REPRESENTATION OF INDETERMINATE QUANTITIES IN FUNCTIONAL CONTEXTS BY THIRD GRADE STUDENTS

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This research is part of a broader project, based on the proposal of *early algebra*, the main purpose of which is to explore the algebraic abilities displayed by primary school students in tasks involving a functional relationship. Algebraic thinking consists in reflecting on indeterminate quantities analytically and it is possible to think about this without having the symbols to express it (Radford, 2018). Our goals in this communication are two. First, to describe how third-grade students represent indeterminate quantities when expressing functional relationships. Second, to illustrate how students make use of the letter in such representations when this one is proposed as a representation for the independent variable of the function. We qualitatively analysed the answers given by 24 students (8-9 years-old) during three consecutive work sessions of a teaching experiment.

The main results show us that the students represent the variables involved with letters, numbers or both, making use of different meanings that they assign to the letters. They can understand the idea of variability and link it with undetermined quantities. Given a literal representation for the independent variable, when having to represent the dependent variable, sometimes they use the order of the alphabet to replace the letters with numerical values. This result coincides with previous research findings. However, in our study we also got evidences of other use of this alphabetic order, as a criterion to choose the letter to represent the dependent variable and leave the value of both variables undetermined. Other times although they assign a unique value to the letter, they indicate that such value can vary according to the chosen letter. Recognizing thus a certain variability. When interpreting the letter as an indeterminate value, students say that it can be "the number that you want". Consequently, to represent the dependent variable they use the same letter, a different letter, or they write any number. The use of numbers could be interpreted as a static view of the letter, however, the students argue that this number is only an example.

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