TEACHERS' MANAGEMENT OF THE EPISTEMOLOGICAL FEATURES OF MATHEMATICS: SEARCHING FOR LINKS WITH PUPILS' MATHEMATICAL KNOWLEDGE

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It is widely accepted today that the mathematical meaning constructed by the pupils is largely determined by the way, in which the subject matter knowledge is processed and filtered in the mathematics classroom. Within this perspective, a number of studies have focused on the consequences of teachers' management of the epistemological features of mathematics for the subject matter knowledge generated in the classroom (e.g., Steinbring, 2001, Tzekaki et al., 2001). However, there are no studies systematically examining the impact of this management on the epistemological features of the mathematical knowledge formulated by the pupils.

In previous studies (e.g., Kaldrimidou et al., 2000), we examined how teachers handle the epistemological features of mathematics in various contexts. The main conclusion drawn from these studies was that teachers tended to deal with these features in a unified manner, mixing them with morphological and procedural elements of the mathematical knowledge. In this presentation, we report on a systematic investigation of the epistemological features of the mathematical knowledge held by a sample of 1,055 pupils, whose teachers' instructional practices were studied and led to the above conclusion. The data came from the subjects' written answers to a number of items, which aimed to identify their understanding of basic mathematical facts. The items with similar epistemological characteristics of the mathematical knowledge targeted were clustered together and the corresponding answers were analysed. The results of this analysis showed that the students' poor performance was due to their almost exclusive reliance on morphological and procedural elements of the mathematical knowledge, which, as argued above, dominated their teachers' instructional practices. This suggests that it might be valuable to examine more systematically the role of the epistemological features emerging in the mathematics classroom in relation to the meaning attached to the mathematical concepts and processes by the students.

References

Kaldrimidou, M., Sakonidis, H., Tzekaki, M. (2000) Epistemological features in the mathematics classroom: algebra and geometry. In T. Nakahara & M., Koyama (eds.) *Proceedings of the 24th Conference of the International Group for the Psychology of Mathematics Education*, Hiroshima: Hiroshima University, 3, 111-118.

Steinbring, H. (2001) Analyses of mathematical interaction in teaching processes. In *"Mathe2000": selected papers*, Dortmund: University of Dortmund, 89-95.

Tzekaki, M., Kaldrimidou, M., & Sakonidis, H. (2002) Reflections on teachers' practices in dealing with pupils' mathematical errors. In J. Novotna (ed.), *Proceedings of the 2nd Conference of the ERME*, Prague: Charles University, 2, 322-332.