Mapping the landscape: A systematic review of implementation research in Nordic Studies in Mathematics Education

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In this presentation, we systematically examine implementation research reported in the journal Nordic Studies in Mathematics Education (NOMAD), focusing on mathematics education innovations implemented in Nordic countries over the past three decades. In particular, we sought to find answers to: What kind of innovations are reported in the papers related to implementation research in the Nordic countries in NOMAD. We identified four distinct kinds of innovations: a new teaching method, a new tool or resource for teaching and learning mathematics, a new method of learning mathematics, and curriculum reforms and textbook innovations. By identifying and categorizing different types of innovations, we contribute to understanding the research landscape in this field, especially in Nordic countries.

## Introduction

Advancements in mathematics education research often lead to the development and implementation of innovative approaches to teaching and learning (e.g., Ahl et al., 2023). Innovations aiming to enhance students’ understanding and mastery of concepts, problem-solving, and overall mathematical proficiency. Implementation research (IR) plays a pivotal role in evaluating the impact of these innovations, contributing to evidence-based decision-making. This paper presents the early results of a systematic review of IR papers published in NOMAD. By analyzing these papers, we aim to gain insights into the trends and advancements in mathematics education research and explore how different countries have embraced and implemented innovative teaching and learning practices. In this paper, we seek to answer the question: What kind of innovations are reported in the papers related to IR in the Nordic countries in NOMAD?

Based on an extensive review of IR-studies, covering education in general and internationally, Century and Cassata (2016) defined IR as “a systematic inquiry into innovations enacted in controlled settings or ordinary practice, the factors influencing innovation enactment, and the relationships between innovations, influential factors, and outcomes” (p. 170). We have employed this definition in our study. In their review, Century and Cassata (2016) grouped 137 papers into five categories of reasons for conducting IR, namely: (1) Inform innovation design and development; (2) Understand whether (and to what extent) the innovation achieves desired outcomes for the target population; (3) Understand relationships between influential factors, innovation enactment, and outcomes; (4) Improve innovation design, use, and support in practice settings; and (5) Develop theory (p. 174). We used these five reasons as the exclusion criteria. For instance, we included studies whose aims aligned with any of the five categories. We followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) (Moher et al., 2009) to structure the review methodology. After conducting the selection process in four steps: identification, screening (abstract and title), eligibility (full-text screening with inclusion and exclusion criteria), and inclusion, 16 papers were included in the analysis.

## Results and discussion

Based on the types of innovations reported in the papers, these can be divided into four categories. The first category is *innovations introducing new teaching methods*, including alternative teaching strategies, a new teacher PD model, and new methods for teaching different areas, such as promoting problem-solving reasoning, modelling, and interdisciplinary teaching. The second category included *introducing a new tool*, such as a digital technology tool or resource for teaching and learning, such as teacher guides, assessment evaluation materials, and a set of non-routine word problems. In the third category, we found *new methods of learning as innovations*. In particular, new methods of learning geometry, specifically focusing on reasoning. The fourth category is *curriculum reforms and textbook innovations*. Two out of three articles in this category focused on curriculum reforms from a historical perspective (the 1960s and 1970s), whereas the third focused on introducing the history of mathematics in new curricula in Denmark, Norway, and the US. Among the four categories, the most common innovation reported in NOMAD was the implementation of a new teaching method.

In this review, we solely included NOMAD-papers. We are aware there are other platforms where the implementation of innovations in mathematics education is reported in Nordic research communities. Hence, it is worthwhile to expand the review by incorporating publications from other journals to identify the gaps in mathematics education innovations within the Nordic region.

## **References**

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