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strategies : Teachers and students designing digitally  
supported science learning

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## RECENT DISSERTATIONS

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From inclusive practices to personal strategies –  
Teachers and students designing together digitally supported science learning  
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#### Abstract

The main purpose of this doctoral thesis is to co-design and examine digitally supported inclusive practices in science learning. Inclusive practices aim to provide quality education and quality learning opportunities for all students. Inclusive practices are characterised by process-oriented development that takes into account a student's personal abilities and needs concerning both knowledge and competencies as well as the classroom context. Since there are very few research-based models for inclusive practices, the longitudinal educational design research (EDR) project aimed to co-design digitally supported inclusive practices at the grassroots level with researchers, teachers and students. The EDR project took place during two years in a primary school, where inclusive education was employed as part of teacher collaboration. The participating class (44 students; 10 students with learning difficulties [LD]) had two primary teachers and one special education teacher, the defender of this thesis. The EDR consisted of four macro-cycles, which intended to increase understanding of co-designing and implementing inclusive practices in science learning. The data was collected through video recordings, questionnaires, students' notes, the teacher's memo and interviews; it was analysed via quantitative analysis of frequencies, qualitative content analysis and co-occurrence network analysis.

The thesis is comprised of four publications that form a holistic picture of the possibilities of digital technology: Publication I reports the results of the first macro-cycle of the EDR in which the participants investigated the possibilities of smartphones and applied them in a water project. Publication II discusses the benefits of using a smartphone in science learning from a student's personal learning perspective. Publication III describes the EDR project's final macro-cycle, electricity project, in which students utilised personal strategies that were supported by the teacher through respectful grouping, differentiated learning tasks and a reflective discussion after lessons. Finally, Publication IV evaluates the development and implementation of the inclusive practises throughout the EDR project from the perspective of the LD students.

As its theoretical contribution, this thesis weaves together the two frameworks of inclusive practices in science learning. First, the digitally supported inclusive science learning supports a student's personal learning through the differentiation through the use of multimodality. The teacher employs a student's personal strategies when preparing a collaborative learning project, and during the project the support aims at giving intensified support and structured guidance in collaborative activities where students require various competences. Second, such a long-term, reflective, co-designing project supports both the use of digital technology and the development of inclusive practices. LD students benefit from a process-oriented, comprehensive, structured and reflective use of technology in their learning. Differences between students' digital competencies bring a new element to the classroom alongside academic knowledge, both of which affirm LD students' social status in the classroom. The thesis emphasises that a long-term co-designing project can both develop teaching practices and engage students to develop their personal learning, and hence, promote inclusive education at the grassroots level.

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