

ON THE POSSIBILITIES OF SUCCESS OR FAILURE OF A TEACHING MODEL. ALGEBRAIC BLOCKS FOR LOW-SCHOOL-PERFORMANCE STUDENTS

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This is an empirical study focusing on the ambiguity between the negative numbers and the subtraction operation in algebraic tasks. It is based on Filloy's theory for the empirical observations in mathematics education. Filloy (1991) stated that cognitive tendencies appear in teaching situations. In this study, the teaching situation refers to the Algebraic Blocks model. Gallardo (2002) found four levels of acceptance of negatives: subtrahend, signed, relative and isolated numbers, which are identified as cognitive tendencies in this study. Research question: Can the Algebraic Blocks model be used to analyze the ambiguity between the subtraction and the negatives? Is there a teaching model that is the best of all? This is a case study of three low-performance 12-13 subjects: S1, S2, S3. The main results. Intermediate senses of negative numbers appeared: subtrahend, signed, relative and isolated numbers. This tendency was extreme when S3 only accepted subtrahends and did not recognized the signed numbers. Inhibiting mechanisms emerged: S3 focused on the binary sign and ignored the unary signs; S2 and S3 had difficulties with general numbers in open sentences. S1, S2, S3 avoided negative solutions in equations. The effect of obstructions derived from semantics on syntax was extreme in S3. It has been proven that it is necessary to give up the search of the good model, due to extreme cognitive tendencies. Examples of these facts are exhibited in a poster presentation.

Filloy, E. (1991). Cognitive tendencies an abstraction process in algebra learning, in Furinghetti (Ed.), *PME XV*, vol. 2: 48-56. Assis, Italy.

Gallardo, A. (2002). The extension of the natural numbers domain to the integers in the transition from arithmetic to algebra. *Educational studies in Mathematics*. 49: 171-192. Kluwer Academic Publishers. Printed in the Netherlands.

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