

Number sense vocabulary: reflections from a pre-school pupil

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Pupils at a very early age are exposed to vocabulary expressing mathematical concepts. It is thus imperative in a teaching and learning process to gain insight into the different ways of relating to these concepts that pupils bring with them in a formal teaching and learning situation. In the present study a case of a six-year-old's reflections on number sense is analysed with the view of discovering embedded relationships thereof. Preliminary results indicated that while the pupil's reflections are characterized by a procedural-applicational orientation, there is a provided opportunity to engage in deep aspects of number sense.

Introduction

The importance of mathematics vocabulary in learning is well established (Riccomini, Smith, Hughes and Fries, 2015; Şengül, 2013; Miller, 1999). It has been observed that “without an understanding of the vocabulary that is used routinely in mathematics instruction, textbooks, and word problems, students are handicapped in their efforts to learn mathematics” (Miller, 1999, p. 312). While the statement by Miller is largely uncontested, it seems that the potential of vocabulary regarding number sense would benefit from further research. This is not entirely unexpected given that research still seems to be grappling with what constitutes number sense (Griffin 2004; Gersten, Jordan, Flojo, 2005). Literature touching on number sense seems to place emphasis on what is in the present study perceived as *procedural-applicational*. Sayer and Andrews (2015) identify three perspectives on number-sense; preverbal, applied and foundational of which foundational numbers sense is desirable from a school mathematics perspective. In their study, Sayer and Andrews associate foundational number sense with arithmetic competencies, including counting, recognition of different representations of number, connecting numbers with quantity, etc.

The point of departure in the present study is a case of a six-year old pupil reflections on the mathematics expressions numerals and digits (SWE *tal* och *siffror*). Using a semiotic framework for analysis, the pupils sense making process as well as emerging ideas relating to numbers are identified. The study highlights the fluid nature of the concept, at the same time revealing the affordance that some

of the of the emerging ideas provide in realizing a meaningful engagement in “number sense”.

Results

Preliminary analysis reveals how the pupil uses aspects of number sense that are apparent, i.e within her reach, to reason on aspects that are withdrawn. It is also observed that the pupil’s expression of some of these withdrawn aspects of number sense is limited from the perspective of subject specific forms of expression Given curriculum demands on developing pupils’ mathematics competencies such as reasoning and communication competencies, the results from the present study is not only consistent with Millers (1999) assertion regarding the importance of subject-specific forms of knowing in engaging preschoolers with meaningful mathematical contents. The present study also focuses attention on number sense concepts and aspects introduced to pupils in a teaching and learning situation.

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