

The framework of the Project TALRO

Projectperiode januar 2021 –juni 2023.

Participants

Five mathematics coaches in five schools nominated a total of 8 potential dyscalculia students at 4. – 6. grade. They were subsequently reduced to 6 students, as two were assessed to be outside the dyscalculia category measured by part of the test from the government, other examine fx PPR, and a interview by the projectmanager.

The five math-advisors(which were reduced to four) were, on guidance from the project manager, each responsible for various interventions with the involvement of the mathematics teachers of the dyscalculia child.

The report is available as a pdf on NCUM's website linked to the NORSMA event (However, only in Danish)

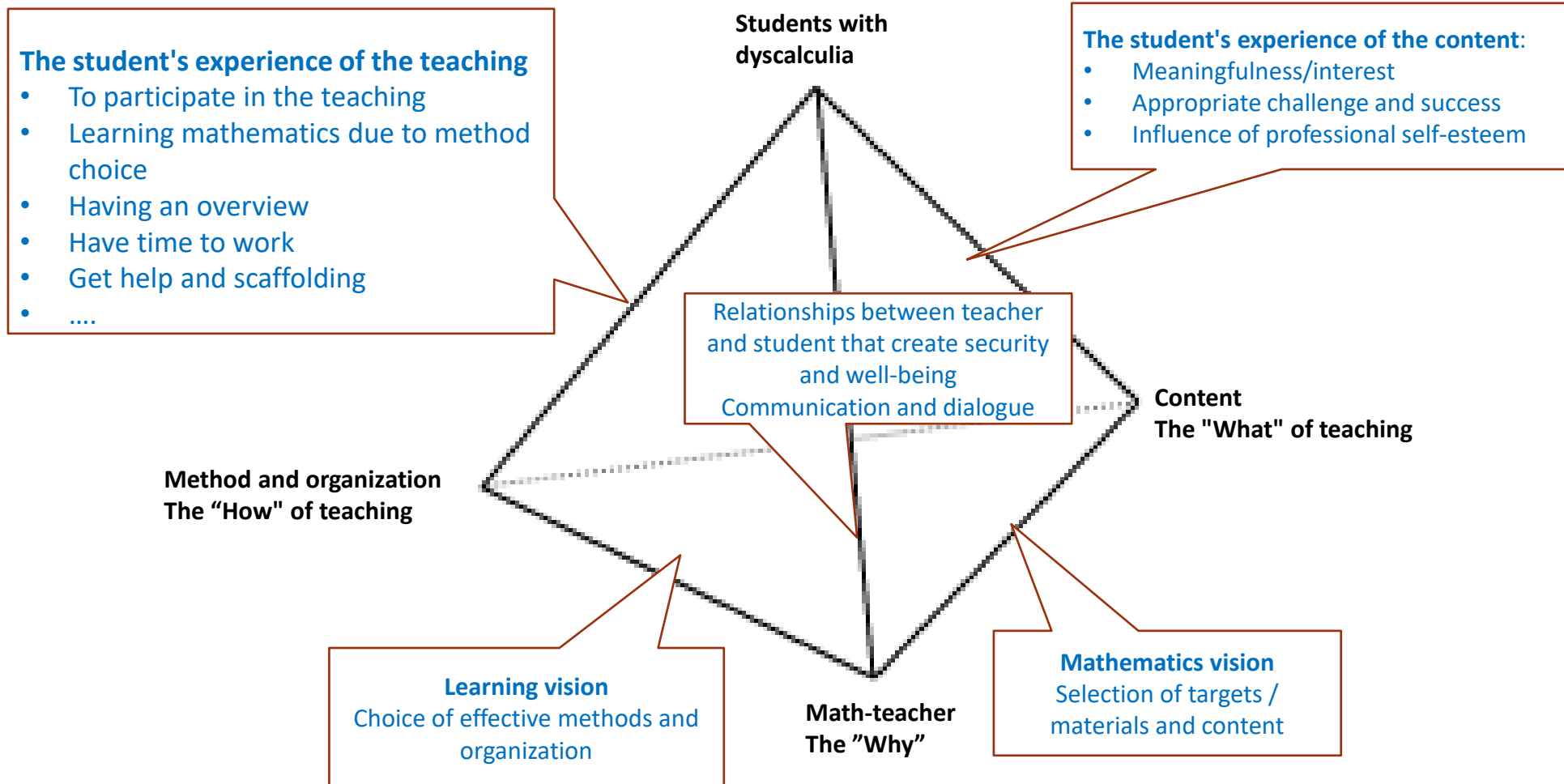


The intervention

- A total of nine full-day meetings were held with the four math-advisors and the projectmanager, where processes and observations leading up to the meeting were analyzed and assessed.
- This was followed up by proposals for subsequent pedagogical, didactic and academic choices for each individual student.
- The intervention consisted partly of one-to-one teaching outside the class and partly as support (and observation) in class



A didactic overview - the "tetra" model



A math overview

Tal og antal				
ANS	Evner på Weberbrøken			
Subitizing	Evnen til at se "Små mængder" (Adler)			
Talnavne –	udpeger – skriver og læser 1 - 20	udpeger – skriver og læser 1 – 50 evt. navneforvirring ved 35 og 53	udpeger – skriver og læser 1 - 100	udpeger – skriver og læser 1 - 1000
Koble antal til symbol	1 – 20 i varierede repræsentationer	1 – 50 i varierede repræsentationer	1 – 100 i varierede repræsentationer	1 - 1000 i varierede repræsentationer
Ordning af tal efter størrelse (talkort)	Ordner 1 – 20 i varierede repræsentationer herunder før og efter	Ordner 1 – 50 i varierede repræsentationer	Ordner 1 – 100 i varierede repræsentationer	Ordner 1 - 1000 i varierede repræsentationer
Ordning af tal på tallinje	Placerer 1 – 20 på stregangivelse af tallinje og tom tallinje	Placerer 0 – 50 på stregangivelse af tallinje og tom tallinje	Placerer 0 – 100 på stregangivelse af tallinje og tom tallinje	Placerer 0 – 1000 på stregangivelse af tallinje og tom tallinje
Nul	Ved at tallinjen starter med nul			
Forlæns tælling	Tæller forlæns op til 20 – med vilkårlig start Fokus på overgange	Tæller forlæns til 50 – med vilkårlig start Fokus på overgange	Tæller forlæns til 100 – med vilkårlig start Fokus på overgange	Tæller i sekvenser Fokus på overgange
Baglæns tælling	Tæller baglæns i intervallet 1 - 20 – med vilkårlig start Fokus på overgange	Tæller baglæns i intervallet 1 - 50 – med vilkårlig start Fokus på overgange	Tæller baglæns i intervallet 1 - 100 – med vilkårlig start Fokus på overgange	Tæller i sekvenser Fokus på overgange
Tallinje som redskab	Gengiver tallet før og efter og	Placerer tal rigtigt på tallinje fra	Beskriver afstande på	Kan anvende skalaer i

Observation 1

- It was common for the students to mention a frustration about why they are good in some subjects but weak in mathematics. It had developed very weak math self-confidence. A self-confidence that increased as they got older. It is a thought that two student developed school refusal. Despite the low self-esteem, three of the students had a remarkable strong will to want to learn- after all, they have experienced "learning something" in other subjects.
- BUT a willpower that had to be kept alive so it didn't burned out. They need an adult contact to "move on" and as a safety factor.
- The conversations with the math advisor had also increased the student's acceptance of their own difficulties and thus created a "liberation" that had evoked new strength

Observation 2

- 3 – 4 of the students showed a certain fear of failing in the class situation. They were nervous making their difficulties visible. There was a need for security by having a "good partner" or an adult nearby.
- Several talk about strong sadness participating in class tests.
- The students' mathematics teachers generally express great uncertainty about how to organize the teaching so that the presumed dyslexic experience some form of participation.

Observation 3

- Confusion and forgetting are two central factors when the math advisors describe the students' learning.
- It is a common feature that students talk about how difficult they find it to store even very simple numerical knowledge and simple arithmetic skills. It should be noted that it is remarkable how little progress there is in the learning of even simple knowledge/skills,
- Example: A student for a period of 4 months with two lessons a week practiced arithmetic strategies in the plus table - where only one seems (which was a great discovery for the student) to have memorized (that, for example, $8 + 9$ can be thought of as $8 + 8 + 1$)

Observation 4

- There are examples of tasks communicated on paper creating a greater resistance or insecurity to fail than oral formulated tasks and the use of concrete materials.
- However, there are limitations in the effect of concrete materials. In particular, the case boy C clearly expresses a negative attitude with concrete materials/games which have no contact with his everyday life, e.g. centicubes.
- There are examples of students who have found behavioral strategies, so that it appears to the teacher as if they are participating in the class's mathematics lessons despite having major academic problems. Strategies which are a kind of prevention agenda, so that the academically weak level is not made visible.

A short summary - recommendations

- Create relationships that counteract the experience of "stupidity" in mathematics
- Create relationships where it is acceptable and part of learning to fail, e.g. through peer training or tutoring arrangements
- Use the student's mastery of linguistic forms of representation to develop conceptual understanding
- They can typically read text assignments and understand the context. However, several are unsure of what they "should use the numbers for". There is possibly an unnecessary barrier, as it seems that it is the student's lack of numeracy that slows down the insight into which types of calculations are to be used and not the problemsolving.
- Understand and further develop the compensatory skillsstrategies and remembering numbers.
- Focus on knowledge building and understanding – leave the skills to e. g. digitale tools
- Choose what the student needs to know carefully as it takes an extremely long time for the student to learn and retain
- Increase the use of compensatory tools - rather ask if there is something that "machines" cannot do than the other way around
- Increase the use of visualization including drawing when solving math problems
- Ensure fast and ongoing feed back
- Organize the above in a multi-year professional support not quick fix courses