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Formative assessment in early mathematics teaching – a comparison of two different approaches

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Introduction

Especially with regard to inclusive education, teachers must recognize the potentials and preconditions of students during the learning process to build on these for successful teaching (e.g. Moser Opitz & Nührenbörger, 2015). However, the formative use of diagnostic information to support decisions is an unfamiliar concept for many teachers (e.g. Zeuch et al., 2017). Studies on the implementation of formative assessment (e.g. van Geel et al., 2016) suggest that structured and curriculum-based measures have positive effects. However, meta-analyses show that there is considerable need for research to understand the conditions of successful implementation (e.g. Kingston & Nash, 2011).

“Formative Assessment in Inclusive Early Mathematics Teaching” is a design-oriented research project in Germany. An in-service program was developed with the focus on diagnosis and individual support. The implementation of two variations of formative assessment – planned for interaction (PI) and curriculum embedded (CE) (e.g. Shavelson et al., 2008) – will be compared. In the approach “Födima-PI” the teachers learn to develop diagnostical questions and support activities, in “Födima-CE”, they use prepared diagnostic and support tasks.

Research design

The project explores how teachers and multipliers can be effectively qualified for professional support-oriented diagnostics and how successful transfer processes into practice can be supported (e.g. Gräsel, 2010). In 2021/22 134 teachers from 37 schools will participate in the project. The research goals concern the evaluation of the acceptance and professional effectiveness of the training concepts and the qualification program. In the first year, the project focuses the following research questions:

- 1 How do teachers evaluate the conceptual framework?
- 2 What are the effects with regard to attitudes, pedagogical content knowledge and performance?
- 3 How effective are the concepts with regard to the development of basic mathematical skills, motivational variables and the self-concept of students?

A *pre-post-follow-up-test design* includes standardized questionnaires and interviews to gain information about the participants' *self-efficacies*, *pedagogical content knowledge* and their *attitudes*

towards formative assessment before and after their participation, to evaluate the effectiveness of the program. Also, the *acceptance* of the developed in-service program will be surveyed.

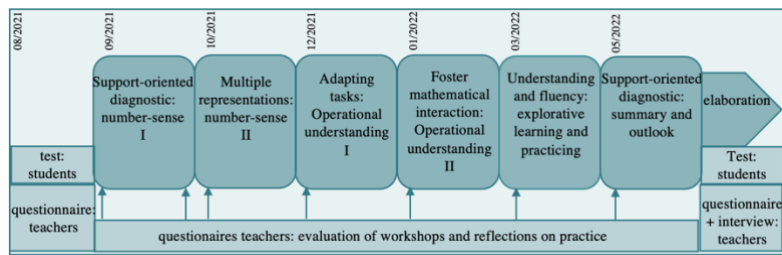


Figure 1: Födima year 1

We expect a positive effect in favor of the Födima-CE approach due to its somewhat tighter structuring and we assume a moderator effect in the form that high pedagogical content knowledge and a positive self-efficacy of the teachers are associated with better effects for the Födima-PI approach.

After evaluation, the two variations will be elaborated into a qualification program for facilitators. There will be further research related to this.

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