

DETECTING VISUAL CHARACTER OF THE ISOSCELES-TRIANGLE SCHEMA

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The purpose of this research is to investigate the relation between a perceptive and an interpretive treatment of a simple geometric figure. A figure is more than what is initially stated in the building instructions and the surplus is not immediately visible but requires a mental reconfiguration. This heuristic approach permits the connection of different concepts under the cognitive construction of a geometric schema, in our case: the Isosceles-Triangle Schema. (ITS).

A concept-understanding schema combines information about concept-image and concept-usage (Moore 1994, Chinnappan 1998). This information follows from a treatment of a geometric figure in two levels: The level of gestalt-apprehension and the one of operational apprehension (Duval 1995). Both treatments may be analyzed in the wider context of visual imagery. Our study aims to trace the 10-grade students' ITS on the basis of their responses to recognition and construction activities demanding different types of imagery as these are defined by Owens and Clements (1998).

The participants were 63 students (31 high achievers and 32 low achievers) who, according to curricula, had been taught geometry in a deductive level for a year.

The language used by the students in order to explain the way of acting was used as a tool of analysis of their conceptual schemata. The analysis of students' responses showed that a successful mathematical treatment of a geometric problem does not assure that students are also capable for a successful conceptual treatment. We have observed a tendency for overgeneralization of the application field of some basic mathematical concepts, but also a tendency for limitation of the operational treatment of the geometric figure on the base of quantitative relations at the expense of qualitative ones.

References

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