

AN EMBODIED PERSPECTIVE ON DIVERSITY IN MATHEMATICS EDUCATION

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The topic of diversity and the need to account for various developmental and cultural paths increasingly gains attention within mathematics education. This growing concern in different learning conditions arising from aspects like language, culture, (dis)ability has been reflected in the recent past in their repeated centralization in conference panels (e.g., Prediger on multilingualism at CERME-12; a panel discussion on the consequences of the Covid pandemic for equity in classrooms at ICME-14; Wagner's call for diversification of mathematics education at PME-44). An ESM special issue in progress has been dedicated to the role of racism in math education, following an editorial in response to the Black Lives Matters protests in 2020 (Wagner et al., 2020). At the same time, embodiment as concerning the role of lived bodily experiences and embodied interactions, including gestures, motor coordinations, eye movements, full body actions, for understanding mathematics has been acknowledged with growing interest within mathematics education (e.g., Abrahamson et al., 2015; Núñez et al., 1999; Shvarts et al., 2021). Following this, it does indeed matter how learners' bodies occupy and act in space we live in (Sinclair & de Freitas, 2019), with our physical and cultural profiles influencing our mathematical thinking and learning. The embodiment lens hence allows for a perspective on diversity that emanates from these conditions as central to knowing and understanding and hence, to mathematical education.

The proposed working group seeks to extend and widen the exploration of the relationships between embodiment and diversity to understand better the challenges and opportunities of diverse populations through the lens of embodiment to be better able to respond to them. It builds on, synthesizes and extends the work of past PME discussion and working groups on embodiment (e.g., 2012, 2017, 2020), inclusion (e.g., 2018), and marginalization (e.g., 2015) in mathematics thinking and learning.

Main topics, guiding questions and objectives of the WG

We propose two main topics that will guide the work in this group: *The first one* concerns the *diversity of bodies* and the influence of learners' *sensory-motor profiles* on learning mathematics. Questions of interest are, for example, related to mathematical epistemology, that is, in how far mathematical cognition and grounded mathematical concepts might differ for people with different bodily configurations and sensory profiles (Krause, 2017). Related to this, we might explore how these differences can shape our approaches for designing the variety of bodies and lived experiences. *The second topic* concerns what we call the *diversity of voices* (e.g., genders, ethnicities), captured by the notion of *social-cultural profiles*. Here we

wonder, beside others, how similar embodied experiences are expressed differently depending on belonging to minority/majority groups and what kind of instructional support might enable learners from various populations to express their experiences in a mathematical conversation. With this, the *main objectives* of this working group are (i) to engage the discourse about the role of the body in diversity and disability with respect to mathematics thinking, learning, and instruction, (ii) to raise key questions for future research and praxis, and (iii) to preparing the basis for a colloquium for the next PME conference.

Activities and structure

Session 1: The first session starts with a short introduction of the organizers, the participants, and the objectives of the WG (10 min), followed by a brief kick-off presentation on general ideas of embodiment and diversity (5 min). We will then explore the diversity of the participants' perspective, experiences, and interests in the topic (20 min) to work in small groups on different aspects of diversity and their relationships to embodiment to gather research questions (30 min). The first session will close with a plenary discussion on the results of the small groups' work (25 min).

Session 2: After a first revision of the first session (7 min), we will give short presentations to introduce the ideas of social-cultural and sensory-motor profiles with respect to embodiment in mathematical thinking and learning (20 min). This is followed by a video-based group work on the influence of social-cultural profiles and sensory-motor profiles on mathematics teaching and learning (33 min). We will then wrap up by discussing and summarizing key topics and questions evolved (10 min) and conclude on next steps and potential future collaborations (10 min).

References

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