



### **Topic 2 - Specific tools and signs in the mathematical work**

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This topic focuses on the use of technological tools and signs that are considered vehicles of knowledge in order to see how they affect mathematical work. We may set a double question in relation to their impact.

The first one is about the potential of technological environments in transforming the mathematical work of the student. As a key elements of the mathematical work space, not only the interaction between signs and tools offer an extraordinary case study, but also the link of signs and tools with the discursive genesis.

The second question arises from the consideration of epistemological background present in ETM. It consists of studying how the tools and the semiotic systems (particularly in the case of technological environments) affect the construction of the student's own knowledge, guiding his mathematical work. This may involve, for example, both the nature of mathematical objects that the student constructs, the proofs that are mathematically acceptable and the role of the steps of the investigation.

See also Synthesis of Theme 2 in the Proceedings of ETM 4 symposium, <http://www.mat.ucm.es/imi/ETM4/ETM4libro-final.pdf>, pages 207-216.

### **Topic 3 - Genesis and development of mathematical work: the role of teacher, trainer and interactions**

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This third topic will advance on the reflection of the teachers role and the interactions when forming a consistent but also efficient ETM, already initiated in the Symposium ETM4. How to manage the interactions around the mathematical work in the classroom? This area will develop the analysis of these interactions and the construction of mathematical thinking from a holistic viewpoint that takes into account different interrelated dimensions (cognitive, educational, technical, affective, cultural). Specifically we will discuss what the purpose of teacher training and the trainers is during the development process. In the class, the interaction between the teacher and the students' work leads to a dynamic equilibrium of ETM. Naturally, the proposed studies within this theme may suggest other ways to describe the process of genesis involving the students and the teachers. In particular, it will be focused on the process of interaction between teacher knowledge and the various areas of mathematical work. How teacher knowledge influences the formation of mathematical working spaces.

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