An Analysis of Three Classroom Episodes

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This paper examines data from an ongoing study of classrooms and teacher-meetings in one secondary mathematics department in the UK. The study draws on enactivist methodology and linguistic ethnography in its conception and practice. This report is focused around the notion of dialogue (Bakhtin 1981) and the development of patterns of dialogue. I analyse examples of an almost identical form of words used by three different teachers in their lessons, and the different things that happen next, concluding that notions of listening and hearing are needed.

Keywords: Classroom dialogue, Bakhtin, Enactivism

Introduction and theoretical frame

I am a teacher in a secondary mathematics department in the UK. In this paper I analyse the role of dialogue (i.e., conversation and inquiry) in the teaching and learning of mathematics. In using the word 'dialogue' I am explicitly aligning myself to the view that meaning 'always implies at least two voices' (Wegerif 2008, 348). We create meaning in communication with others; my analysis of dialogue takes account of historical patterns, how the past constrains what may happen now and the ways that speakers break such patterns. This approach is consistent with the enactivist methodology which informs my work, and the broad field of linguistic ethnography from which I take analytic techniques.

Bakhtin and the words of others

> The word in language is half someone else's. It becomes one's own only when the speaker populates it with his own intentions … Prior to this moment of appropriation, the word does not exist in a neutral and impersonal language … but rather it exists in other people's mouths, in other people's concrete contexts, serving other people's intentions: it is from there that one must take the word and make it one's own. (Bakhtin 1981, 293-4)

I take it from this quotation that we not always make words our 'own', and that it is possible the words we speak continue to serve others' intentions. I do not assume we are conscious of, or consistent about, our intentions but believe something can be inferred, in that moment, about our beliefs from what we say and do.

I am taking video data of three teacher's classrooms (of whom I am one). Having read the quotation above in Zack and Graves (2001, 231) and working through some video data, I was suddenly struck by hearing almost the identical words (see below) in the mouths of all three teachers (TA, TB, TC) in consecutive videos that I happened to watch. The three extracts are all from lessons in 2008, to 11-12 or 12-13 year olds.

TA: Can anyone else explain what she's done there?

TB: can anybody say what Josh has just said

TC: can anybody re-create her reasoning there?

As Head of Department, I saw myself as responsible for developing a culture of collaboration amongst mathematics staff, with a focus on sharing effective teaching strategies within rich mathematical activities. I read these almost identical words as evidence of an emerging shared culture, and was immediately drawn to studying the similarities and differences in what happened next.

I analyse the dialogue by looking for patterns both within and across what is said. I am not concerned with reconstructing meaning but with what disturbance to the pattern of classroom dialogue is noticeable following the use of a teaching strategy. I have worked on these analyses with the three teachers in the study. My analysis is also informed by Bruner’s (1990, 17) question, linked to his notion of a culturally sensitive psychology: ‘how does what one does … tell us about what we think and believe’; i.e. about our intentions. In keeping with micro-analysis principles of linguistic ethnography, this is a question I keep in mind as I study, turn by turn, the detail of transcripts and watch and re-watch the actual video. I offer a snapshot of context in introducing each section, to help orient the reading.

Teacher A

The full transcript of classroom dialogue starting from the quote above is reproduced here. In reading this transcript, a significant piece of history to be aware of is that Teacher A makes many comments to the class about the notion of ‘thinking mathematically’. Just before line 1 a student had offered a proof of a conjecture the class had been working on for several lessons.

Notation: (.)=brief pause; (1)=1 second pause; ( )=undecipherable; (text)=my guess; / /=overlapping

1	TA:	Oh amazing (.) Can anyone else explain what she’s done there?
2		(4) Can anyone else explain what she’s done there? (.) Janie
3	S1:	( )
4	T:	(Will you) explain this first?
5	S1:	Yeah ( )
6	T:	Okay, try and do that and then somebody else.
7		I want you all to listen to this
8	S1:	What she’s done (is that she’s timesed)
9	T:	Go on, go on, in your own words
10	S1:	abc is any number abc, if you times that by a thousand
11		its going to be abc with three zeros on it /
12	T:	/ lovely, yeah/
13		/ and you added another abc
14	T:	If you added another abc and you get abc abc, Mishal
15	S2:	It’s pretty simple
16	T:	It is pretty simple
17	S2:	It’s basically 123 times one thousand and one (equals) 123 123
18	T:	Does it matter what the 123 is, if it was 567 or 589
19	S2:	Yeah, like you said, it could be any three digit number,

20 you times it by a thousand (.)
21 T: And then times it by one
22 S2: Yeah and then times it by one
23 T: So, this is quite key isn't it, the fact that it's a thousand and one
24 (.) we talked in other lessons whether multiplication
25 was commutative or not and whether it mattered
26 what order we did it in (.) so would that be the same as doing it
27 another order (2) I think we convinced ourselves
28 that multiplying was commutative, Conner
29 S3: ( ) four digits ( )
30 T: Right we're going to have to be really quick about this because
31 we haven't got much time to do it in your books
[some procedural teacher talk skipped here]
32 What I like about Janie's proof is its simplicity (2)
33 and proofs don't have to be complex (.)
34 so for me I feel convinced by this (.)
35 Jodie has convinced me that when she takes any three digit
36 numbers and timeses it by 7, 11, 13 she will get abc abc
37 S3: I've got a theorem as well

The contribution before line 1 is the only student utterance in this lesson to which Teacher A asks for another student's interpretation. Given this, and Teacher A's comment (line 1) 'Oh amazing', I take it Teacher A valued that utterance highly – and indeed this is consistent with her explicit aim to develop mathematical thinking with the class. In the video recordings with this class Teacher A will usually make at least one metacomment (see Coles and Brown 1999) about 'thinking mathematically' or 'becoming a mathematician'. Moving conjectures to theorems is a particularly strong theme. The teaching strategy in line 1 is followed by three contributions from Teacher A (lines 4, 6, 9) all supporting students articulate their ideas. The pattern of dialogue remains Teacher-Student-Teacher throughout but does not follow the classic "Initiation-Response-Feedback" (I-R-F). The teacher's actions slow down the discussion at this key point, dwelling in the student's proof, and allowing Teacher A to flag up this piece of mathematical behaviour to the whole class. It is significant, in terms of the mathematical behaviour Teacher A is trying to foster, that at the end of the sequence dealing with proof, another student says they have a different theorem and want to share their proof. I take it therefore that the words in line 1 serve Teacher A's purposes and intentions of developing this key aspect, for her, of doing maths.

Teacher B

Again, the transcript from Teacher B's lesson is reproduced below. Just before line 1, S1 had offered an idea. After a pause of a few seconds, another student (Tim) made a guttural noise (Huh?), which I took to indicate confusion. Teacher B had been explicit to the class in this lesson about the need for them to listen to and comment on each others' ideas rather than contribute only their own new points.

1 T: Okay (Tim) is a bit confused,

2		can anybody say what Aaron has just said
3		(5) Aaron can you go through it again
4	S1:	(If there are) all the starting numbers up there
5		have got a nine in on the
6	T:	These are finishing numbers, these are starting numbers
7	S1:	Yeah, er finishing
8	T:	All the finishing numbers
9	S2:	Not 1818
10	S1:	Er, don’t know about that one, when you put (.)
11		if you switch them round the nines’ll be together
12		so it’ll be like nine and nine will make eighteen
13		so you’ve got eight and
14		then you add the one onto ( ) so the nines go together
15	T:	Okay, so why is that important, how does that help us?
16	S1:	In case you have numbers with just 1 and 9 and 8 in
17	T:	You think it’s something to do with ( ) Okay, um (4) Callum
18	S3:	I just tried 4163 and it came up with 8998

In line 1 Teacher B responds to Tim’s expression of confusion from just before the transcript begins. In line 2 she uses the teaching strategy of getting someone else to explain an idea. Most other student utterances in this lesson are responded to by Teacher B saying something along the lines of: ‘Has anyone got a comment about what S has said?’, consistent with her explicit aim in this lesson to get students responding to each other in discussion. The use of the word ‘comment’ to refer to something said in relation to a previous statement in contrast to a ‘new point’ is common language in many classrooms in the mathematics department. What is different just before line 1 is that, unlike at other times in the lesson, a student utterance is greeted with an expression of incomprehension. Teacher B refers to Tim when asking for someone else to explain. Even with the luxury of being able to hear the original idea of S1 over and over again I have found it hard to decipher, it is then perhaps not a surprise that no other student offers an explanation in their own words, despite a long pause (5 seconds – line 2) which gives ample opportunity. When S1 then explains again, after an interchange, very like TA, in which S1 is supported in articulating his idea, another student then does respond with a comment (line 9) ‘Not 1818’. Despite my still not quite being able to make coherent sense of S1, I take S2 to be offering a counter-example to S1’s idea, which S1 recognises (line 10): ‘Er, don’t know about that one’. This is the first time in the lesson when the T-S-T pattern is disrupted so I take it that the strategy of asking for another’s interpretation, despite not getting an immediate response, is effective in terms of TB’s explicit aim for the lesson of getting students commenting to each other. At the time, TB does not seem to recognise this and in line 15 asks ‘how does that help us?’ directed at S1, in a tone of voice indicating she does not think it does help. I might have expected here an invitation to S1 to respond to S2’s comment, for example. In line 18 I interpret S3 as making a ‘new point’ unrelated to S1’s idea. It seems therefore that the words in line 2 did serve Teacher B’s intentions but perhaps without her realising, and therefore without her intention becoming actualised for more than a single turn in the dialogue.

Teacher C

A key component of working on the classroom task in TC's lesson, is for students to learn how to find the areas of complex shapes; in particular the move from finding areas by counting squares to the use of the idea that a triangle is half a rectangle. Supporting this shift is one of TC's intentions in this activity. Just previous to line 1 a student had used the idea of halving a triangle in explaining, how to find an area.

1	T:	Can anyone explain, how has Lucy worked out (.)
2		( )
3		Lucy is telling us that
4		this triangle here comes to four point five
5		can anybody explain how she (.)
6		can anybody re-create her reasoning there?
7		Amy's asked a question, each of these aren't halves
8		how did she know that that triangle comes to four point five?
9		(1) She knows [laughing] anybody else know? (1) Simon
10	S1:	[quietly] one, two, three, four, five, six, seven,
11		[louder] o::oh you just do (.) it's actually three point
12		(.) wait is that eight squares or
13	T:	From there to there is nine squares
14	S1:	Yeah, from where the shading is/
15	T:	/yeah/
16	S1:	/from where the shading
17		stops is it nine or eight squares?
18	T:	The shading should go all the way up to there
19	S1:	Oh, so yeah, it is, yeah, I know why it is
20	T:	Go on Simon
21	S1:	Cos you got to (.) like that there
22		goes all the way through the like nine squares
23		all the way diagonally so its half
24	T:	So if I just drew it on its side maybe (.)
25		we've got a square one two three four five
26		six seven eight nine (.)
27		we've got a triangle going like that
28	S1:	Yeah
29	T:	And you're saying Simon,
30		that that's half of the whole rectangle
31	S1:	Yeah
32	T:	So the whole rectangle's nine
33	S1:	And then half of it's four point five
34	T:	So this must be four point five here and four point five here

35 S1: Yeah

36 T: Okay, lovely, that could help some people

The teaching strategy "Can anyone explain what S1 said" is used at the point S1 demonstrates a technique TC is conscious of wanting others to use. A student had, earlier in this lesson, shown she was finding areas by trying to split into squares, and in the turn before this one, a question was left unanswered about how we find areas when squares have not only been split in half – said by one of the highest attaining students in the class. The teacher seems to have made an assessment that the class needed support in finding areas in a more sophisticated way. Teacher C's contributions in lines 13, 15, 18, 20, as with TA and TB, are all supportive of S1 articulating his idea. As with TA the pattern of dialogue is T-S-T throughout, but also without falling into "I-R-F", for example in line 33, S1 completes TC's sentence, and in line 34 TC repeats S1's utterance – this section of dialogue feels collaborative; initiator and responder alternate. The effect, again as in case 1, is of slowing down the discussion at this point that TC judges to be key, and appears to fit TC's intention.

Conclusion

Bakhtin (1981, 293) talks of how words 'exists in other people's mouths … serving other people's intentions' until we make them our own. Teachers in this department watch videos of each other teaching and jointly plan sequences of lessons. We literally take words from each other's mouths. One difference pointed to by teachers in the department when considering the three transcripts is that TA and TC use the strategy in question at a point when they have made sense of a student comment, which they want more people to engage with, and TB uses the strategy at a point when she has not made sense of a student comment. My reading of the three dialogues, however, indicates that the same strategy was effective in supporting the different intentions of the teachers. A key difference, for me, in the second dialogue was TB seems not to hear the most significant student utterance in terms of her intentions. I have in the past used notions of listening and hearing to analyse dialogue. I held off bringing a prior categorisation to this data, in using some micro-analysis techniques; yet these transcripts suggest an important link between a teacher's intentions in using a teaching strategy and how they hear the utterances that follow.

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