

## Children's Literature with Mathematical Dialogue for Teaching Mathematics at Elementary Level: An Exploratory First Phase about Students' Difficulties and Teachers' Needs in Third and Fourth Grade

**Authors :** Goulet Marie-Pier, Voyer Dominic, Simoneau Victoria

**Abstract :** In a previous research project (2011-2019) funded by the Quebec Ministry of Education, an educational approach was developed based on the teaching and learning of place value through children's literature. Subsequently, the effect of this approach on the conceptual understanding of the concept among first graders (6-7 years old) was studied. The current project aims to create a series of children's literature to help older elementary school students (8-10 years old) in developing a conceptual understanding of complex mathematical concepts taught at their grade level rather than a more typical procedural understanding. Knowing that there are no educational material or children's books that exist to achieve our goals, four stories, accompanied by mathematical activities, will be created to support students, and their teachers, in the learning and teaching of mathematical concepts that can be challenging within their mathematic curriculum. The stories will also introduce a mathematical dialogue into the characters' discourse with the aim to address various mathematical foundations for which there are often erroneous statements among students and occasionally among teachers. In other words, the stories aim to empower students seeking a real understanding of difficult mathematical concepts, as well as teachers seeking a way to teach these difficult concepts in a way that goes beyond memorizing rules and procedures. In order to choose the concepts that will be part of the stories, it is essential to understand the current landscape regarding the main difficulties experienced by students in third and fourth grade (8-10 years old) and their teacher's needs. From this perspective, the preliminary phase of the study, as discussed in the presentation, will provide critical insight into the mathematical concepts with which the target grade levels struggle the most. From this data, the research team will select the concepts and develop their stories in the second phase of the study. Two questions are preliminary to the implementation of our approach, namely (1) what mathematical concepts are considered the most "difficult to teach" by teachers in the third and fourth grades? and (2) according to teachers, what are the main difficulties encountered by their students in numeracy? Self-administered online questionnaires using the SimpleSondage software will be sent to all third and fourth-grade teachers in nine school service centers in the Quebec region, representing approximately 300 schools. The data that will be collected in the fall of 2022 will be used to compare the difficulties identified by the teachers with those prevalent in the scientific literature. Considering that this ensures consistency between the proposed approach and the true needs of the educational community, this preliminary phase is essential to the relevance of the rest of the project. It is also an essential first step in achieving the two ultimate goals of the research project, improving the learning of elementary school students in numeracy, and contributing to the professional development of elementary school teachers.

**Keywords :** children's literature, conceptual understanding, elementary school, learning and teaching, mathematics

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