Nuffield Seminar Series on Mathematical Knowledge in Teaching

Short input on:

An, S., Kulm, G. & Wu, J. (2004). The pedagogical content knowledge of middle school mathematics teachers in China and the US. *Journal of Mathematics Teacher Education* 7(2), 145-172.

Lara Alcock

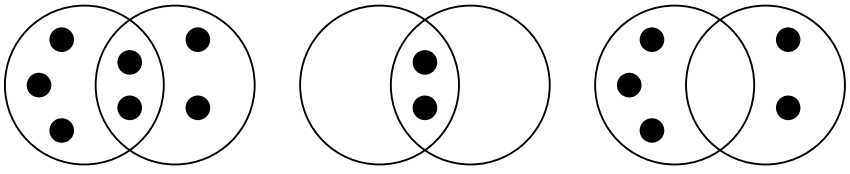
Ray Huntley gave an overview of the content of the paper. I concentrated on methodological issues with respect to this paper. In particular:

Questionnaire design

- The questions for each task were not comparable; each had several parts, but not the same parts.
- It did not appear that the participants were told how much to write, yet conclusions about their knowledge were drawn from the fullness of their answers. This *might* be reasonable, but does not necessarily mean that those who wrote less would not have been able to expand their responses.
- Conclusions were drawn from the language used, e.g. (p.157) comments about the use of "forgot" versus "didn't understand". Inferences are drawn about some teachers not understanding the challenges to students in their learning, which again might be reasonable but perhaps should have been better justified or hedged.

Top-down vs. bottom-up methods of analysis

- The coding seemed somewhat inconsistently question-dependent, e.g. one code was about using questions or tasks to correct misconceptions, when this was specifically asked for in some questions but not others.
- The grounded-theory style codes were then fit into four pre-existing larger categories. This seemed inconsistent with the usual aims of grounded theory methods.
- This fitting of codes into large categories had overlaps in the sense that one code would appear in multiple larger categories. We were not told how the individual instances within a code broke up across these categories, and I wondered which of the diagrams below would best illustrate this. If the third, for instance, then it seems the code should really be two codes.



Research stance

- The writers' stance as researchers, as opposed to proponents of particular teaching methods, did not seem to be well maintained. Numerous claims were made about what constitutes good practice as part of the results section, e.g. (p.158) "Internalizing and connecting knowledge about like units into a coherent whole provides a close link that makes learning easier and leads to mastery." This may well be true, but no evidence or justification was provided in this paper, so perhaps such comments should have appeared in a separate section stating the authors' position on these matters.
- There were some statements about the teachers' effects on their students that were not supported by the evidence in this paper (although this may have been acquired in other parts of the study). E.g. (p.162) "the US teachers sparked their students' interest" and (p.164) "the US way of defining fraction multiplication tends to produce confusion for students." Again, these may be true statements, but it would be very difficult to give adequate evidence for so many such claims in a statement of this length. (I raised the issue of how much can be covered in general, comparing with the chapter from Ma's book, which is of similar length but only covers responses to one task.)