From using artefacts to mathematical meanings: the teacher’s role in the semiotic mediation process

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Abstract: The potential of artifacts for learning have been extensively studied, with a main focus on their possible use by students and the subsequent benefits for them. However, there has been the tendency to underestimate the complexity of exploiting this potential, and specifically the complexity of the teacher’s role orchestrating the teaching and learning process. The theoretical framework is that of Theory of Semiotic Mediation (TSM) has been developed (Bartolini Bussi and Mariotti, 2008) with the aim of providing a teaching and learning model, where attention is focussed on the social construction of knowledge and on the semiotic mediation accomplished through cultural artefacts.

Following Vygotsky’s seminal idea of semiotic mediation, we postulate that the teacher can exploit the semiotic potential of an artifact to make students develop genuine mathematical meanings. The evolution of meanings, described through the analysis of signs produced in classroom activities, corresponds to the move from personal meanings, rooted in the context of the artefact, to conscious mathematical meanings. Such an evolution is a long term process that, according to our assumption, is neither spontaneous nor granted, and for this reason needs a delicate, carefully designed, intervention of the teacher. The teaching organization proposed in the Theory of Semiotic Mediation will be illustrated by examples that will focus on different aspects of the process of semiotic mediation.

Taking a semiotic mediation perspective means to acknowledge the central role of signs in teaching-learning activity: the focus is on semiotic processes, specifically production of signs and their transformation. Fostering or guiding these processes is a crucial issue and a demanding task for the teacher. Through the semiotic lens it is possible to highlight specific patterns in the teacher’s action that make students’ personal meanings evolve towards the mathematical meanings that are the objective of the intervention.

In my lesson, I will discuss a first model of the teacher’s action and I will provide some examples drawn from long term teaching experiments carried out at different school levels.

References

