Nuffield Seminar Series: Mathematical Knowledge in Teaching

Short paper identifying and arguing for particular issues as important for future research

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(I am not a teacher educator so this document will necessarily be less well-informed of those with a better knowledge of the literature. It may be that all the questions below have already been answered, but having read the abstracts for the book and reflected on the seminars, these are some issues that stand out for me.)

1. Is there any evidence about the relative impact on mathematical knowledge of professional development based on, e.g., problem solving, lesson study, the knowledge quartet etc.? Perhaps these are all valuable in different ways, but can we clarify what those ways are in terms of some relatively small number of dimensions?

2. What do we know about teachers' perceptions of different kinds of professional development? What do they think they have learned at the end of a session? Again, is there any consistency in how this has been evaluated for different types of experience, so that these could be compared?

3. If there are differences in teacher perceptions of different types of experience, is it the case that some might be more obviously helpful/appropriate for new teachers and some for more experienced teachers?

4. How much do teachers ordinarily change their presentation of material from one year to the next? When do they usually spend most time thinking about alterations? Might there therefore be an optimal time to offer sessions aimed at enhancing mathematical knowledge?

5. What, if any, are the organising principles teachers claim to use in structuring their presentation of a mathematical topic?

In my own area, the sessions have also made me think about the following questions.

1. What do lecturers think about when designing their teaching? Is this focused in any way on what they know about student learning? If so, how, and does this change over their career?

2. Is there scope for research involving, say, bringing together ten people who've all recently taught linear algebra, to compare their notes, problem sheets, use of books, experience of student responses etc.?