CONSTRUCTION OF PERSONAL SYMBOL SYSTEMS

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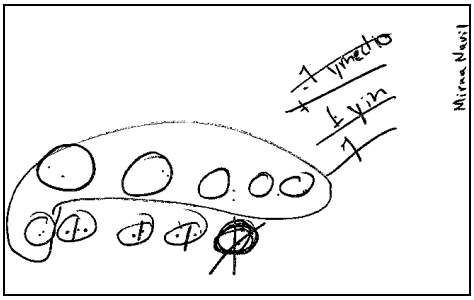
Children from 4 to 8 years of age attending the second grade of kindergarden and the first to third grades of elementary school participated in a two-year longitudinal study; in which one of every 17 students was interviewed on six different occasions. In the protocols specific tasks were included, regarding different ways of counting, sharing of continuous wholes and composed unities, using words for fractional units, graphical partitioning representations and propotional sharings.

The information in relation with the constrction of personal symbol systems arises from an investigation structured with two case studies of the longitudinal study (see Martínez, 2001). Works of several researchers, for example from Fuson (1988) on natural numbers and from Kieren (1999), Streefland (1984) and Figueras (1996) on rational numbers have been used as a theoretical framework in both studies. Qualitative analyses was carried out in order to identify strategies used by the students when solving partitioning problems of discrete sets and continuous wholes.

The construction of personal symbol systems has been related to the ways children communicate number knowledge, forms in which the verbal expressions are distinguished from the graphical ones. In this investigation, attention is focused on the symbols constructed by Mirna (7 years old, 2nd grade of primary school) when solving proportional sharing problems, especially those in which the part and the number of children were known and the whole needed to be build up.



In Mirna's work you can observe the way in which she uses the symbols of natural numbers to represent the whole unity and words to speak about the fractional units; the symbol of the addition is used to indicate a computation with these quantities, which are new for her. The written expresion 1 and half (*1 y medio*) permits her to connect the level of concrete actions – linked to the drawings - with the one of her ideas, and at the same time to justify what she assumed to be the answer to the problem posed: ten pizzas for six children. Her symbolic representation also helps her to contrast her initial ideas and alouds her to consider her estimates.

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