

## CONSTRUCTING PROCEDURES AND CONCEPTS IN THE CLASSROOM – ADDITION AND SUBTRACTION UP TO 100

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Children learning in mathematics can be taken as a specific activity constructing **cognitive structures** (various relationships between real situations, their models, and mathematical notations etc.) in children's minds (Kuřina, [2]). Various interpretations of concepts, models and visual aids support the understanding of the concepts and processes in a determined way. For illustration this idea an introduction of addition and subtraction up to 100 will be used. The nature of children strategies will be described in the framework of theory of procept (Gray, Tall [1]).

*The organisation and framework of the study:*

We conducted an experimental education in 4 classes (children aged 7) where different teaching materials were used. Starting points for the study:

- in teaching children the teacher usually come out from the textbook – it means they use the same representations;
- children will be given the opportunity to create and use their own strategies, because they are able to introduce new procedure of addition and subtraction up to 100 without any explanation of the teacher. This promotes understanding and creation of procepts.

*Questions of the study:* What strategies do children use in mentally adding and subtracting up to 100 in respect to the aids used mainly in the classroom?

What nature have these strategies from the point of view of creation the procept?

### Conclusions:

- Pupils are better motivated to learn when teaching builds on their own strategies.
- Paying attention to relation between the learning aid, procedure and concept is necessary. Various tools are essential to carry out activities but they do not lead direct to creation of the processes, concepts or procepts.
- When pupils learn to co-ordinate systems of signs, with their activity, their reasoning system becomes more powerful (more efficient, faster, less subject to distraction).

### References:

- [1] Gray, E. M.,- Tall, D. (1994): Duality, ambiguity and flexibility: a proceptual view of simple arithmetic. Journal for Research in Mathematics Education, 25, 2, 1994 s. 116 – 141
- [2] Kuřina, F. (1995): Konstruktive Zutritte zum Mathematikunterricht. In: Beiträge zum Mathematikunterricht: Vorträge auf der 30. Bundestagung für Didaktik der Mathematik vom 4. bis 8. März 1996 in Regensburg.

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