

MATHEMATICAL LEARNING DISABILITIES IN EARLY ALGEBRA



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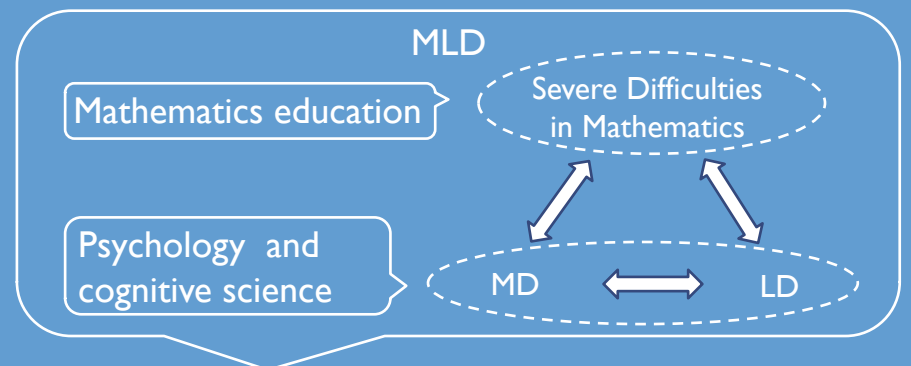


Swiss Context

Government proposition: Concept 360° - Switzerland, Canton Vaud

Political will to take care of the special needs of ordinary students (LD, severe difficulties, ADHD...).

Subject of the Study



Mathematical Learning Disabilities – MLD

Different definitions:

- Severe Difficulties in Mathematics: students with specific and persistent difficulties in math, identified as the worst in math within a certain group (Pfister, Opitz, & Pauli, 2015).
- MD: Math Disorder; “a biologically based difference in the brain, which results in significant difficulties with mathematics” (Lewis & Fisher, 2016).
- LD: Learning Disabilities not specific to math (dyslexia, ADHD,...; Deruaz & al., 2019).

87% of the research on MLD is about arithmetic (Lewis & Fisher,

2016) but MLD are heterogeneous (Fias, Menon & Szucs, 2013).

Early algebraic thinking

“Algebraic thinking can be interpreted as an approach to quantitative situations that emphasizes the general relational aspects with tools that are not necessarily letter-symbolic, but which can ultimately be used as cognitive support for introducing and for sustaining the more traditional discourse of school algebra” (Kieran, 1996, p. 275).

Analytic thinking where indeterminate quantities are considered as if they were specific numbers (Radford, 2012).

Research Questions and Hypothesis

Research Questions

1. How arithmetical competences are linked to algebraic ones?
2. Which characteristics (difficulties and competencies) do MLD students have with respect to not MLD students in the process of generalisation in early algebra?
3. What class intervention to help MLD students in the process of generalisation in early algebra?

Research Hypothesis

The nature of the difficulties is the same for MLD and not MLD students.

MLD students can develop basic algebraic skills.

Pilot Study

Pattern generalisation as a bridge from arithmetic to algebra

September 2019 – June 2020. Ordinary classes: 4th grade → 9th grade

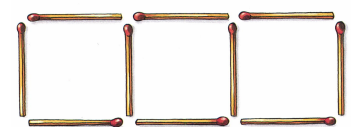
Focus for the pilot study: which age suits better? Which adaptation for the tasks?

An example of patterns generalisation: 99 squares (MER, 6th grade)

We need 10 matches to construct this pattern of 3 squares. How many matches do we need to construct a pattern of 99 squares?

Les 99 carrés

Pour former cette suite de 3 carrés, il a fallu 10 allumettes. Combien faut-il d'allumettes pour former une suite de 99 carrés?



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