# DISCUSSION GROUP:
# LANGUAGE AND MATHEMATICS EDUCATION

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The discussion group was designed to bring together mathematics education and applied linguistics. To this end, the panel included two participants from applied linguistics, both attending their first mathematics education conference. Discussion was stimulated by texts introduced by members of the panel. These included a paragraph of guidance from the NNS booklet *Mathematical Vocabulary* (DfEE, 1999: 2) entitled 'How do children develop their understanding of mathematical vocabulary'; a transcript from a KS2 classroom of a discussion about dimensions; and a transcript from a KS1 classroom featuring some work on money. What follows is a (very!) brief summary of some of the input of the panel as well as our impressions of some of the issues which emerged during the discussions at various stages.

## Mathematical vocabulary - NNS guidance

*Candia:* The guidance separates learning vocabulary from learning language and learning and doing mathematics. Teachers' talk and mathematical practice in the home is presented as using "informal, everyday language" and contrasted with implicitly 'better' "technical mathematical vocabulary", so devaluing other language practices. The focus on vocabulary presents a picture of mathematics as a collection of objects. The suggestion that teachers can explain, rehearse, sort out ambiguities or misconceptions presents a simplistic model of language and of learning. There is no mention of meaning making as a part of mathematical activity. Indeed the language needed to engage in processes of mathematical inquiry and reasoning is given little place anywhere in the document.

*Constant:* The guidance implies a 'black box' model of linear transmission of knowledge, though research shows teacher input and student learning is complicated and messy. Teacher-pupil interaction is assumed to be organised around the IRF (Initiation, Response, Feedback) model. This approach does not sit comfortably with the idea of developing pupil initiative in their own learning. There seems to be an assumed sequence from spoken to written language, though pupils do not always learn in this way. There is also an assumption of monolingualism in the guidance.

*Some of the questions raised in the discussion which followed:*

- Do we need to take account of the non-mathematical aspects of classroom interaction?
- What is the point of raising language issues for mathematics teachers?

- How do we deal with pupils' home languages (not English)?
- How do we deal with the ambiguities between mathematics language and 'ordinary' language when we are constantly switching between the two in classroom talk?
- The official (NNS) text doesn't deal with language beyond the word level in any explicit way. How do we deal with this?

## Further discussion

The rest of the sessions engaged with two contrasting transcripts through both group and plenary discussion. Since there is insufficient space to reproduce both transcripts and panellists' commentaries (which make little sense without the transcripts), this section offers one issue that emerged from the discussion for each of the panellists:

*Brian:* From an ethnographic perspective, a key question is: what is going on? Much of the interaction in both transcripts is concerned with classroom management and discipline, organising doors and windows or whose turn it is to speak, for example. The interaction is also social, so we see joking and giggling. Much of the discussion appears to be implicit. In the KS1 transcript, for example, when a pupil gives a response like 'fifteen', the teacher will often ask 'fifteen what? In fact such questions are framed both by preceding discussion and through reference to past events. In summary, therefore, classroom interaction must be seen as highly complex.

*Richard:* The discussion in the KS2 transcript is messy, with the teacher openly not being able to answer some of her students' questions. Use of key terms is changeable, negotiable, and sometimes does not conform to mathematical norms. Some DG participants liked the teacher's willingness to explore ideas (with which she was not always confident) since it led to mathematical thinking. For other participants, the discussion and use of language was confusing and ambiguous. For me, the students' exploration of language and ideas is highly mathematical. Creating the conditions for such mathematical discussion is, however, a largely *social*, discursive activity.

*Candia:* The problematic nature of the relationship between mathematics and the real world is apparent in patterns of language used in the classroom. In the KS1 transcript the teacher cues children to reinsert reality into their solution, "20 what?", expecting the answer "pence". The alternative answer from one pupil,"20 bananas", may show a remarkable understanding of the arbitrariness of school mathematics activity but is unlikely to be accepted!

*Constant:* A recurring theme for me was a constant tension, not always articulated at the surface level, between discourse data related questions and (sometimes indirect) observations and recounts of teaching experience, and the semi-formal statements by some participants on the importance of clarity in expressing mathematical ideas. I think there is a certain incommensurability between these two tendencies. Underlying these two tendencies there is perhaps a split between those who were concerned with the teaching of mathematics and those who were interested in mathematical reasoning and the search for an effective way of representing it in natural language.

## Final comment

The discussion over the two sessions was complex, sometimes intense, and explored a wide range of issues. We thank all those who attended for their participation and hope they gained as much from the discussion as we did. It seems clear to us that there is plenty of scope for further discussions between linguists, mathematicians, teachers and researchers.