

Topic Study Group 54

Social and Political Dimensions of Mathematic Education

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1. Aims of the TSG

The broad focus of TSG-54 is to explore how mathematics education practices, research and policy in current societies connect to power. Since ICME-13, when TSG-54 was run for the first time, unexpected world events have drawn attention to a series of deep changes that constitute a new reconfigured context for education, and mathematics in particular. This is a new geo-economic-political configuration of relations, between humans and between human and non-humans that put at stake their conditions of existence, a landscape termed the New Climatic Regime by Latour (2018). These conditions are manifested in the multiple crises of societies, among those the COVID-19 pandemic.

Thus, at ICME-14 we aimed to build on the advances of ICME-13 in the light of the contemporary world landscape, inviting empirical and theoretical contributions offered from different locations and experiences. The following questions guided our task: (1) How do contemporary national and global economic and political interests relate to the changes in material conditions in which mathematical and mathematics education practices take place? (2) What are the relations between policy and the directions they steer, and mathematics education practice and research? (3) How do the meanings of key concepts used in sociopolitical research — such as access, equity, quality, inclusion — emerge in particular space and time configurations? How might these be different in a New Climatic Regime at this time, and why? (4) What do theories and methodologies of sociopolitical research offer to understand the articulation of mathematics education and this contemporary landscape? (5) Which forms of activism and action emerge to question and/or promote mathematics at this time?

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1.1. Submissions

For the 2019 review process, we received 32 submissions from 20 countries, distributed as follows by continent (Africa, 3; Asia, 6; Australasia, 1; Europe, 13; North America, 3; and South America, 6). Of these, 13 were accepted as short presentations, and 19 were invited to develop into long paper presentations. In addition, we invited one long paper. Of the 32 submissions accepted in 2019, 24 formed the final TSG-54 at the 2021 online Congress (5 long papers and 19 short presentations).

1.2. Sessions

We chose to prioritize discussion in our three allocated TSG-54 sessions. Informed by our guiding questions, we wished to explore emerging themes across the contributions, with the aim to further develop our thinking together. Thus, prior to the event, we circulated — with the necessary author permissions — the 24 papers put forward for the 2021 Congress to participants. Then, each of the TSG-54 sessions had three main components: paper presentations limited to five minutes per paper and supported with a one-page slide; individual reflection time on common themes and questions recorded in a shared electronic whiteboard; and plenary time to look at individual whiteboard responses and to discuss ideas to take forward. The final two-hour session also included a concluding discussion, reflecting on the contributions and discussions across all sessions, and thoughts on advancing the ideas. To promote inclusion in the online Congress format, the grouping and ordering of presentations was primarily based on the geographic location of the presenters, with common themes considered next.

1.3. Paper Topics

A list of the 24 contributions is included in Tab. 1 (on the next page). In total, authors of 23 of these papers presented at the TSG.

2. Common Themes Explored and to be Taken Forward

Participants offered responses to the guiding questions from different areas of mathematics education: teaching, learning and assessment in school and university mathematics classrooms; teacher education; resources such as textbooks and other online materials; research theories and practices; the nature of “mathematics”; and the positioning of the “mathematical citizen”. In spite of such variety, there were identifiable commonalities with respect to:

- 1) Theoretical approaches, in particular posthuman thought and decolonial thought. This is a visible advance in the last years and a contribution from so-named “global South”.
- 2) Attention to context in which mathematics and mathematics education is practised. This means that people research and write *from* the particularities of context rather than adopting an “external” perspective *on/about* context.
- 3) Acknowledgement that the problematization of mathematics and mathematics education that aims at reimagining it is not completely new. It is highlighted by and exacerbated in the New Climatic Regime, including the health pandemic. Recognition of

the connectedness of *all* places in their experience of crises, albeit in inequitable ways, and the extent of how crises are being experienced in the “global South”, make the problematization relevant for all.

Tab. 1. Paper titles in order of presentation

Paper and author(s)	
[1]	Mathematics education and the Anthropocene: Educating in precarious times. <i>Alf Coles</i> (UK).
[2]	The cultural politics of mathematics education in the “New Climatic Regime”. <i>Paola Valero</i> (Sweden).
[3]	Promised “land” of mathematics education: Towards a sociomaterial tracing of research on children’s mathematics. <i>Ayşe Yolcu</i> (Turkey).
[4]	Thinking about mathematics education and the political with Laclau and Mouffe. <i>Dionysia Pitsili-Chatzi</i> (Canada).
[5]	Critical, reflexive, justice-informed mathematics education: Troubles of justice and decolonial possibilities. <i>Dalene Swanson</i> (UK).
[6]	Black holes in Chilean teachers training programs: Mathematics teacher practices and educational policies. <i>Melissa Andrade-Molina</i> (Chile).
[7]	Governmentality and performativity in the process of making Brazilian mathematics textbooks. <i>José Wilson dos Santos and Marcio Antonio da Silva</i> (Brazil).
[8]	The globalisation of testing and learning outcomes. <i>Anita Rampal</i> (India).
[9]	Within-school tracking and mathematics learning outcomes: A case study in Yogyakarta. <i>Shintia Revina, Goldy Fariz Dharmawan, and Florischa Ayu Tresnatri</i> (Indonesia).
[10]	Teacher conceptions on social justice and democracy in mathematical education. <i>Natalia Ruiz-López and José Bosch Betancor</i> (Spain).
[11]	Maths vs. Letters: A systematic delirium. <i>Gustavo Nicolas Bruno and Natalia Ruiz-Lopez</i> (Spain).
[12]	Making mathematical talk possible: A case of teaching calculus in our contemporary world. <i>Sabrina Bobsin Salazar</i> (Brazil).
[13]	Drawing an aesthetic of mathematics education research. <i>Alex Montecino</i> (Chile).
[14]	About the mathematics that we teach. <i>Yasmine Abtahi</i> (Norway).
[15]	Powerful new frontiers: A preliminary exploration of assessment as relational relevance in authentic caring mathematics education. <i>Paulo Tan, Alexis Padilla and Anette Bagger</i> (USA).
[16]	Addressing social issues by empowering students using model-eliciting activities and projects in mathematics lessons. <i>Mulugeta Woldemichael Gebresenbet</i> (Ethiopia).
[17]	The presentation of core socialist values in Chinese junior middle school mathematics textbooks: Based on the analysis of five series of PEP textbooks. <i>Jian Li, Lili Song, Na Tang, Zhentian Mao, Yueyuan Kang, Hong Yan and Han Yu</i> (China).
[18]	Interrogating the promise of online mathematics instructional programs. <i>Lisa Darragh</i> (New Zealand).
[19]	Contextual barriers to the integration of problem solving in the Egyptian mathematics classroom. <i>Mariam Makramalla and Andreas J. Stylianides</i> (UK).
[20]	Teaching critical mathematics: Obstacles from the teacher's perspective. <i>Daniela Steflitsch</i> (Austria).
[21]	Transition of Mozambique’s primary mathematics intended curriculum in post-colonial period: A focus on adaptation from exogenous curriculum. <i>Satoshi Kusaka</i> (Japan).
[22]	Crests and troughs: The use of trigonometric modeling towards a critical and realistic mathematics education. <i>Dale Aldrinn Pradel and Catherine Vistro-Yu</i> (Philippines).
[23]	Mathematics education, citizenship and the “commons” in our “global” world? <i>Anna Chronaki</i> (Sweden), <i>Eirini Lazaridou and Effie Manioti</i> (Greece).
[24]	A southern perspective on sociopolitical mathematics education research in the New Climatic Regime. <i>Kate le Roux</i> (South Africa).

4) Concern for an ethical mathematics education that recognises: (a) multiple mathematical knowledges, ways of knowing and doing mathematics, and being a “mathematical” knower, and (b) “the commons”/“relations”: between the human (body and mind), the non-human, material technology, place, and so on.

Yet substantial work is required to understand the particularities of the role of mathematics and mathematics education in the contemporary landscape, in particular how to conceptualise and enact basic common values, aims and conditions for an ethical and responsible mathematics education. Such work requires the challenging tasks of:

- Troubling the strong and dominant narratives of the “power” of a particular place-based “mathematics” (“Western Mathematics”), for example, the use-value and exchange-value attributed to this mathematics (e.g., Williams, 2012).
- Thinking about the role of mathematics and its “use-value” and “exchange-value” in the New Climatic Regime, in particular in the prevalent conditions of precarity and unemployment (absence of “work”), even more urgent in the context of a post-COVID-19 pandemic world.
- Making space in educational practices, curricula and policies for other forms of mathematical knowledges and ways of knowing that can enrich people’s notions and experiences of mathematics beyond the closed standards of school mathematics.
- Navigating the tension of foregrounding and backgrounding mathematics, that is shifting between a mathematics that is considered objective and fixed, and a sensibility for mathematics in the dynamics of context, diversity and power. This requires exploring the extent to which mathematics education is open to consider “mathematics” content both as unique and at the same time just one of the many equally important elements entangled in the current predicaments of our times. This is important if the aim of mathematics education is providing tools to live in and understand our complex, wicked world.
- Instantiating how “mathematics” and mathematics education might be something else, if at all possible.

Taking such concerns forward, returns us to the notion of *power* that underpins the work of TSG-54. There is a certainly a need for us to consider what theories of power we are using to understand the contemporary world, and to inform our research, activism and pedagogical action. In particular, as a community we need to understand why and how mathematics and its processes of teaching and learning are conceived as powerful in both a positive productive way of empowering, and also as oppressive, selective and excluding from education and society at large. In other words, we need to continue exploring the power relationships at work in mathematics education spaces and what and how practices instantiate both their positive and negative effects. Important questions remain such as what mathematics and mathematics education become valuable? For whom? How do these become valuable? Where do they become valuable? We also need to consider where and to whom we look (beyond the privilege of academia) for such learnings.

References

- B. Latour (2018). *Down to Earth: Politics in the New Climatic Regime (English edition. ed.)*. Cambridge, UK: Polity Press.
- J. Williams (2012). Use and exchange value in mathematics education: Contemporary CHAT meets Bourdieu's sociology. *Educational Studies in Mathematics*, 80(1–2), 57–72. <https://doi.org/10.1007/s10649-011-9362-x>.

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