# Implementing a French teaching program in a Swedish grade 1

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In this presentation we share experiences of having implemented a French teaching program in a Swedish grade 1 classroom for the duration of one school year. The French teaching program, Arithmetic and Comprehension at Elementary School (ACE) takes a structural and relational approach to teaching and learning numbers in early grades. The aim of this presentation is to describe the implementation process of the ACE-program in a Swedish context and to discuss how principles of variation theory can develop the program. Following the structure and the principle of the program we found that the program, with small adjustments, is possible to implement in a Swedish grade 1. We suggest that the program may be further developed by adding principles of variation theory.

In this presentation, we share experiences of having implemented a French teaching program in a Swedish grade 1 classroom for one year. The Arithmetic and Comprehension at Elementary School (ACE) program has been developed and tested by researchers and teachers in more than 500 French classrooms with 6–7-year-olds (Joffredo-Le Brun, et al., 2018; Sensevy, et al., 2015). The ACE program is based on certain principles such as: i) focusing on small numbers and number relations for a long period of time, ii) the relational meaning of the equal sign, iii) first representations that promote students’ ability to see the part-whole relations of numbers (e. g., finger-patterns) then iconic representations (e. g., triad diagram), then to write equation in canonical form. When arithmetic operations are introduced, the students are guided to explore number relations by comparing and decomposing numbers in different ways and learning efficient ways of compositions and decompositions of numbers. Students are to be encouraged to “write mathematics”, using paper and pencil to document and communicate mathematics and thereby develop a deeper understanding of mathematics. The program consists of a connected series of situations (most often including a game) where the principles are focused. The teaching guide gives detailed descriptions of the mathematical ideas included in the situation, rules of the game, the teacher’s didactical role and the program’s progression (Programmation et Progression ACE, n. d.; Sensevy, et al., 2015).

The principles described in the French ACE-program have similarities with an intervention project conduced in preschool class (5-6-year-olds) in the same municipality. Whereas the intervention in pre-school class as well as the French program are built on a structural approach to numbers and number relations and one of the games from the ACE-program had been used successfully in the preschool project, we saw the potential of trying to implement the program in grade 1. The aim of this presentation is to describe the implementation process of the French ACE-program in a Swedish context. We also want to discuss how principles of variation theory (Marton, 2015) might further contribute to develop the program.

One experienced grade-one-teacher and one researcher worked in close collaboration. We tried to understand the central components included in the teacher guide, especially the teacher’s didactical role, the descriptions of the situations and games, the mathematical ideas and the program’s principles. Worksheets from the original program was used, but with small adaptions for the Swedish context. The involved teacher implemented the ACE-program in her classroom during one school year. She followed the structure of the teaching sessions; introduction of the rules of the game in whole-class, followed by pair-work (the game) and thereafter summarization in whole class. Documentation of teaching (filmed lessons, photos, teacher’s field notes and students’ worksheets) were collected for the ongoing analysis of how the program worked out in the classroom. During the school year the teacher and researcher got more confident with the underlying mathematical and didactical ideas, and the program’s components. Strengths of the program, such as: students’ engagement and the focus on number relations, and the progressions, were identified. In the original ACE-program the teacher should, at the end of each teaching session, select students’ work for a whole class discussion. Our understanding of the teacher guide is that it gives to some extent examples and comments on *how* to select interesting students’ work for the discussion. Therefore, we tried to improve how to select and contrast students’ solutions, and how the teacher by adding alternative examples of solutions could focus on the mathematical idea in a systematic way by using principles of the variation theory (Marton, 2015). This was made based on analysis of worksheets and what the teacher had identified as *critical* for the students to discern for them to understand the current mathematical content.

Drawing on experiences from the first year of implementation, we suggest that the ACE-program in a Swedish context have a potential to replace or be a complement to the textbook and can be further developed by adding principles from the variation theory. The refinement of the program is ongoing. In the teacher guide, we now add critical aspects, being identified from the first year and patterns of variation. In this school year, seven teachers in the same municipality, being familiar with the variation theory, will implement the program in their classes. A further analysis of the original program and the implementation in a Swedish context is needed.

## References

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