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Semiotic representations and cognitive operations of thinking. (Registros de representación semiótica y funcionamiento cognitivo del pensamiento.)

Hitt Espinosa, Fernando, Didáctica - Investigaciones en matemática educativa II. 35 aniversario del CINVESTAV. , (ISBN 970-625-151-0). 173-201 (1998).

That mathematical knowledge can be represented under semiotic forms is very often pointed out. But very few studies focus on the operation of changing the semiotic form through a knowledge is represented. However, it is a basic cognitive operation. Irreducible to any processing pattern, it seems strongly related to the understanding processes and the difficulties of conceptual learning. It causes obstacles that only the coordination of various registers of semiotic forms helps to overcome them. The aim of this paper is to show the central place of the ability to change the register of any semiotic representation in the learning of mathematics. For that we shall tackle three topics. First, many of the difficulties encountered by students at different levels of their curriculum can be described and explained as a lack of coordination of registers of representation. Secondly, conceptual knowledge is like the invariant of manifold semiotic representation. Thirdly, by taking into account different registers of representation we can define independent variables specific to cognitive contents, and so organize didactical sequences in order to develop the coordination of registers of representation. (Author's abstract)

Classification: C30