

## IMPACT OF RESEARCH ON MATHEMATICAL LEARNING DIFFICULTIES ON TEACHING AND LEARNING: A BRIDGE TOO FAR?

[Keynote](#)

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For a few decades, the topic of mathematical learning difficulties have been receiving a great deal of attention in scientific research. Studies from different theoretical perspectives (neurocognitive and developmental perspectives; mathematics as low achievement from sociological and didactic perspectives) have dealt with questions of the development of numerical understanding as well as with math difficulties. The field of numerical cognition has been working for some decades under the assumption that impairments in number processing in infancy and preschool age are an important precursor to math learning difficulties in primary school years. Other theories suggest that MLD originate from cognitive abilities that are not unique to math, such as impairments in working memory or executive functions. SES has been identified as an important factor; in recent times, especially with regard to the multilingualism in classrooms, linguistic factors are discussed as well. Based on different theoretical approaches, numerous diagnostic tools and pedagogical interventions were developed and evaluated in terms of efficiency. However, the efficiency studies mainly give proof for effects achieved by specialized trainers. The effects are much lower if the diagnostic tools and pedagogical interventions are carried out by teachers in schools. After decades of intense research, the question arises how science can guide the general and special needs education in mathematics. Science should have an impact on different levels: On a macro-level, there is growing awareness of the potential role ECEC can play in compensating for the adverse effects of early educational disadvantages. According to Duncan (2007) early math is the strongest predictor for later achievement. Large scale assessments like PISA and TIMSS show large within and between countries differences in quality of education. That does not always apply to the absolute SES. We have to take a closer look on the curricula of the countries: there is a gap between the curricula and reality in early grade education, with more demanding curricula in low performing countries than in higher performing countries. As a consequence, a systematic, cumulative acquisition of knowledge, to build up a stable basis of competencies, is made impossible. The current research knowledge has to be integrated into teacher education in order to enable teachers to make use of e.g. RTI diagnostics and support or intervene in a sensible way. The implementation of intervention programs inside the school requires, on a meso-level, the acceptance of the training and an adaption of scholastic conditions to those of the intervention program. Lastly and importantly, on an individual level the support program has to be adapted to the children's specific individual prerequisites and needs.