

# Qualitative follow-up study on the implementation of NEM mathematics textbooks

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## Problem addressed

This qualitative follow-up study builds on a baseline investigation of mathematics teachers in rural and Indigenous public schools, focusing on how they reinterpret and adapt the Nueva Escuela Mexicana (NEM) textbooks under conditions of limited resources. These adaptations generate heterogeneity in classroom practices and raise questions about the capacity of textbooks to serve as effective carriers of reform. While the baseline study relied on teacher self-reports to document tensions linked to language, class size, time constraints, and material shortages (Nava-Guzmán et al., 2025), direct classroom evidence is still needed. Implementation research emphasizes the significance of examining how end users, material traits, organizational conditions, and support factors influence enactment (Ahl et al., 2023; Century & Cassata, 2016).

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Within the international mapping of implementation research in mathematics education, this problem can be read as part of a wider effort to understand how innovations travel through curriculum reforms, curriculum resources, and professional development, and how these carriers interact with local conditions. Ahl et al. (2023) show that curriculum reform (CRf), curriculum resources (CRs) such as textbooks and teacher guides, and professional development (PD) constitute three main forms through which innovations reach teachers, with studies increasingly focusing on how these carriers function in practice. Their mapping also highlights that many projects are investigated from the perspective of teachers' enactment of reforms, while planning, design, and fine-grained classroom processes are less frequently documented in depth.

From Century and Cassata's (2016) perspective, these issues can be interpreted through interacting "spheres of influence" that link characteristics of the innovation ("the it"), individual teachers, organizations, and broader environments. In the NEM context, tensions related to language, time, and material conditions are not merely background constraints but part of the configuration of influential factors that shape how textbooks are reinterpreted in rural and Indigenous schools. This follow-up study therefore addresses a double gap: it provides classroom-based evidence on NEM textbook enactment and contributes conceptual clarity about how curriculum resources operate as reform carriers under resource constraints.

### **Theoretical and methodological approach**

The study combines implementation research frameworks with a qualitative case design. The theoretical perspective of spheres of influence (Century & Cassata, 2016) and selected concepts from Ahl et al. (2023) guide the analysis of how materials, teacher knowledge, and organizational settings interact. Eight teachers will be selected to represent two theoretically relevant contexts: four from rural schools and four from Indigenous schools. Data will include semi-structured pre-lesson interviews (60–75 minutes), two non-consecutive lesson observations using an episode-based protocol (focusing on in-the-moment decisions, mediation of language, task management, and whole-class discussion), post-lesson interviews on critical incidents, and the collection of artefacts (textbook excerpts, teacher guides, lesson plans, and student work). The unit of analysis will be episodes in which a textbook resource is interpreted, recontextualized, and enacted. Transcripts and field notes will undergo open coding, construction of case matrices, pattern analysis, cross-case contrasts, and integrative mapping to link observed practices with their corresponding spheres of influence.

## **What is implemented**

The study focuses on the implementation of the reform-oriented NEM textbooks. It examines the process of their classroom enactment, exploring how mathematics teachers in rural and Indigenous public schools interpret and adapt textbooks, tasks, projects, and prompts in real-time lessons. It builds on the baseline insights into teacher reports (Nava-Guzmán et al., 2025) by generating direct classroom evidence of how the textbooks function in practice. Through pre-lesson interviews, episode-based classroom observations, post-lesson interviews, and the collection of artefacts, the study documents how resources from the textbooks are recontextualized and enacted in practice. The implementation focus is on identifying how language mediation, task management, and organizational conditions influence teachers' decisions and classroom dynamics, while also addressing frictions already signaled in teacher reports—linguistic and cultural barriers, organizational and material limits, and professional support gaps—and situating them within broader spheres of influence involving materials, school contexts, and available support.

In Ahl et al.'s (2023) mapping review, textbooks and related materials are treated as curriculum resources (CRs), one of three main innovation carriers together with curriculum reform (CRf) and professional development (PD). Our follow-up study adopts that perspective by following NEM textbook tasks from the written page into the enacted lesson, examining how teachers select, combine, omit, or transform them under local constraints. Within Century and Cassata's (2016) framework, attention to language mediation, task management, and organizational conditions allows each textbook-based episode to be located within spheres of influence, clarifying what is actually implemented when teachers "use the textbook."

## **Potential importance and significance**

The study will provide fine-grained accounts of how teachers interpret, transform, and assess reform textbook tasks in practice. To begin with, it will specify mechanisms behind the heterogeneity observed in teachers' reports (Nava-Guzmán et al., 2025). By integrating episodes with spheres of influence, it will generate an integrative explanatory scheme to identify where and how to act—whether through materials, teacher development, or school organization—and in what time frame. The contribution is not causal estimation but the identification of plausible mechanisms and transferable conditions under which the NEM textbooks can function as effective reform carriers in diverse and resource-constrained public schools (Ahl et al., 2023; Century & Cassata, 2016).

At field level, this project responds to two needs in recent work on implementation research: detailed accounts of how innovations are enacted in practice, and clarity about how innovations, influential factors, and outcomes are defined and related (Ahl et al., 2023; Century & Cassata, 2016). By specifying NEM textbooks as CRs, situating them within spheres of influence, and analyzing their enactment at the episode level, the study offers a structured case that can be read in dialogue with the literature on implementation and replication. It develops an explanatory scheme to guide the design of future NEM materials and the planning of PD that takes textbook use seriously. It also informs school-level decisions in rural and Indigenous contexts by identifying plausible mechanisms and conditions that may travel across settings, rather than by estimating general impacts.

## References

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