

Localized replication of the OECD Global Teaching InSights in Mexico: A socioepistemological perspective

Olimpia Isaura Gómez Pérez ¹ 

Jesús Enrique Pinto Sosa ² 

Problem addressed

The OECD *Global Teaching InSights* (GTI) study (OECD, 2020) provided large-scale, video-based evidence on the teaching of quadratic equations across eight education systems, including Mexico. To enable cross-country comparison, GTI deliberately focused on a common mathematical topic and applied a shared analytical framework comprising six domains of teaching quality. While this standardization is essential for international comparability, it also raises questions about what may become less visible when teaching is examined through common categories across diverse educational contexts. This tension is particularly relevant in Mexico, where the current national curriculum emphasizes contextualized learning and

¹ olimpia.gomez@correo.uady.mx

Universidad Autónoma de Yucatán, Mexico

² psosa@correo.uady.mx

Universidad Autónoma de Yucatán, Mexico

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connections between school knowledge and students' communities (SEP, 2024). Socioepistemological Theory, in turn, conceptualizes mathematical knowledge as socially constructed through culturally and historically situated practices (Cantoral, 2016). From this perspective, the question is not whether GTI's framework is valid, but to what extent its common indicators capture, reframe, or overlook locally situated processes through which mathematical knowledge is produced, legitimized, and experienced in Mexican classrooms. Examining GTI evidence through a locally grounded theoretical and epistemological lens can therefore illuminate both the explanatory reach and the contextual boundaries of internationally standardized indicators of mathematics teaching.

How it is addressed (theory/methods)

This study employs what we term a *localized replication* of the GTI study using the Mexico dataset (103 teachers, approximately 2,783 students, 794 artefacts, 412 coded lessons). We use *localized replication* to describe a replication strategy that retains the empirical and analytical core of a prior study while systematically re-examining its analytical categories and interpretations through a locally grounded theoretical and epistemological lens. This conceptualization builds on the view that replication does not require exact duplication, but rather that its outcomes provide diagnostic evidence about claims from prior research (Nosek & Errington, 2020), while recognizing that meaningful replication also depends on whether constructs and their interpretations remain valid across contexts (Flake et al., 2022). Thus, localization adds an explicit epistemic operation to replication: examining what internationally derived analytical categories capture, transform, or overlook when viewed through this locally grounded lens.

Theoretical framing: Socioepistemology (Cantoral, 2016; Cantoral et al., 2014; Cantoral et al., 2015) provides this locally grounded lens by conceptualizing mathematical knowledge as socially constructed and legitimized through culturally and historically situated practices. The study examines how GTI's six domains align with, diverge from, or may overlook socioepistemological processes in Mexican mathematics classrooms.

Data sources: GTI video codings across six teaching-quality domains; artefacts of instruction (lesson plans, assessments); student questionnaires on engagement, enjoyment, and perceived cognitive demand; and contextual variables (urban/rural, public/private, region, SES).

Methods: (1) reproduce GTI analyses of teaching quality using the full Mexico subset; (2) reanalyse and reinterpret the six domains through socioepistemological categories, including discursive practices, processes of institutionalization, and forms of exclusion; (3) contrast student-reported

emotions and perceptions with observed classroom practices; and (4) examine variation across educational and socioeconomic contexts (urban/rural, public/private, SES quintiles, and regions).

The approach therefore combines reproduction of the original analytical procedures with theoretically and contextually situated reanalysis. It is related to existing approaches that allow replication to introduce theoretically meaningful variation (Hüffmeier et al., 2016). In this study, localization serves an additional purpose: not only to assess whether previous findings can be reproduced or generalized, but also to examine how the conceptual framework through which those findings were originally produced operates when applied in a different educational context.

What is implemented/replicated

The project retains GTI's empirical and analytical core by using its video codings, instructional artefacts, student and teacher questionnaires, and teaching-quality framework, while reanalysing and reinterpreting this evidence through Socioepistemology. Specifically, it:

1. Examines the extent to which GTI's six domains reflect practices of knowledge production in Mexican mathematics classrooms.
2. Maps correspondences and tensions between GTI categories and socioepistemological constructs.
3. Examines what GTI's framework captures or may overlook—including exclusionary discourse and contextualized meaning-making—when representing the teaching of quadratic equations in Mexico.

This localized replication preserves sufficient continuity with the original study to examine its findings and analytical categories while deliberately introducing a locally grounded theoretical and epistemological lens. In doing so, it examines both the explanatory reach and the contextual boundaries of internationally standardized indicators of mathematics teaching.

Potential importance and significance

- A. **For replication research:** Employs what we term localized replication, a context-sensitive replication strategy that complements methodological continuity with an explicit epistemic operation: re-examining prior analytical categories and interpretations through a locally grounded theoretical and epistemological lens. This approach engages with ongoing discussions about replication, construct validity, and generalizability by making visible the role of locally situated knowledge

in evaluating the explanatory reach and contextual boundaries of prior findings.

B. For mathematics education: Provides evidence on how the teaching of quadratic equations in Mexico can be understood when internationally derived indicators of teaching quality are examined alongside socioepistemological processes, integrating cognitive and affective dimensions with locally situated practices of mathematical knowledge production.

C. For policy: Provides a basis for examining the extent to which internationally derived indicators can inform educational decision-making across contexts, while examining whether and where locally situated discourse, institutionalization, and cultural practices may require additional consideration.

By combining GTI's internationally comparable evidence with a socioepistemological lens, this study illustrates how *localized replication* can preserve the value of cross-context comparison while examining epistemic and contextual dimensions that may be less visible within standardized analytical frameworks. In doing so, it contributes to a more context-sensitive understanding of the explanatory reach and contextual boundaries of international indicators of mathematics teaching and learning.

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