



Improving Reading Outcomes for Disadvantaged Students: Scaling and Implementing Interventions

Research Proposal for the Novo Nordisk Foundation

Simon Calmar Andersen



SIMON CALMAR ANDERSEN, PHD, PROFESSOR
DEPARTMENT OF POLITICAL SCIENCE, AARHUS UNIVERSITY, DENMARK

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Summary

About 15% of all 15-year-old students in Denmark are considered to have very low reading skills, and are at high risk of attaining no education beyond 9th grade (Hummelgaard, 2017). Many interventions aimed at improving students' reading skills have proven effective in small-scale evaluations (Bergman, 2019; Mayer et al., 2018; York et al., 2018). However, when educational interventions include more than a thousand students, effect sizes tend to approach zero (Andersen & Hvidman, 2020b; Castro et al., 2015; Kalil, 2015). This problem of scalability is recognized in the literature, yet there exists very little systematic, research-based knowledge on how to solve it. Understanding how effective educational interventions can be implemented at large scale is therefore one of the biggest challenges, not just in Denmark, but in developed countries all over the world.

The overarching vision of this research project is to develop and test a reading intervention that can be implemented so effectively that it benefits all children with reading difficulties in Denmark. To accomplish this, the research project is divided into four stages, each with its own goal or purpose. In Stage 0, the prologue, the goal is to develop the core reading program by building on the best available evidence internationally. We have previously found strong effects of a shared book reading program targeting parents and their children in primary school. Shared book reading refers to a process in which children, while reading a book with an adult (parent or teacher), hear open-ended questions that invite them to reason, draw inferences and transcend the here-and-now. This highly interactive process has been shown to support children's language learning (Grøver

et al., 2020). We want to build on and further improve our existing shared book reading program by collaborating with world-leading experts as well as local and national governments in Denmark. In this project, the core program will be targeted at children in 1st and 2nd grades and run for most of a school year. The participating families will receive both digital and physical books that they can read together, and different integrated interventions will support the motivation of both children and parents.

In Stage 1 we plan to invite a randomly selected one-third of all public schools in Denmark (about 400 schools with around 16,000 students at both grade levels) to participate in the program. Our main claim is that the scaling of educational interventions fails because implementation support is not scaled proportionally. The main objective of this first trial, therefore, is to study both whether and how implementation support should be scaled up in order to maintain the positive effects often found in small- and medium-scaled interventions. Building on state-of-the-art research from different strands of research on implementation, we present a theoretical framework that guides how we will design the implementation support targeting school managers, teachers and families. To study the implementation process, we will develop a number of novel ways of measuring implementation at all levels of the process, from managers to individual families, and combine these behavioral data with Denmark's exceptional register data on schools and families.

In Stage 2 we will build on the results of Trial 1 in order to design a second trial. By running two sequential trials, we will be able to learn from the first trial and address any weak links in the implementation process. The goal of this stage is to demonstrate the robustness of a large-scale implementation (involving another 400 schools with about 13,000 students at both grade levels) of the shared book reading program targeting vulnerable students.

The purpose of the project's final Stage 3 is to disseminate the results and work with our advisory group (whose members are from the Ministry of Education and the second-largest municipality, the City of Aarhus) on a potential national roll-out of the program. The per-student cost of the program, including implementation support, is around 1% of the annual cost per student in public schools. If we succeed in improving reading skills—especially of the most vulnerable students—this will provide a strong business case for implementing the program across all schools in Denmark (and beyond).

The research project will run for four years from 2021 to 2025 with a budget of 20 million DKK. The majority of the budget will be used to finance the two large-scale interventions. The contribution of the research project is therefore twofold. First, it aims to make a direct impact on learning in vulnerable Danish families by scaling an evidence-based, low-cost intervention to

thousands of children. Second, in order to produce a societal effect beyond the children reached, and to bridge the gap between research and policy, the initiative will analyze, document and disseminate insights on how to implement social programs successfully at scale. The large scale of the project allows us to leverage a series of randomized controlled trials to study how to support the implementation of this intervention. By combining unique data on implementation behavior with register data on all primary school students and their families in Denmark, these interconnected trials will create knowledge that will be of utmost importance to local and national governments as well as the international research community.



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