Developing the repertoire of teacher and student talk in whole-class primary English teaching: Lessons from England

Jan Hardman

University of York, UK

ABSTRACT

This paper investigates the types of talk moves used by teachers and students following the implementation of a dialogic teaching professional development program. It draws on talk data derived from 42 video-recorded primary English lessons collected as part of a larger impact evaluation of the intervention. The video recordings were subjected to a systematic analysis and quantification of teacher and student talk moves together with a more nuanced, micro-level analysis of a sub-sample of 18 lesson transcripts. The findings showed that teachers in the intervention compared to the control schools made significantly greater use of discussion and dialogue, characterised by open/authentic initiation questions and follow-up talk moves that resulted in students participating more in the whole-class talk and elaborating on their thinking and that of other students. Implications of the findings for classroom practice and teacher professional development are discussed.

Introduction

Promoting the use of spoken language in the classroom for students' cognitive, social and linguistic development is seen as one of the major goals of education (Alexander, 2018). In order to address students' spoken language needs, teachers need to create the pedagogical conditions in which students are given the opportunity to work collaboratively with their peers, listen to and build on the contributions of others, asks questions to clarify and inform the discussion, challenge when necessary, and articulate and justify their answers, arguments and opinions. Within English lessons, teachers can create such opportunities through their whole-class interaction with students where teachers are guiding the co-construction of knowledge and understanding, and through student-to-student interaction in which the knowledge and status of participants are more symmetrical.

Drawing on data collected as part of a larger evaluation of a dialogic teaching professional development program using an experimental design (Jay et al., 2017), this paper investigates how teachers and students interacted in whole-class talk and highlights differences in the types of talk moves they used when the talk was more dialogic in nature. It goes on to consider the practical implications of the findings for implementing and supporting a dialogic pedagogy in the primary English classroom.

Theoretical background

Research dating back to the early 20th century suggests teacher-fronted talk has been a dominant practice in whole-class teaching and that it remains the pedagogical default (Hardman & Hardman, 2017a). In seminal studies of whole-class teacher-student interaction conducted by Sinclair and Coulthard (1975) in England, it was found that a teaching exchange typically consists of three moves. It was often found to be made up of an *initiation*, usually in the form of a teacher question, a *response* in which a student attempts to answer the question, and a *feedback* move, in which the teacher provides some form of feedback (henceforth IRF). In what became known as the 'recitation scripts', it was found that the IRF exchange was particularly prevalent

in directive forms of teaching and often consisted of closed teacher questions, brief student answers, superficial praise or criticism rather than diagnostic feedback, and an emphasis on recalling information rather than genuine exploration (Nystrand, Gamoran, Kachur, & Prendergast, 1997; Tharp & Gallimore, 1988).

For example, a study of the teaching of English to Year 5 students in 72 primary schools in England following the introduction of a national literacy strategy analysing teacher and student talk moves in video-recorded lessons found open questions (designed to elicit more than one answer) made up just 10 per cent of the questioning exchanges, and 15 per cent of teachers did not ask any such questions (Hardman, Smith & Wall, 2003). Probing by the teacher, where the teacher stayed with the same student to ask further questions to encourage sustained and extended dialogue, occurred in just over 11 per cent of the questioning exchanges. Uptake questions (building a student's answer into a subsequent question) occurred in only 4 per cent of the teaching exchanges, and 43 per cent of the teachers did not use any such moves. Only rarely were teacher questions used to ask for student elaboration, argumentation and reasoning. As a result, most of the student exchanges were very short, lasting on average 5 seconds, and were limited to three words or fewer for 70 per cent of the time.

Similarly in the USA, a study of teacher-student discourse moves of more than 200 video-recorded eighth and ninth-grade English and social studies lessons in a variety of schools in the Midwest of America found that whole-class discussion in which there is an open exchange of ideas averaged less than 50 seconds in the eighth grade and less than 15 seconds in the ninth grade (Applebee et al., 2003; Nystrand, Wu, Gamoran, Zeiser & Long, 2003). Using markers of interactive discourse to encourage more reciprocal forms of teaching such as open-ended questions, uptake questions, student questions, and level of evaluation, it was found that shifts from recitational to more interactive patterns of discourse which they termed 'dialogic episodes' were rare. Across the 1,151 instructional episodes observed (i.e. when a teacher moves on to a new topic) only 66 episodes (6.69%) could be described as dialogic in nature.

Despite the dominance of the three-part exchange structure found in whole-class teaching, research suggests it can be opened up at the initiation and follow-up moves to create more space for student engagement and participation in the classroom talk (Cullen, 2002; Hardman, 2008; Hardman, 2019a, 2019b; Hardman & Hardman, 2017b). In an attempt to open up the I-move, research focused on teacher use of 'higher-order' questions to initiate student reflection, self-examination and enquiry. They included, for example, the use of 'open' questions to invite a range of possible answers to encourage students to speculate, hypothesise, reason, evaluate, and consider a range of possible answers (Wragg & Brown, 2001). A range of alternatives to teacher questions in the I-move was also suggested which included the use of provocative, open-ended statements by teachers to encourage students to ask their own questions, and maintaining silence so students have thinking time before they respond (Dillon, 1994).

Other research studies focused on the follow-up move. For example, Nystrand, Gamoran, Kachur and Prendergast (1997) argued that teachers need to pay more attention to how they evaluate student responses to promote 'high-level evaluation' where they incorporate student answers into subsequent questions. In this process, which they termed *uptake*, they suggested that teacher questions should be shaped by what immediately precedes them so that they are genuine questions. When such evaluation occurs, Nystrand and colleagues argue that it acknowledges the importance of the student response and creates the possibility for it to influence the course of the classroom discussion in some way.

Similarly, Wells (1999) advocated that teachers use *comments* and *probing* questions in the follow-up move to invite further student elaboration and participation. Molinari, Mameli, and Gnisci (2013) and Lefstein, Snell and Israeli (2015) also found open questions were often followed by complex answers and the re-initiation of the same question to different students. Such episodes generally promoted higher levels of argumentation, elaboration and reasoning from the students. Teacher follow-up to student contributions was therefore found to be a key factor in extending the teaching exchanges.

Research by Michaels and O'Connor (2015) into primary science in the USA also identified several talk moves that have been found to be academically productive by opening up the third move in the IRF exchange to promote student justification and reasoning. For example, some of the moves prompted students to share and expand upon their ideas, to listen carefully to other students, to dig deeper into their thinking by providing evidence to support their claims, and to think with the reasoning of others students by building on, elaborating, and improving the thinking of the group. Together with clear ground rules for class and group discussion, the 'accountable talk approach' aimed to establish a culture of respectful and productive talk in the primary science classroom by getting students to elaborate on their thinking.

In his influential conceptualisation of dialogic teaching, Alexander (2016) places great emphasis on teachers developing their repertoire of talk moves in whole class, group-based and one-to-one interactions with students. In arriving at a broader repertoire of teacher and student talk, Alexander's (2016) model of a dialogic pedagogy consists of five principles whereby the talk is collective, reciprocal, supportive, cumulative and purposeful. Such principles are reflected in the way teachers interact with students. For example, by asking questions which go beyond the simple recall of information, probing student answers to ensure they are followed up and built upon rather than simply received and inviting other students to comment and ask questions on the matter under discussion, leading to more varied and extended student contributions. Such contributions should include students arguing, explaining and justifying their thinking and asking questions directed both to the teacher and other students.

The study

Dialogic teaching professional development program

As discussed in the introduction, the current paper draws on data collected as part of a larger evaluation of the dialogic teaching program to investigate the types of talk moves used by teachers and students in the whole-class teaching of primary English following the dialogic teaching intervention. Thus, the main research question for this paper was: To what extent does participating in the dialogic teaching intervention broaden the repertoire of teacher and student talk in the whole-class teaching of primary English?

The school-based professional development intervention was based on Alexander's concept of dialogic teaching and designed to develop the teacher and student talk repertoire by building on traditional forms of teaching talk made up of exposition, closed questions and directions to include more dialogue, argumentation and discussion (Alexander, 2018).

The dialogic teaching program was a whole-school involvement and ran over two school terms (20 weeks). It was intensive and sustained and it involved the collective participation of teachers and mentors and grounded in the teachers' daily teaching lives. Specifically, the program included an induction day (delivered by the developers of the intervention) to introduce to the participants the concept of dialogic teaching, to explain why it mattered and to illustrate classroom conditions, strategies and tools that supported dialogic teaching. Printed and video-based materials and directed reading activities supplemented the induction.

Building on the teacher professional development literature suggesting teachers need ample opportunities to think through new ideas and to try out innovative practices, peer mentoring and stimulated recall using video footage were central to the school-based program (Saito & Khong, 2017; Wilkinson et al., 2017). The mentoring relationship with the teachers was intended to be dialogic in nature and to be one of support and reflection to encourage open and non-judgemental discussion. The school-based program consisted of 11 cycles of training spread over the two terms. A key component of the program was the guided planning, target setting and review of critical moments selected from video recordings of lessons for discussion by the participating teachers and mentors. It involved the mentor and teachers from each intervention school collaboratively viewing and discussing video footage of a lesson with a focus on the dialogic teaching principles and talk repertoires, reviewing what happened in the lesson, setting targets for the next lesson and teaching the lesson with the targets in mind.

Evaluation of dialogic teaching professional development program

Following a pilot of the professional development program in ten London primary schools in 2014–15, the program was subjected to an independently organised randomised control trial (RCT) from September 2015 until June 2016 to test the efficacy of the intervention run independently by a team from another university (Jay et al., 2017). Seventy-six schools with at least two Year 5 classes serving socio-economically deprived areas in the cities of Birmingham, Bradford and Leeds were randomly assigned to an intervention or control group.[1] The schools were made up of approximately 5,000 Year 5 students (10–11 years of age) with an average class size of 30. Also taking part in the trial phase were 80 teachers, 38 mentors and 37 head teachers from the intervention schools.

During the 20-week intervention, it was 'business as usual' in the control schools, and they were expected to follow their normal curriculum activities. Using a 'waiting list' approach, they were offered the professional development program following the trial in the summer term of 2016. Overall, the independent impact evaluation found that students in the intervention schools made, on average, two additional months' progress in English and science, and one additional month's progress in mathematics, compared to students in the control schools. Students eligible for free school meals made two additional months' progress in English, science and mathematics compared to similar children in the control schools (Jay et al., 2017).

In parallel with the impact study, a process evaluation

Lesson				
Transaction				
T Initiation Move (I)	*S Response Move (R)*	*T Feedback / Evaluation Move (F/E)*	*T Follow-up Move (F-up)*	*S Response Move (R)*
Act	*Act*	*Act*	*Act*	*Act*

Figure 1. Dialogic model of classroom discourse

was conducted by the program development team to study changes in pedagogical practices and the quality of the classroom talk (Alexander, Hardman & Hardman, 2017; Hardman, 2019a). The main purpose of the process evaluation was to study changes in pedagogical practices arising from the school-based professional development intervention using computerised systematic observation and transcript analysis of a sub-sample of teachers drawn from the intervention and control schools. Fifteen teachers from the intervention schools and 11 teachers from the control schools agreed to participate in this aspect of the study. The schools were matched using national assessment data, number of children receiving free school midday meals and speaking English as an additional language.

Two video recordings of each teacher teaching across English, mathematics and science[2] were made in weeks two and three of phase 1 (autumn 2015) to provide a baseline and again towards the end of phase 2 in weeks 18 and 19 (spring 2016). However, not all of the 11 control teachers were able to be recorded twice, which left a paired sample of 6 teachers who were eventually included in the data analysis. Although this method reduced the amount of data used, this like-for-like comparison allowed for greater confidence in detecting any changes between the phases. In other words, the same sample population was tested twice and as identically as possible.

Analysis of teacher and student talk

The current paper draws on the video data collected in the teaching of English. Over the two phases, a total of 42 English lesson recordings (30 intervention and 12 control) was used for the computerised systematic analysis (21 in each phase). The lessons were approximately 60-minutes long, yielding the data set of 2,520 audio-minutes. A sub-sample of 18 recordings were transcribed professionally using punctuation and capturing student bidding for the micro-level analysis.

In order to analyse the teacher talk, an analytical framework primarily drawing on the traditional IRF exchange structure discussed earlier was devised. Sinclair and Coulthard (1975) were the first to show how the IRF structure was hierarchical in nature. In their analysis they showed how it consisted of ranks comprising of 'lesson' (at the highest rank made up of an unordered series of transactions), 'transaction' (a series of exchanges), 'exchange' (made up of one or more moves), 'move' (made up of one or more acts), and 'act' (at the lowest rank realising the smallest unit of classroom discourse). Traditionally, the model followed a strict structure of teacher (often closed/test) question, student (brief) response and low-level teacher feedback/evaluation which cut short the classroom interaction and opportunity for a student to elaborate on their thinking.

There was, therefore, a need to reconceptualise the recitation model of classroom discourse to best capture dialogic teaching in which the teacher opens up space within and across IRF exchanges to allow for greater student participation in whole-class talk. The most appropriate place for the extension of the IRF exchange was at the level of moves and acts, as shown in Figure 1. It is in these ranks that more interactional activity between the teacher and students can occur as they allow, for example, a teacher to probe a student answer or invite other students to comment on a contribution. As discussed below, use of the follow-up moves by teachers often leads to an extended student contribution and the nature of such moves are best described at the level of the *act*.

Drawing on the analytical framework above, two coding systems at the level of the move were devised for the systematic observation of teacher talk moves and student talk moves in the videoed lessons. The development of these coding schemes draws on the classroom interaction and dialogic pedagogy literature, and they were piloted during the development phase of the study (2014–15) in the 10 London schools.

Coding scheme for teacher talk moves

The teacher coding scheme included teacher initiation and follow-up talk moves, as presented in Table 1.

Teacher initiation questions were coded as 'closed' and 'open' which served to launch or extend interaction with students. The teacher follow-up category included seven talk moves: 'teacher expand question', 'add on question', 'rephrase question', 'revoice question', 'agree/

Table 1. Coding scheme for teacher initiation and follow-up talk moves

Teacher initiation talk moves	Description	Example
Closed T question	Teacher asks a closed/test question – allows one possible response.	'Yes what's the clue in the story, Jonathan?'
Open T question	Teacher asks an open/authentic question – allows various response.	'What do you think is really important in this text, Nathaniel?'
Teacher follow-up talk moves	**Description**	**Example**
T expand question	Teacher stays with the same student and asks to say more.	'Okay, tell me more. Think about what you came up with yesterday'
T add on question	Teacher asks a student to add on to other's contribution.	'Rowan, have you got anything to add to Phoebe's instructions?'
T rephrase question	Teacher asks a student to repeat or reformulate own or other's contribution.	'Sagitta, can you tell what Kiran has just said?'
T revoice question	Teacher verifies his/her understanding of a student contribution, which requires a student response.	'So, are you saying without chocolate you can't concentrate in class?
T agree/disagree question	The teacher asks if a student or students agree or disagree with other's contribution.	'Do we agree with simple language?'
T why question	Teacher asks for evidence or reasoning.	'Why else would it be more expensive?'
T challenge question	Teacher provides a challenge or a counter-example.	'I like it. So how, how are you going to persuade me to get that? Because it's a good idea but I'm not persuaded. Persuade me to do that? Luke.'

Table 2. Coding scheme for student response/contribution moves

Student talk moves	Description	Example
Brief S contribution	Student provides pre-specified, brief information without any development.	'Congruent means identical.'
Extended S contribution	Student provides non-specified information and thinking. The contribution is developed to some extent through, for example, explanation, expansion, evaluation, justification, argumentation, and speculation.	'Chocolate is cheaper than some healthy snacks because chocolate's like 50p and healthy snacks like sandwiches are £1, £1.50; and chocolates are cheaper.'

disagree question', 'why question' and 'challenge question'. These were the ways in which teachers expanded, built on and probed student responses and contributions. They served to extend, sustain and enrich classroom talk by creating a space for dialogue and encouraging students to listen attentively, share, clarify and expand their ideas, build on others' contributions and provide reasoning for their thinking. As with open teacher initiation questions, research suggests that these talk moves open up the IRF structure and are regarded as key indicators of active, dialogic whole-class discussions.

Coding scheme for student talk moves

The coding scheme for student talk included brief and extended student contributions, as presented in Table 2.

Student contributions, coded as 'brief' and 'extended', were talk moves in response to teacher questions. A 'brief student contribution' contained pre-specified, brief information and was often in response to a closed

teacher question requiring one 'right' answer and usually expressed in a word, phrase or main clause. In contrast, an 'extended student contribution' contained non-specified information and thinking and was often a more elaborated response (i.e. moving beyond a word, phrase or clause) to an open teacher question or an elaborated contribution in the form of, for example, explanation, expansion, evaluation, justification, argumentation, and speculation. This move was also regarded as a key indicator of dialogic classroom talk.

Coding inter-reliability

Inter-rater reliability was carried out to maximise coding consistency. Four coders were recruited from a cohort of PhD students studying educational linguistics and trained intensively over two weeks using the selected sample of six English lessons amounting to approximately 360 audio-minutes of data. They were also involved in the iterative process of testing and refining the coding schemes. The coding inter-reliability between the pairs of coders was calculated using Cohen's Kappa. After four training sessions and three checks on the inter-rater reliability of the coders in the Observer software, the level of agreement reached nearly 80 per cent (Kappa = 0.73 and Kappa = 0.75). Ambiguities and differences in codings were discussed and resolved (sometimes with the help of a senior researcher). For example, to determine if the teacher move 'agree/disagree' was intended to be open was through the analysis of the student response.

Analysis of talk moves

To systematically analyse the database of lesson recordings, a computerised observation software package known as The Observer XT 12.5 was used to identify and quantify the coded talk moves and to highlight dialogic episodes occurring in the lessons for later transcription analysis. This software, programmed to generate quantitative data analysis, has been successfully used in previous studies of classroom interaction (Smith, Hardman, Wall, & Mroz, 2004; Snell, 2011). The coding schemes devised for the current study were uploaded to the Observer XT 12.5, and the coders were also trained to use this software for data coding and checking their inter-reliability.

The quantitative analysis of the video data focused on the following measures as they were regarded as key indicators of dialogic episodes occurring in the whole-class talk:

- the change in the frequency of teacher initiation questions over time, and intervention/control comparisons;
- the change in the frequency and types of teacher follow-up talk moves over time, and intervention/control comparisons;
- the change in the frequency and types of student contributions over time, and intervention/control comparisons.

Statistical procedures

Following the coding of the frequency of both the teacher and student talk moves, the data were then subjected to SPSS analysis to compare the intervention and control groups and also within-group variation across phases 1 and 2 of the intervention program.

In order to analyse the differences in talk moves between the control and intervention groups, means and distributions of the talk move variables were compared. Independent sample t-tests were applied (with a two-tailed confidence level of 95%), and where sample distributions were found to be skewed and not normally distributed, Mann-Whitney tests were used instead. Tests for unequal variances were also applied and the appropriate test statistic reported. For the analysis of the differences in talk moves used by teachers within-group across phases 1 and 2 of the study, means and distributions of the talk move variables were compared for each group. Only lessons that formed corresponding pairs in both phases were included. Paired sample t-tests were performed (with a two-tailed confidence level of 95%), and where sample distributions were found to be skewed and not normally distributed, Wilcoxon tests were used instead. Effect sizes were estimated using Cohen's d values for standard t-tests, and correlation r values for non-parametric tests.

Analysis of lesson transcripts

Following on from the analysis of teacher and student talk moves in the videoed lessons, transcripts of lesson episodes that were found to contain more extended student contributions (averaging 13 audio-minutes in length) from a sub-sample of 18 lessons (collected in week 19 towards the end of phase 2 of the study) were analysed.

The analysis was intended to be more nuanced and to dig deeper by closely examining the kinds, nature and quality of talk engaged in by students when making extended contributions. This required an analysis of the transcripts at a micro-level to investigate how the student contribution unfolded following the teacher initiation and follow-up moves. A separate coding scheme at the lower level of the student talk *acts*, the smallest units of classroom discourse, was therefore devised for this fine-grained analysis (Table 3).

The coding scheme consisted of 11 categories of talk *acts*. The talk *acts* made up, either singly or in

Table 3. Coding scheme for extended student contributions at the level of acts

Talk *acts* making up extended student contributions	Description	Example
S expand/add	Student says more by building on, adding to or extending own or other's contribution.	'You could also have quotes with people that have seen it [Bigfoot], like, the mountaineer and the local ranger'
S connect	Student makes an intertextual reference to something else, e.g. a previous discussion, another text, event, experience or resource.	'I've seen it in *EastEnders*. [a UK soap opera]'
S explain/analyse	Student explains something in some detail or examines own or other's contribution. (not to convince/persuade).	'Rhetorical question is, it's a question that doesn't have an answer'
S rephrase	Student repeats, reformulates or summarises own or other's contribution.	'Harvey said that like the things that are going to be different is when…'
S recount	Student gives an account of an event or experience.	'He was driving, he was driving, and then saw a shiny object coming down from the sky. And then he went there…'
S evaluate	Student makes a judgement.	'I think it's like, it's quite awful to say that, like you wouldn't say that, when someone passed away because it's like, a bit like … I would say mean or a bit awful'
S position	Student states a position, opinion or argument.	'I would disagree to use footage in a newspaper report because…'
S justify	Student provides evidence or reasoning.	'I have two reasons. The first one is, Miss, you know … there is caffeine in chocolate'
S speculate	Student predicts or hypothesizes an idea or situation.	'If courgettes was the bestselling last year, they're going to…they might be the bestselling this year'
S imagine	Student creates an analogy, mental image or scenario.	'We could draw like a bee coming into a flower'
S challenge	Student provides a challenge or counter-example.	'But what if they don't read the introduction part?'

combination, an extended student contribution. In other words, one or more categories of *acts* could occur within a single extended student turn, for example, a position and justification. The categories of student talk *acts* are in response to some of Michaels and O'Connor's (2015) teacher talk moves which prompt students to share and expand upon their ideas, to provide evidence for their claims, and to build on, elaborate and improve the thinking of the group. In other words, they capture the kinds and nature of talk engaged in by students during whole-class discussion resulting from teachers using a broader repertoire of talk moves. They also reflect Alexander's (2018) repertoire of learning talk consisting of narrating, explaining, instructing, questioning, building on answers, speculating/imagining, exploring and evaluating ideas, discussing, arguing, reasoning and justifying, and negotiating.

The more detailed analysis of lesson transcripts was carried out by two senior members of the development team with expertise in classroom discourse analysis. The data coding of a randomly-selected sample of six transcripts was checked for reliability and the coders agreed on the categories assigned to over 80% of the talk acts. Ambiguities and differences in codings were discussed and consensus reached by taking into account, for example, discourse markers (e.g. 'because', 'but' and 'and then'), signalling words (e.g. 'reason', 'I think', 'why', 'maybe' and 'good'), a change of talk focus or purpose, a change of discourse type (e.g. from narration to evaluation) and a juxtaposition of discourse acts (e.g. a position immediately followed by justification).

Findings

Quantitative analysis of video data

Overall, the quantitative analysis of the video data showed that the intervention had a positive impact on the quality of classroom talk in the English lessons over time and highlighted significant differences in the use of the talk moves between the control and intervention groups of schools.

Changes in the ratios of open teacher initiation questions to closed initiation questions over time and between the intervention and control groups

The focus of this analysis was to examine closely the types of initiation questions the teachers used in English lessons. A teacher initiation question played a pivotal role as it not only initiated a teaching exchange but the structure it took could either close or open classroom talk. Open/authentic teacher questions encouraged contributions that were not always anticipated by the teacher and required students to think, share and reason. In contrast, closed teacher questions were typically test questions which had a closed structure and were intended to check student recall rather than invite student thinking, reasoning and genuine exploration, resulting in answers which were often brief which teachers tended to simply evaluate as right or wrong and not to build upon.

As shown in Figure 2, there was no significant difference in the ratios of open teacher question to closed question talk moves, between the intervention and control groups, in phase 1. By phase 2, however, there was a significant increase in the ratios of open teacher question to closed question between the intervention group (mean of 1.03 per lesson) and control group (mean of 0.12 per lesson). The findings suggest that

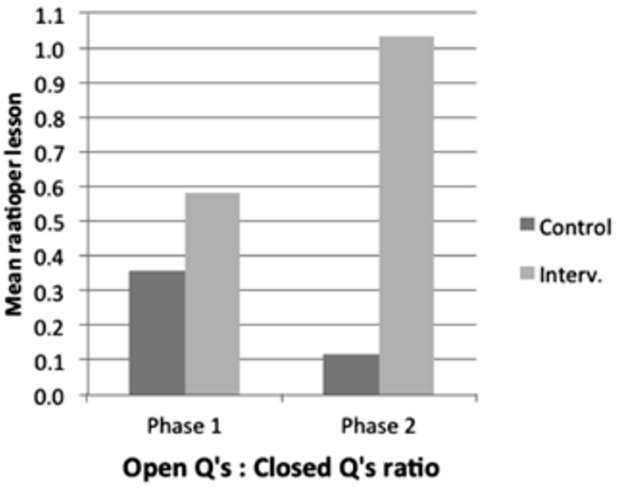

Figure 2. Change in the ratio of open teacher initiation questions to closed initiation questions during phases 1 and 2 of the intervention

the questioning skills of teachers in the intervention group improved significantly over the 20-week period of the program by ensuring a better balance of open and closed questions.

Changes in teacher follow-up moves over time and between the intervention and control groups

The data analysis reported in this section aimed at determining the extent to which and the ways in which the teachers followed-up student responses and contributions, leading to open discussion and dialogue. As discussed earlier, teachers in the intervention group were trained to deploy a variety of follow – up talk moves on the basis that these talk moves would both increase student engagement and enhance their learning.

As can be seen in Figure 3, there was no difference between the intervention and control groups in phase 1. By phase 2, changes in the frequency of the follow-up-moves between the intervention and control groups were evident. While the overall increase in follow-up talk moves appeared moderate, upon closer analysis, it was found that the intervention teachers were making greater use of a broader range of such moves compared to the control group. In particular, the talk move 'agree/disagree', which was absent in the control group, was now present in the intervention group. Research suggests this talk move is responsible for encouraging students to listen attentively, think with others and build on each other's contributions.

Changes in extended and brief student contributions over time and between the intervention and control groups

The data were analysed to determine the extent to which students expanded and extended their contributions in response to open teacher initiation questions and follow-up talk moves.

As shown in Figure 4, the intervention group did not have significantly more or less extended student contributions than the control group in phase 1. Following the intervention in phase 2, the intervention group had significantly more extended contributions (mean of 32.93 per lesson) than the control group (mean of 10.67 per lesson). Conversely, the intervention group showed a significant decrease in brief student contributions in phase 2 (with a mean of 20.33) compared to phase 1 (with a mean of 35.40). The increase in extended student contributions indicated greater student participation in whole-class talk, and they correlated strongly with teacher use of open initiation questions and follow-up moves reported previously.

Overall, the findings suggest that following the dialogic teaching professional development program,

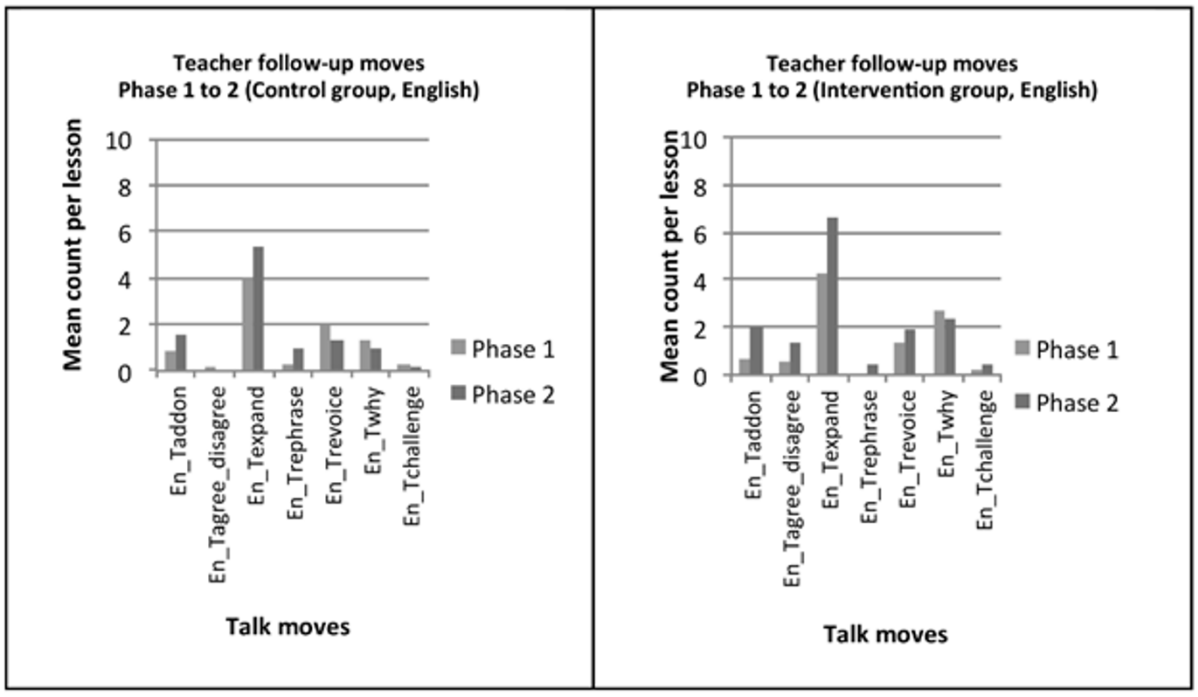

Figure 3. Comparisons of teacher follow-up talk moves during phases 1 and 2 of the intervention

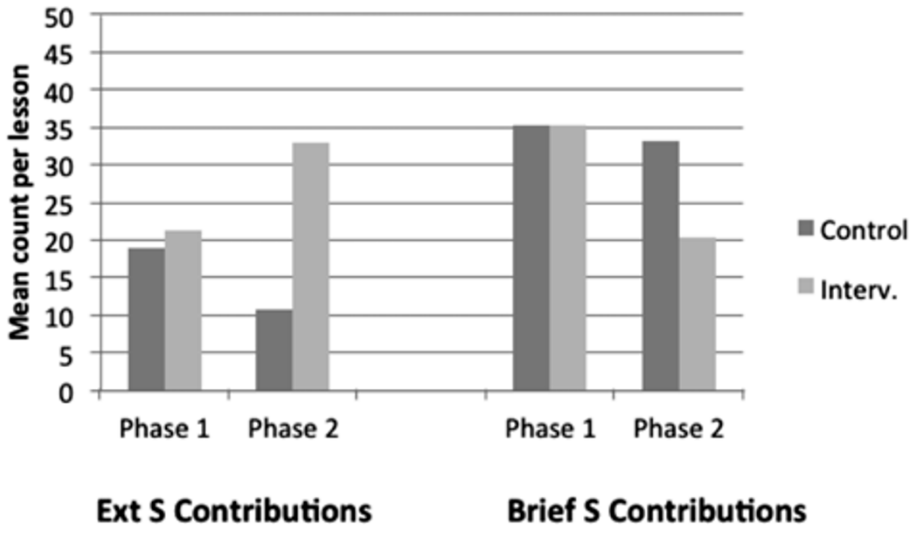

Figure 4. Changes in extended and brief student contributions during phases 1 and 2 of the intervention

the talk exchanges between teachers and students in the invention schools were more extended, sustained and deepened with teachers ratifying the importance of student responses and allowing them to influence the course of the discussion in some way, thereby building extended student contributions and promoting student-to-student dialogue.

Analysis of extended student contributions

The micro-level analysis of a sub-sample of 18 lesson episodes (taken from phase 2 of the study) focusing on extended student contributions was carried out using the coding scheme devised at the lower level of talk *acts* in Table 2. The analysis was intended to dig deeper and gain insights into the nature of extended student contributions and to determine the extent to which the repertoire of student talk types widened as a result of dialogic teaching.

Comparisons in terms of talk *acts* that made up extended student contributions between the intervention and control groups

The analysis of extended student contributions showed the intervention students were using a wide repertoire

of talk *act* categories that included connection, explanation/analysis, evaluation, argumentation, reasoning and challenge. Conversely, many of the contributions by students in the control group were narrow in range (predominantly explanation/analysis and imagination) and often lacked evidence and argumentation as shown in Table 4.

Table 4. Talk acts categories that make up extended student contributions

Student *talk act* categories	English	
	Intervention	Control
S expand/add	6.87%	7.01%
S connect	3.05%	-
S explain/analyse	33.58%	42.10%
S rephrase	1.52%	7.01%
S recount	1.52%	1.75%
S evaluate	3.81%	1.75%
S position	25.95%	7.01%
S justify	15.26%	7.01%
S speculate	4.58%	5.26%
S imagine	1.52%	21.05%
S challenge	2.29%	-
Total occurrence	131	57
Mean frequency	13.1	7.12

Upon closer examination of the table above, the occurrence of the talk act 'student explain/analysis' moderately decreased from 42% to about 34% when the control and intervention groups of extended student contributions were compared. There was also a striking reduction in 'student imagine' from 21% in the control group to just over 1% in the intervention group. As suggested, this may have been because teachers in the intervention classes were prompting students to provide more evidence from the texts under discussion to back up their ideas or opinions compared to teachers in the control schools who appeared to allow for more imaginative responses to the text. It may also explain the higher percentage of student 'connect' moves (e.g. *I've seen it in EastEnders*) whereby an intertextual reference to another text, event, experience or resource was employed in the student reasoning, a marked increase in the occurrence of student 'position' (26%) and 'justify' (15%) moves, and the presence of student 'challenge' moves in the intervention compared to the control group. Thus, these findings suggest that dialogic teaching broadens the repertoire of student talk types with an emphasis on evidence and argumentation.

Analysis of lesson transcripts

Overall, the analysis of lesson transcripts using the talk moves and acts showed that the patterns of talk exchanges in the intervention group of classes tended to be lengthened and sustained to support greater student-to-student dialogue and discussion and the teacher's role was predominantly facilitative (as illustrated in Transcript 1). By contrast, teacher-student talk patterns in the control group of classes were largely teacher-dominated, closed, short and tightly-structured IRF sequence and student responses were brief, often expressed in a word, phrase or clause (as illustrated in Transcript 2).

Transcript 1 is taken from an English lesson from the intervention group in phase 2. The topic was how to write an instructional text. To save space, several talk turns have been edited out without compromising the flow of the teacher-student interaction and student-student interaction.

As illustrated in the transcript above, the pattern of classroom talk is lengthened, sustained and deepened over several transactions (each transaction dealing with a set of student writing instructions) to support dialogue and discussion. The teacher's role is facilitative, supporting a coherent chaining of student contributions by means of a wide repertoire of talk moves, namely, 'open initiation questions' (lines 1, 3, 36, 42, 51, 55, 120) and follow-up moves such as 'teacher expand question' (line 5), 'challenge' (line 75) and 'agree/disagree' (line 120).

In turn, each of the students is given an opportunity to contribute to the discussion and dialogue for at least two turns. Like the teacher, they use a wide range of talk *acts* when making extended contributions, for example, 'student connect' (line 2), 'explain' (lines 4), 'expand' (line 54), 'evaluate' (line 72), 'justify' (line 124), 'position' (line 126) 'add' (lines 37,73) and 'challenge' (lines 45,56). These talk acts are rich in content and dialogic in nature and quality.

There are several instances in the transcript where students are building on their own and others' contributions. For example, P2 adds on to P1's contribution '*I've got a tip for Tristan*' (line 37), and he then builds on his own idea '*Sometimes in America, they have the other side for the driving side …',* leading to P1's (somewhat indignant) response '*I knew that'* (line 40).

There are also instances where students are challenging the teacher and one another. For example, the teacher's idea of making the instructions clearer

Transcript 1. Writing clear instructions

Line		
1	T	What ideas have we got?
2	P1	Well, I've watched my dad do it – how to drive a car.
3	T	How to drive a car, okay. What would your very, very first instruction be?
4	P1	Well, first you'd be out the car, so my first instruction would be: use the key, and open it, and press the open button, then open the door, and sit on the chair -
5	T	How would you open the door? How would you open the door?
6	P1	You would carefully, because if you open it like that, there might be, like, a tree there –
7	T	Perfect.
(27 turns – deleted)		*[P1 continues with his set of instructions]*
35	T	Okay, can I stop you there? Thank you very much. Good instructions – very good. …So when you're writing instructions, you must use technical terms: lever, pull, push, ignition, pedal, the switch instead of saying the button on the wall socket, you will say, "Turn on the switch on the wall socket", and so on.
36	T	Any other ideas?
37	P2	I've got a tip for Tristan.
38	T	Go on then, well done.
39	P2	Sometimes in America, they have the other side for the driving side. And we have the right side, they have the left.
40	P1	I knew that.
41	T	So he needs to consider that as well, don't you? Or maybe, your instructions need to be – maybe you need to be clear, in your introductory paragraph, that these are the instructions on how to drive a car in the UK.
42	T	Yeah? Do you think that would avoid that confusion?
43	P2	Yeah.
44	T	Yeah, possibly, because if someone doesn't know – for example, someone needs to find instructions on how to drive, and they live in America, they look online, they find Tristran's instructions. Mmmm (sounding unsure), yeah? But if they read, "They are made for driving in the UK", then they won't use it, will they?
45	P1	But what if they don't read the introduction part?
46	P3	No, but they would.
47	P2	But he would.
48	T	They will. But everyone has to.
49	T	(pointing to pupil with hand up) Go!
50	P4	How to make a fire.
51	T	How to make a fire. What would your first instruction be?
52	P4	First of all, make sure you have your tinder.
52	T	Okay.
54	P4	E.g. dry grass, dry leaves, cotton wool, quite a lot of things.
55	T	Okay, so what do we like about Phoebe's first instruction? Jessica?
56	P5	She's said, "tinder," but what if you don't know what that is? And then she said, "E.g." and then what it can be.

57	T	Perfect. Well done! Next.
13 turns – deleted		*[P4 continues with his set of instructions]*
71	T	Rowan, have you got anything to add to Phoebe's instructions?
72	P7	Well, I think they're very good.
73	P7	But she could also mention other ways to light a fire as well, in them.
74	T	Perfect, well done. I agree.
75	T	What if that doesn't work? What if you're not good at striking quickly, and it doesn't work? Maybe you should mention. So your next step would be, "If the above step fails, you can do blah-blah-blah."
76	T	Any other instructions? You've got one, go!
(41 turns – deleted)		*[Another student gives a new set of instructions]*
118	T	… Not all instructions have that; sometimes you don't need, "You will need, yeah, go!
119	P2	Simple language, so that anyone can understand it, possibly?
120	T	Do we agree with simple language?
121	P1	No.
	T	Why don't you agree?
122	P1	Well, I sort of agree, and sort of don't agree.
123	T	Yeah?
124	P1	Because, like, I was talking about the car. If you just put the key into the hole, it won't really, like, tell me exactly what to do; and so, "Put the key in the ignition," that would tell me what to do – and then turn it to the right.
125	T	Have you got anything else to add to what Tristan's saying?
126	P4	Yeah, like, going back to Tristan's idea, I kind of disagree with Oscar.

'*… maybe you need* to *be clear, in your introductory paragraph …*' (line 41) is challenged by P1 '*But what if they don't read the introduction part*?' (line 45*)*. Another student, P3, in turn, challenges P1 (line 46) '*No, but they would*' and this contribution is reinforced by another student, P2, '*But he would*' (line 47). This segment of the transcript illustrates the highly-engaging (and somewhat heated) dialogic interaction between students.

Another example of student challenging and reasoning can be seen when P1 responds categorically '*no*' (line 120) to the teacher's question '*Do we agree with simple language?*' (line 119), but he later softens his position '*Well, I sort of agree, and sort of don't agree*' (line 122), followed by a justification '*Because,…*' (line 124*)*. P1's contribution is subsequently picked up by another student, P4, who states his position '*Yeah, like, going back to Tristan's idea, I kind of disagree with Oscar*' (line 126).

In contrast, Transcript 2 of the control group below is a typical example of teacher-led recitation. This is a literacy lesson where the teacher and students discuss what makes 'good handwriting'.

All of the teacher's questions in the above extract are closed, eliciting a series of brief student responses. The teacher, in fact, has exact answers in mind, as can been seen in line 3 '*But what am I looking for?*' Also in lines 5 to 8, the teacher is not satisfied with P3's initial one-word answer '*understand*' and insists on getting the student to complete her sentence '*you need to be able to do what?*' to which P3 provides a fuller response *'be able to read it'*. Another striking observation from this transcript is that the students (except for P3) has only a single turn and the teacher moves quickly from one student to the next. The teacher does not only control the turn-taking but also the content of the interaction, and hence stifling student contributions.

Discussion and implications

The aim of this paper was to analyse the impact of a 20-week professional development intervention promoting a dialogic teaching approach on teacher and student talk moves in whole-class teaching in primary English lessons. Overall, the findings showed teachers

Transcript 2. Good handwriting

Line		
1	T	Handwriting, now, tell me about handwriting. What am I talking about when we're talking about handwriting? Sky?
2	P1	It's not (inaudible: 00:05:06).
3	T	But what am I looking for? What … what do we mean by, 'We want good handwriting'? What is good handwriting? Isobel?
4	P2	It has to be neat and legible.
5	T	It has to be neat, it has to be legible. What does legible mean? What does legible mean, Lucy? When I write something, what do you need to be able to do?
6	P3	Understand it.
7	T	So to understand it, you need to be able to what?
8	P3	Be able to read it.
9	T	Yeah. So if it's legible, that means that you can read it, okay? So your handwriting needs to be neat, it needs to be legible, and there is something else, and I know some of you are finding this really hard. Lauren?
10	P4	Joined up.
11	T	It has to be joined up, okay? I know some of you find that really hard, and some of you that are neat and legible and not joined, okay? And I understand that for some of you it's easier to do that, you're more comfortable doing that, I get that, okay? But unfortunately it's the rule now in Year 5 and 6 that it must be joined, okay? So you've really got to work on that, okay?

in the intervention schools made significantly greater use of open questions, thus achieving a better balance of closed and open questions, and that they used a wider repertoire of follow-up talk moves to promote extended student contributions than those found in the control schools. Such contributions involved the students in sharing, explaining, arguing and justifying their thinking and building on the ideas of other students. In contrast, teachers in the control schools largely operated within a recitation script made up of closed questions, brief student answers and low-level evaluation as to the appropriateness of the answer. When extended student contributions did occur in the control schools, they were often limited to explanations/analysis and they tended to lack evidence and argumentation. Overall, the whole-class teacher-student interaction and talk identified in the intervention schools showed a high degree of reciprocity leading to higher levels of student engagement, participation and learning outcomes compared to the control schools. They, therefore, allow some important conclusions to be drawn with regard to implementing a dialogic pedagogy in the English primary classroom.

From the analysis of the primary English lessons, a number of academically-productive talk moves and *acts* to optimise participation and learning outcomes have been identified that broadly correspond to Alexander's repertoire of teaching and learning talk (2016). From the research, it seems that teachers of English can broaden their talk repertoire by asking questions which have more than one possible answer, giving students time to answer a question or asking pairs to discuss a question for a minute before they answer it, and sharing questions at the start of a lesson based on the learning objectives (e.g. 'These are the questions we will be trying to answer in this lesson') (Lefstein, Snell & Israeli, 2015; Molinari, Mameli & Gnisci, 2013). In terms of following up a student response, teachers can probe with words and phrases like 'Explain', 'Why?', 'What makes you think that?' and 'Tell me more', to provide greater challenge, encourage speaking at greater length and to get students to think around the question in greater depth. As Dillon (1994) advocates, teachers can also comment on a response to exemplify, expand, justify or add additional information, or ask other students to comment or ask a question based on the contribution. Teachers can also make use of provocative, open-ended statements in response to what a student has said and encourage students to elaborate on their answers and invite other students to contribute (e.g. 'I was wondering if that would make any difference'). By using uptake questions, teachers can also build student responses into subsequent questions in order to let them influence the direction of the

discussion and to acknowledge the importance of the contribution.

In supporting the implementation of dialogic pedagogy, both of the coding schemes devised for the current study could be utilised as tools for making the pedagogy more visible to both teachers and students (Edwards-Groves & Davidson, 2017; Hattie, 2012). In addition to providing teachers with a range of dialogic talk moves that have been found to lead to higher levels of student engagement, participation and learning outcomes in whole-class talk, the coding scheme for student talk could be shared with students to help develop their metadiscoursal and metacognitive awareness and understanding of how participating in whole-class and group-based talk can help extend their thinking, argumentation, reasoning and communication skills, leading to higher learning outcomes.

The findings from the current study also point to the importance of teachers having supportive interactions with peers through modelling and feedback so as to avoid the dialogic talk moves being applied in a formulaic way (Coe, Aloisi, Higgins, & Major, 2014; Darling-Hammond, 2017; Hennessy, Dragovic & Warwick, 2018). Feedback loops using video footage, as in the current study, have been found to be a powerful tool for teacher professional development (Khong, Saito, & Gillies, 2019; 2019). Haneda, 2017; Saito & Khong, 2017; Wilkinson et al., 2017; The use of video-recordings, audio and transcribed sections of lessons capturing critical moments selected by teacher and observers can provide a powerful means of promoting critical reflection on professional by encouraging teachers to articulate and demonstrate their own understanding of their interactive and discourse practices, thereby provided opportunities for continuous professional development (Jensen, Sonnemann, Roberts-Hull & Hunter, 2016).

Conclusion

The analysis of teacher and student talk moves during dialogic episodes in whole-class talk as a result of the dialogic teaching professional development intervention makes a significant contribution to the existing literature on the nature of whole-class interaction in English lessons in primary schools serving socially-disadvantaged areas of England. While any system of talk analysis will inevitably simplify the complexity of classroom interaction and discourse, the analytical frameworks used in the current study point to some fundamental changes occurring in the underlying pedagogy of teachers and learning talk of students in the intervention schools compared to the control schools. Overall, the findings revealed there were significant changes in pedagogical practices and higher levels of student engagement, participation and learning in the intervention schools following the dialogic pedagogy training. They also point to the fact that student repertoire of talk practices is central to the learning process and that it is the teacher who enables such talk to occur.

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Note

1 Using free school meals as a proxy for socio-economic status it was found 35 percent of students received such meals and over 50 per cent spoke English as an additional language.

2 In some schools, science was not taught on a weekly basis resulting in fewer lessons available for recording.

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Jan Hardman is Associate Professor in Language Education in the Department of Education at the University of York, United Kingdom. She researches classroom talk, discourse analysis, dialogic pedagogy, and teacher education in all phases of education. She has been involved in some international research projects and published widely on dialogic classroom talk and teacher professional development. Informed by her research, Jan contributes to staff professional development courses on teaching and learning in schools and higher education.