

MATHEMATICAL MODELING AND SOCIAL JUSTICE IN K-12 MATHEMATICS EDUCATION: A SYSTEMATIC LITERATURE REVIEW

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Mathematics educators have recently shifted towards prioritizing social justice within the classroom, reflecting a broader recognition of the importance of addressing societal inequities and fostering inclusive learning (Buell & Shulman, 2019; Gutstein & Peterson, 2013). There is additional consensus that mathematical modeling can help students connect their experiences outside the classroom with big ideas in K-12 mathematics (Ball et al., 2005). These perspectives underscored the urgency of addressing themes such as cultural diversity, sociopolitical topics, and environmental issues relevant to learners in diverse mathematics classrooms worldwide (Aguirre et al., 2019; Jung & Magiera, 2023; Felton-Koestler, 2020; Rosa et al., 2022).

Mathematical modeling and social justice research approaches are rapidly expanding, encompassing diverse perspectives and epistemologies worldwide (e.g., Barbosa, 2006; Jung & Brady, 2023; Orey & Rosa, 2023). It is important to summarize these views and understand the different approaches, designs, and methods to guide informed research lines that adds to this emerging field. With this goal in mind, we embarked on a systematic literature review to analyze the current state-of-the-art of mathematical modeling and social justice development research. In this poster, we present one research question that has guided our first efforts to summarize this field of research: *What are the predominant themes at the intersection of mathematical modeling and social justice across the research in mathematics education?*

Methodology. In this study, we employed a systematic literature review (Torres-Carrión, 2018; Snyder, 2019) to explore the integration of social justice into K-12 mathematical modeling. We searched six relevant academic databases (Web of Science, Scopus, Springer, JSTOR, Taylor and Francis, and Eric) using keywords (e.g., social justice, equity, culturally responsive, and mathematical modeling). A multi-stage screening process ensured methodological rigor and minimized bias (Moher et al., 2015). At first, two independent reviewers categorized titles as “relevant,” “irrelevant,” or “maybe” using Covidence, a website for multi-layer screening. Reviewers did this process by ensuring each paper was related to mathematical modeling, social justice, and K-12 education. Discrepancies were resolved by a third reviewer. This process reduced the initial pool from 5,685 to 539; we kept papers classified as “relevant” and as “maybe”. After abstracts were similarly reviewed, we conducted full-text analyses of the remaining studies.

Summary of results. Our ongoing process has completed the initial screening phase, where we evaluated the titles and abstracts of the papers. As we transition to the full-text screening stage, preliminary discussions among the research team have illuminated the potential development of several thematic codes: ethnomodeling, teacher knowledge of social justice and

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mathematical modeling, culturally responsive pedagogical approaches on mathematical modeling, and the evolution of mathematical modeling and social justice in education. In this poster session, we will provide a summary of the interaction between modeling and social justice by sharing the relevant themes, subthemes, details, and recommendations for future work.

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