A CONSTRUCTIVIST APPROACH OF ERROR IN ADDITIVE ARITHMETIC PROBLEM SOLVING

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Theoretical Framework

The status of error in the teaching and learning process has been analysed from several points of view depending on the epistemological bent from which different authors stand. Within a constructivist perspective, the error produced by a subject when performing a task is not an ill to eliminate and forget, but a behaviour worthy of analysis and interpretation. (Inhelder *et al.*, 1974, Vinh-Bang, 1990, Astolfi, 1997).

This research has the goal of analysing errors commited by pupils, from kindergarden, first and second grades, on solving different kinds of addition arithmetic problems (e. g. composition and transformation) (see G. Vergnaud, 1981).

We intend to answer to three issues: firstly to determine if the error produced by the child results from a lack of structural mechanisms to solve the question or if it is only a functional difficulty. The second issue is to determine if the pattern of errors is connected with the child's psychogenetic development. The third issue is to determine the relationship between the additive problem proposed and the type of errors commited.

Methodology

In this investigation 30 pupils where questioned in four sessions and qualitative methodology formed the basis of data collection. After a operatory diagnosis being done with three Piaget's tasks (number's conservation, seriation of lenght and class inclusion), nine additive verbal problems were be presented at which the child shall answer using manipulative materials, followed by iconographic representation and finally symbolic representation (calculus) to determine the kind of errors produced.

Results and Conclusion

The first results analysed until now shows:

1. In general, pupils commited more errors in additive problems involving transformation.
2. These errors seem to be at the root of a lack of structural mechanisms of knowledge; in fact pupils with low results in Piagetian tasks, independently of their educational level, are those who commit more errors.
3. Errors comming out from functional difficulties, like computational errors, are not connected with psychogenetic development, but with the educational level of the pupil.

References

INHELDER, B *et al*. (1974). *Learning and the development of cognition.* Cambridge: Harvard. University Press.

ASTOLFI, J. P. (1997). *L'erreur, un outil pour enseigner.* Paris: E.S. F. Editeur.

VERGNAUD, G. (1981). *L'enfant, la mathématique et la réalité.* Berne: Peter Lang.

VINH-BANG. (1990). L'intérvention psychopédagogique. *Archives de Psychologie,*

58, 123-135.