

‘GUESSING’ IN A YEAR 1 MATHEMATICS LESSON WHEN ENGLISH IS AN ADDITIONAL LANGUAGE

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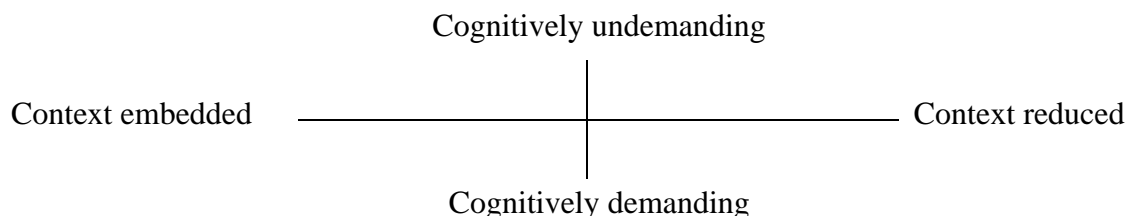
Young bilingual students in the UK face the challenge of learning mathematics and learning English simultaneously. In this paper, I draw on work in bilingual education concerning the role of participation in meaningful interaction in language acquisition. Using an approach to analysis based on ideas in discursive psychology, I present an analysis of a short extract of interaction between a Year 1 learner of English as an additional language (EAL) and his teacher in a mathematics lesson. The student appears to make ‘guesses’ in response to the teacher’s questions. My analysis suggests, however, that this behaviour arises from the socially organized structure of the interaction, as much as from the student’s arithmetic proficiency.

INTRODUCTION

There has been little research into the learning of mathematics in the UK by students who are also learners of English as an additional language (EAL) [1]. In particular, there has been little investigation of the participation of learners of EAL in lower primary school mathematics. In this paper, I analyse a short extract from interaction in a Year 1 classroom in a multicultural classroom in London.

THEORETICAL PERSPECTIVE ON LANGUAGE LEARNING

Research in bilingual education has considered the role of interaction in language acquisition. Cummins (e.g. 2000, p. 68), for example, proposed a 2 dimensional framework relating linguistic context with the cognitive demands of the interaction:



Context refers to the context available to participants to support their interaction. Face-to-face talk, for example, relies on a high degree of context, in the form of gestures, facial expressions and the presence of many of the objects of discussion. Such context supports sense-making and so tends to reduce the cognitive demands of the interaction. Some interaction involves less context. In telephone conversations, for example, it is not possible to draw on facial expressions or gestures. Reduced context tends to lead to more cognitively demanding interaction.

Cummins ideas, however, are pitched at a rather general level, saying little about the detail of interaction. Such detail has been explored by Swain (e.g. 2000), whose work suggests that participation in interaction can contribute to language acquisition. In particular, she argues that “[linguistic] output pushes learners to process language more deeply – with more mental effort – than does input...Students’ meaningful

production of language – output – would thus seem to have a potentially significant role in language development” (Swain, 2000, p. 99). These ideas suggest that ‘meaningful production’ in a rich linguistic context will support learners of EAL to learn English in and of the mathematics classroom.

THEORETICAL AND METHODOLOGICAL PERSPECTIVE ON INTERACTION

My research has involved the development of an approach to the analysis of interaction in multicultural classrooms which focuses on examining the discursive practices used by participants, rather than on the individual meanings participants have ‘inside’ their heads. This approach draws on discursive psychology (Edwards, 1997) and conversation analysis (Sacks, 1992). In particular, the social functions of interaction such as arguing, agreeing, negotiating or conducting relationships, are seen as primary in structuring discourse. In effect, the social structures the ‘content’. Conversation analysis shows how, for example, talk is structured in turns, with the turn-taking structure both enabling and organising interpretation. A common feature of turn-taking is the occurrence of two-part structures, such as question-answer, greeting-greeting or invitation-acceptance. These two-part exchanges are called adjacency pairs. The second part of an adjacency pair may appear directly after the first, or may appear some turns later, often with other pairs nested in between, as in the following example, used by Sacks (1992, vol. 2, p. 529; see also Silverman, 1998, p. 106):

- A: Can I borrow your car?
B: When?
A: This afternoon
B: For how long?
A: A couple of hours
B: Okay.

In this exchange, the first and last turns in the extract form an adjacency pair, with two question-answer pairs inserted in between. An important feature of adjacency pairs is that once the first part has been deployed, it is difficult for the addressee to avoid completing the pair in some way. Indeed any response will be interpreted in the light of the adjacency pair structure, so that even if, for example, B were silent after A’s question, that silence would still be heard as a response. These ideas will be used to analyse a short extract of interaction from a Year 1 classroom, following an outline of the research context.

RESEARCH CONTEXT

The lesson featured in this paper took place in a primary school in London. There were 26 students in the class, including EAL learners from Kosovan, Bengali and Anglophone and Francophone Africa. In this particular lesson, another teacher (T2) joined the class for part of the lesson and supported individual students with their work. The lesson, which focused on halving and doubling, began with the students using number fans to respond to teacher's questions. Later, the teacher moved on to a problem-like scenario about two children who have various items, one child having double or half the amount of the other. The teacher introduced the use of multi-link cubes formed into rods to support thinking about halving.

K is a refugee Kosovan student. He joined the school at the start of Reception. He was assessed by the school as EAL stage 1 (new to English) in November. The teacher estimated that he is probably stage 2 (becoming familiar with English) by the time of this recording. His parents were reported as being supportive, though K's mother did not speak much English. K had Albanian language books on English and mathematics. The teacher felt he had a good memory, giving spelling as an example, characterising his memory as 'very visual'. The teacher reported that K relied on guessing, often not listening to instructions before embarking on a course of action. The teacher believed K was working at a relatively high level in mathematics but was concerned that he could not show what he knew. In school tests, he scored more highly in English than in mathematics. I recorded K using a lapel microphone connected to a mini-disc recorder, worn in a pouch attached to his waistband (rather like a small walkman). K was recorded for an entire numeracy hour lesson, apart from a few minutes at the end, after the microphone became disconnected.

GUESSING

The teacher reported that K tended to guess in his responses to questions. During the lesson there were a number of sequences in which K's participation could be interpreted as guessing. In the following extract, for example, T2 is working with K and Steven, reviewing K's written responses on part of a worksheet [2]:

- K I'm trying my second one//
- 680 Ste now you can do your **own** one//
- T2 okay **now**/ four cars// d'you know what you've done look here//
'kay it's eight cars and it should be **double** eight and you've
halved it/ you've made half of eight and it must be **double**
eight/ what's double eight?
- 685 K umm=
- T2 =eight plus eight
- K two
- T2 eight and eight together

- K seven!
- 690 T2 what's eight/ and another eight/
 Ste I know
 T2 eight plus eight
 K two!
 T2 [no
 695 Ste [sixteen
 T2 sixteen
 K oh
 T2 so it should be sixteen cars/ /woah now you have to work out/
 one and a six/

In this extract, T2 indicates that K has mis-interpreted the question on the worksheet, saying that K has halved a number of cars, when the task is to double the quantity. She formulates this point twice, emphasising the words 'double' and 'halved'. She concludes with the question 'what's double eight?' which is contextualised by the preceding formulations. She has moved from interpreting the task to a direct question. By asking a question, the first part of an adjacency pair, she creates an opening for K to contribute, although the nature of the question also indicates the kind of responses that might be given: a number is expectable. K's response is 'umm', an utterance which allows him to take up his allotted turn, whilst buying some time. His turn is cut off, however, by T2, who reformulates 'double eight' as 'eight plus eight'. Such reformulations can be seen as guiding students, glossing previous utterances to provide a range of interpretations for the student to work with. They might also be seen as supporting the student in engaging with the language of the task, in this case by relating a mathematical term 'double' with an operation 'plus'. As a socially organised exchange, however, T2's glossing also serves to raise the stakes for K. Having been offered two formulations, 'double eight' and 'eight plus eight', there is a greater obligation on K to come up with a suitable response to complete the pair. This obligation, I should emphasise, comes from the interaction, rather than any intention on the part of the teacher. It is a feature of talk that the more information that is provided with a question, the harder it is to not respond. K does provide a response: 'two'. This response is generically suitable: it is a number. K has taken the turn for which T2 has nominated him, and rather than giving a non-committal 'umm', a response which was marked as unsuitable by the teacher's swift intervention, K offers something generically appropriate and which completes the pair. T2 again indicates this response is not suitable, however, by again reformulating, this time saying 'eight and eight together'. The stakes continue to rise. K offers another generically appropriate but mathematically unsuitable response, this time as an exclamation, 'seven!'. Again T2 indicates unsuitability by reformulating, 'what's eight/ and another eight'. This time Stephen takes the open slot, saying 'I

know'. He indicates that the question is answerable and that, given the opportunity, he would be able to give a suitable response. The effect is to raise the stakes again. Not only is T2 reformulating the question, but Stephen claims to know the solution, implying K should too. T2 returns to an earlier reformulation 'eight plus eight' and K gives the same response he offered on the first occasion it was used: 'two!'. Both T2 and Stephen break the pattern of the preceding turns. T2 now explicitly evaluates K's latest (re)offering, 'no'. Stephen, overlapping, takes up the opportunity created by his previous turn, to give a response of his own, 'sixteen'. This response is accepted by T2 through her repetition, 'sixteen'. K accepts this closure, 'oh'. Finally, the teacher recontextualises Stephen's solution within the problem on the worksheet, by referring to 'sixteen cars'.

DISCUSSION

To summarise this analysis: a number of patterns run through this exchange.

- the interaction is structured by the question-answer format;
- the sequence of reformulations raises the stakes through the exchange;
- the reformulations run through a range of glosses for 'double': '...plus...', '...and...together' and '...and another...'

How might these patterns interact with K's position as a learner of EAL? My first observation is that K is clearly able to participate in the question-answer pattern common in much classroom talk. He takes up turns when he is nominated. Indeed K's 'guessing' can be seen as arising in response to this pattern. It may be linguistically less demanding to provide a 'guess' than to ask for more information or to find some other way out of the pattern, particularly when the teacher's reformulations raise the stakes. Furthermore, K's responses are generically appropriate, indicating more specific familiarity with the norms of mathematics classroom talk. A second observation is that the range of formulations of 'double' provide potentially valuable linguistic input, offering a range of ways of talking about a particular concept. In this particular sequence, K does not appear to respond to these reformulations, but it may be that over time, he would become familiar with a number of ways of talking about 'double' and relate the concept to other arithmetic structures, including addition. It is noticeable, however, that in this extract, as throughout the lesson, K rarely uses the term 'double' himself. The occasions when he does so are in the form of repetitions. If meaningful production is an important part of the acquisition process (Swain, 2000), however, whilst hearing various glosses for a term like double is an important contribution to K's learning of the language of mathematics, supported opportunities to use such terms himself would also be beneficial.

In conclusion, I have argued that K's 'guessing' can be seen as arising from the interactional patterns found in the mathematics classroom as much as from his arithmetic proficiency. It is possible that K attends more to the interaction than the mathematics, perhaps in a bid to maintain an appropriate social role in the class.

NOTES

1. English additional language (EAL) refers to any learner in an English medium environment for whom English is not the first language and for whom English is not developed to native speaker level.

2. Transcription conventions: Bold indicates emphasis. / is a pause < 2 secs. // is a pause > 2 secs. (...) indicates untranscribable. ? is for question intonation. () for where transcription is uncertain. [for concurrent speech. & for utterances which continue on a later line.

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