

## **Nuffield MKiT Seminar 5: Group 1 discussion**

The papers identified three complementary pathways for thinking about deepening teachers' mathematical knowledge, namely: (1) encouraging their personal engagement with mathematical activity in one form or another; (2) involving teachers in professional mathematical communities; (3) developing their capacity to choose and design rich tasks, including taking given tasks and handling them in enriching ways. The challenge for researchers is to identify and characterise more fully the processes by which knowledge is deepened through these activities. More clarity is also required about what constitute significant outcomes, such as: (a) understanding of coherence, connections and links; (b) openness to variants and alternatives; (c) capacity to make knowledge accessible in appropriate ways.

There are further crucial issues which deserve analysis and research. For example, at what point(s) in training or career does fostering engagement with mathematics make best sense? Scheduling some part of this after professional training and experience may be important, so that teachers bring capacity to relate to, and reflect on, teaching. In that case, what kinds of provision can be effective, and what range of –mathematical and pedagogical – experience and expertise do teacher educators require? Contrary to received views, there may be examples of university mathematics courses which are helpful in developing mathematical capacities for teaching (NZ, Germany). However, potentially important historical, epistemological, and developmental dimensions are missing from most mathematics courses.

These fundamental issues have been exercised over many years, and are apparently pervasive across educational systems, at least in the English-speaking world. It needs to be recognised, however, that they manifest themselves in different ways, depending on current and local circumstances. Questioning of the viability of teacher-educator advocated practice in typical circumstances of school practice needs to be addressed in a reflexive way. At primary level, other kinds of 'being' may be as important as, and need to be balanced with/against 'being mathematical'. Issues of scaling up of 'personalised' approaches are often neglected.