



BRILL

Impact Sheet

Aguilar, M. S., Ahl, L. M., Jankvist, U. T., & Helenius, O. (2023). Towards characterization of scale and scaling in implementation research within mathematics education. *Implementation and Replication Studies in Mathematics Education*, 3(1), 99–122. DOI: 10.1163/26670127-bja10012

1 Problem Addressed

The problem addressed in the research paper is the need for more conceptual clarity on the notions of scale and scaling in the context of implementation research within mathematics education. The terms “small scale,” “large scale,” “at scale,” and “scaling” are widely used, but are often handled tacitly, leading to diverse interpretations and to a lack of consensus. The study in this paper aims to provide a clearer understanding of these terms by gathering opinions from experienced researchers and reviewing available literature on scale and scaling in mathematics education.

2 What Is Researched and How?

The research study investigated the conceptualizations of scale and scaling in implementing educational innovations in mathematics education. The research was conducted using a two-step approach:

The first step is an adapted Delphi technique. A panel of 14 educational researchers — mainly from the field of mathematics education — with experience in large-scale implementation of educational innovations or reforms was identified and selected. These experts were invited to answer two scale-related questions via email, with all agreeing to participate. Their responses were compiled into a shared document for data analysis.

The second step is a literature review. The researchers reviewed 22 articles included in two special issues related to implementing and scaling innovations in the journals *Educational Studies in Mathematics* (Maass et al., 2019) and *ZDM — Mathematics Education* (Roesken-Winter et al., 2015). The articles were read and analysed, extracting data on definitions of scale and explanations of

what was referred to when talking about small scale, large scale, scaling, and at scale.

Data analysis was guided by Coburn's (2003) four dimensions of scale. The authors defined indicators for each dimension and sought these indicators in the explicit definitions or characterizations of the concepts of "large scale," "small scale," "scaling," and "at scale" stated by the experts or declared in the research articles. When explicit definitions were not found, the indicators embedded in the implicit formulations of these concepts were identified.

3 Implications and Significance

The paper highlights the need for more clarity in defining small- and large-scale implementation projects in mathematics education research, and it proposes ways to deal with this question, such as specifying scale in terms of organizational levels. Particularly, the paper suggests considering factors such as contact, material, and organizational factors to differentiate between small- and large-scale implementation projects. Moreover, the research introduces the concept of medium-scale implementation projects, which can bridge the gap between small- and large-scale projects. It provides examples of different scenarios in which medium-scale projects can be conceptualized.

The insights gained from this research can inform future implementation research in mathematics education by providing a characterization for understanding and discussing scale and scaling — and this not only in terms of quantitative measures, but also in terms of the qualitative features of the innovations in question.

Reference

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- Roesken-Winter, B., Hoyles, C., & Blömeke, S. (Eds.). (2015). Evidence-based CPD: Scaling up sustainable interventions [Special issue]. *ZDM — Mathematics Education*, 47(1).