Nuffield MKiT Seminar 5: Group 3 discussion

During the meeting a number of themes were discussed, mostly from the perspective of analysing barriers to systematic approaches to the amelioration of teachers' mathematical subject knowledge. The first was the changed role of the inspectorate – and in this respect a distinction was made between HMI and Ofsted - and the demise of the residential courses formally provided by HMI where inspectors' acknowledged subject content knowledge and didactic expertise were made available to the profession at large. It was felt that Ofsted had neither the authority nor the confidence of teachers to undertake such developmental roles.

The second theme concerned the use of texts in the development of teachers' subject knowledge. It was generally agreed that texts have the potential to address, from a number of perspectives, both pre-service and serving teachers' subject knowledge for teaching. However, the manner in which most texts are presented, with and an overemphasis on procedural knowledge and lack of clear progression in the development of mathematical concepts and structures, means they may be counter-productive as tools for the professional development of teachers. In this respect it was generally agreed that a regulatory body, assuming its rules of engagement and composition could be satisfactorily resolved, focused on ensuring the appropriateness of any published text in relation to curriculum expectations would be one step towards overcoming this increasingly worrying problem.

The third theme related to the activity of education-related quangos and the overemphasis of generic rather than subject-specific objectives to the detriment of warranted approaches to the curriculum and the manner of its assessment. Indeed, the lack of subject representation on many bodies, including recent reviews of mathematics and its teaching, was seen as a problem unique to England in its explicit appeasement of users rather than creators of mathematics. It was noted that it would be difficult to imagine French teachers accepting a mathematics curriculum devised by economists and industrialists.

The previous concern led to the next fourth theme concerning the historical roots of mathematics as a curricular given and the long-standing English view that the primary purpose of education is to prepare learners for a world beyond school. In some respects this aspect provoked the widest range of views with some colleagues arguing that the Dutch realistic mathematics education model, which was being trialled at the Manchester Metropolitan University, provided a meaningful context in which to locate both teachers' and students' acquisition of subject knowledge. This view was not held by all and the consensus was disappointment that the dominant English mathematics curricular tradition privileged procedural knowledge over all other forms of mathematical competence. In this respect it was argued that attempts to facilitate changes in teachers' subject knowledge for teaching would require substantial change at systemic level, particularly in respect of the nature of mathematics and a systemic rationale for its curricular inclusion.

The fifth theme, not unrelated to the previous, concerned the lack of both systemic and systematic mathematics pedagogy. It was felt by majority of the group that the traditional English focus on the individual – manifested in many ways - rather than the collective militated against the possibility of developing a coherent programme of subject knowledge development for those in teacher education.

The previous comments led to the sixth theme concerning the encouragement of the exploitation in more systematic ways than is currently the case of the outcomes of

comparative mathematics education research. This has highlighted, for example, the inadequacies of English text books in the development of students' higher order mathematical skills, the failures of the English curriculum to address the fundamental, at least in respect of the generation of mathematical knowledge, skills of mathematical reasoning and proof, and the relatively low expectations and didactic skills of English teachers of mathematics when compared with many of their European colleagues. Moreover, it was argued that comparative education research has the potential, through systematic examination, to highlight the adaptive potential of another system's mathematics education traditions for another.

In summary, much of the discussion focused on contextual and cultural issues concerning expectations in relation to both mathematics itself and the participants involved in its teaching and learning. It was agreed that many cultural factors militated against the development of the sort of teacher knowledge that would privilege higher order learning of the subject – whatever that is – and the discussion closed with the question; should the group advocate radical or incremental change?