teachers need further encouragement and opportunity to consider the underlying principles of interactive teaching. On the other hand, the use of higher order questions in curriculum areas other than literacy in the younger classes suggests that the children are quite capable of giving higher order answers to questions. In other words, the Literacy Hour at KS1 may be seriously underestimating children's thinking skills. As some of our case studies (reported, for example, in English et al., 2002) the VSRD has the potential to improve this situation.

In brief, the project has four main achievements to date including:

1. A typology of definitions of interactive teaching and their associated contexts and conditions.

2. Development of video stimulated reflective dialogues as a method of professional development.
3. Quantitative, observational evidence of the effects of the literacy hour on teacher/pupil interactions in primary classrooms, with disturbing findings concerning the effects of the NLS on cognitive demand at KS1. These finding have serious implications for the revision of the NLS objectives at KS1. At the same time, it appears that older children are not being challenged intellectually in curriculum areas such as science, geography, and English.
4. A 'Year 2000 English' analysis of Hall et al's (1979) seven Stages of Concern (SoC) about innovation, based on present day teachers in England as opposed to 1970s' teachers in Texas. Given the nature and rate of innovation which teachers in England have accommodated in recent years, it is suggested that the English structure may represent a genuine change in concerns about innovation, and the CBAM Stages of Concern questionnaire should be administered to a larger sample.

The SPRINT project, whilst not fulfilling its originally hoped-for conclusions, has shown without doubt that elementary school teachers in England have made their teaching more 'interactive' in a basic sense. They have increased the ratio of questions to statements, thus giving children more opportunity to answer questions. Further, teachers of younger children had drastically increased such opportunities for active participation in the lesson. In this sense pupil contributions were definitely 'expected and encouraged'. Unfortunately, even where more challenging questions were dominant in the Key Stage 2 classes, responses were rarely 'extended'. As long as this is the case, the peculiar, teacher-led nature of classroom interaction will persist and opportunities for intellectual growth through natural contingent social interaction with a more experienced other are unlikely to be realised.

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TABLE 1: A typology of interactive teaching constructs

Key features emphasised by teachers when defining interactive teaching		No. of teachers (N=30) who referred to type
Surface		
	Engaging Pupils Constructs relating to maintaining pupil interest in the curriculum and providing fun and enjoyable experiences.	24
	Pupil Practical & Active Involvement Constructs emphasising 'hands on' learning and activity requiring 'movement' and practical engagement.	26
	Broad Pupil Participation Constructs referring to strategies that involve the whole class in activity or those that allow the teacher to assess pupil knowledge through whole class presentation of knowledge e.g. the use of white boards or letter fans.	18
	Collaborative Activity Constructs relating to pupil-pupil collaboration as the basis for learning e.g. NLS 'Time Out'.	28
	Conveying knowledge Constructs that refer to issues around assessing and extending pupil knowledge and conveying new knowledge, particularly non-didactic methods.	25
Deep		
	Assessing and extending knowledge Constructs that refer to issues concerned with assessing and extending pupil knowledge	
	Reciprocity and Meaning Making Constructs that relate to 'two way' communication where both teacher-pupil and pupil-teacher interaction is encouraged. Constructs that emphasise the construction of meaning through dialogue rather than didactic approaches.	21
	Attention to Thinking and Learning Skills References to attention to, and development of, pupil thinking skills, and comments that imply learning frames or attention to pupils' learning processes.	17
	Attention to Pupils' Social and Emotional Needs/Skills References to teaching addressing the emotional needs and social interests of the pupils.	26

Table 2 Characteristics of the five SPRINT Scales of concern HERE

Concerns scale	Variance extracted	Typical item (and its correlation with scale total less this item)	Mean score/item	Standard deviation	N
Lack of information	8%	17 I would like to know how my teaching is supposed to change ((0.55)	3.63	1.19	26
Conflicting demands	10%	8 I am concerned about conflicts between my interest sand responsibilities (0.75)	3.28	1.54	26
Professional adoption	30%	14 I would like to discuss the possibility of using interactive teaching more effectively (0.87)	5.52	1.17	27
Collegial development	16%	18 I would like to familiarise other teachers and other schools with the way I am working during interactive teaching (0.68)	4.19	1.37	27
Critical concern	7%	22 I would like to modify our use of interactive teaching in this school based on the experience of our pupils. (0.59)	4.08	1.14	26

(*Professional adoption* and *Collegial development* correlate significantly at r = 0.46 (N=26, p=0.02).)

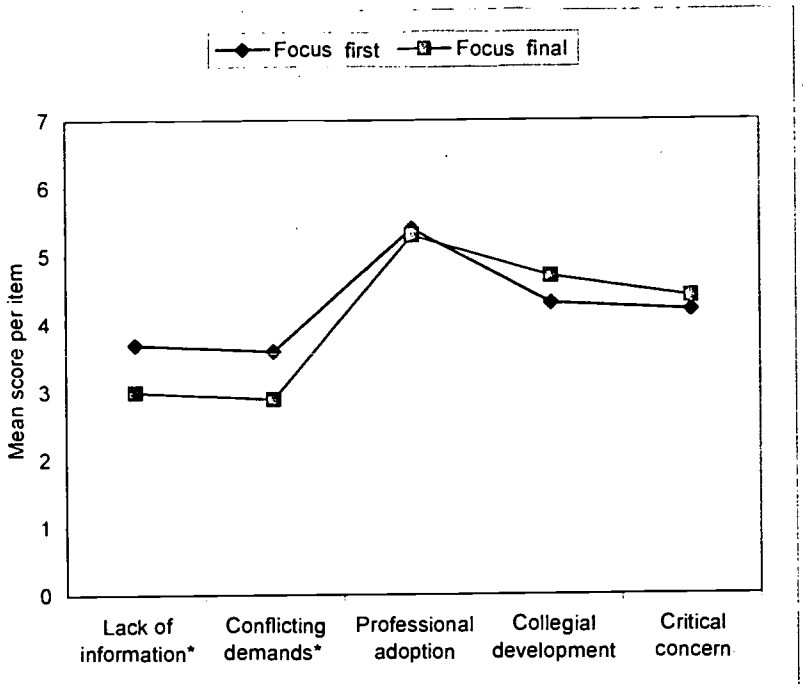


Figure 1a Focus teachers' first and final concerns

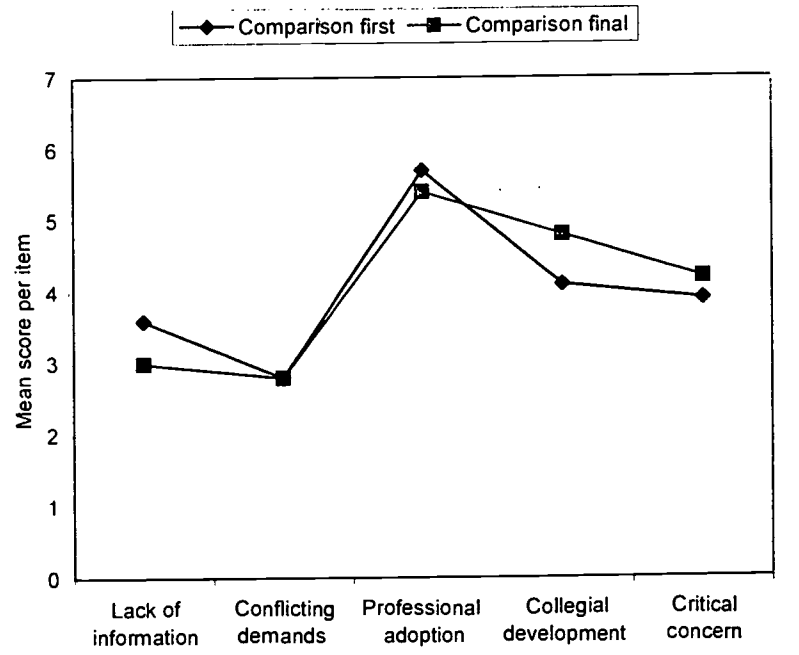


Figure 1b Comparison teachers' first and final concerns

Figure 2 Teacher-pupil interaction in 1976, 1996 and the Literacy Hour 2000

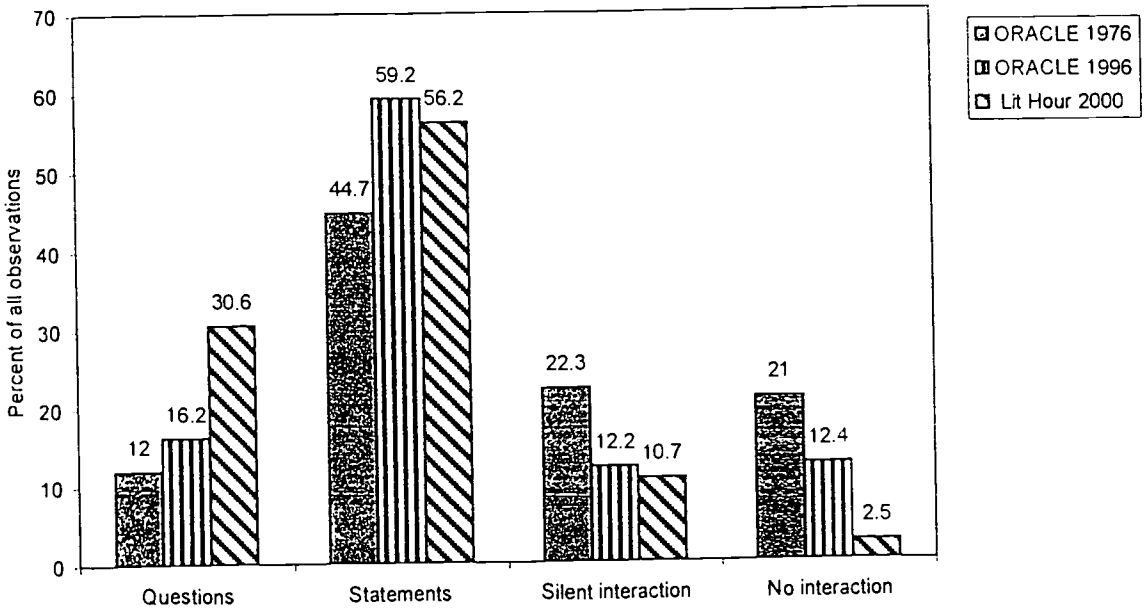


Figure 3 Question types in Key Stage 2 English and the Literacy Hour at Key Stages 1 and 2

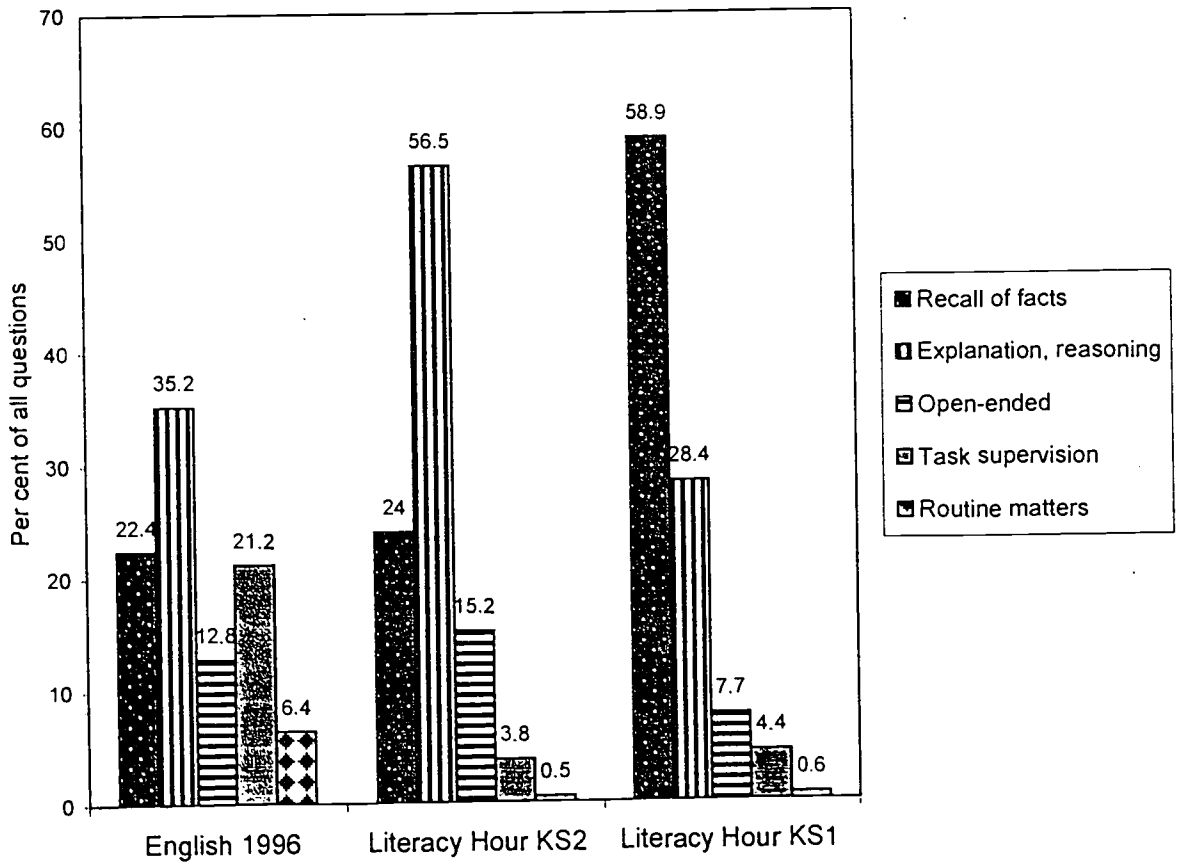
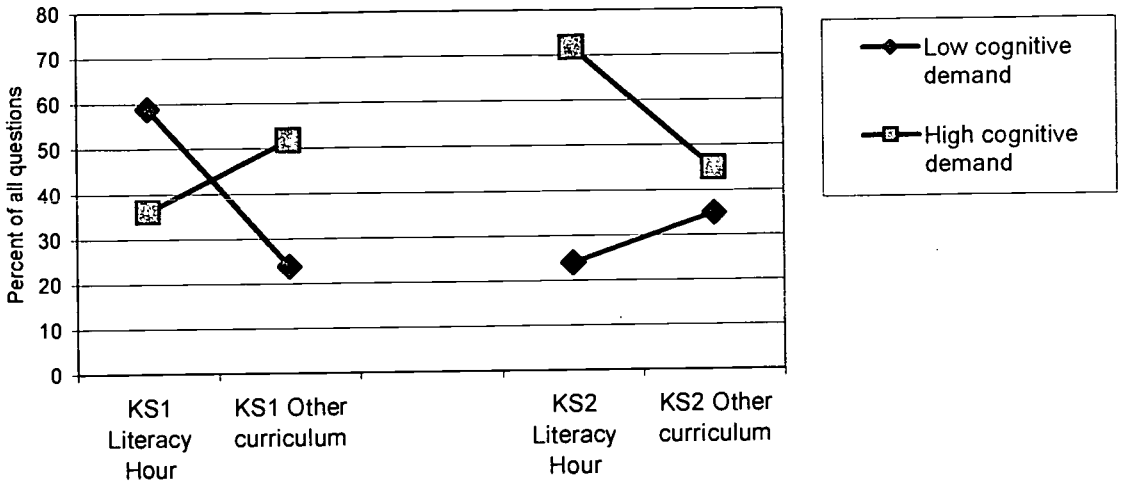


Figure 4 Interactions between key stage, curriculum and cognitive demand



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