

## **TSG 54: Social and political dimensions of mathematics education**

Class: B

### **Session 1: Tuesday 13 July**

1. 19:30 —19:40

Mathematics, mathematics education and research in the new climatic regime

**Paola Valero**, Kate Le Roux, Andrew Brantlinger, Murad Jurdak and Xuhui

Stockholm University, Sweden; University of Cape Town, South Africa; University of Maryland, USA; American University of Beirut, Lebanon; California State University, Long Beach, USA.

This session introduces the TSG and the challenges that mathematics education faces today, in an era of “climatic changes”. The dynamics for the sessions will also be explained and the first plenary panel introduced.

2. 19:40 — 19:45

Mathematics Education and the Anthropocene: Educating in precarious times

**Alf Coles**

University of Bristol, United Kingdom

Mathematics education as a field has had little interaction with issues of ecological precarity, yet the world faces unprecedented global and societal challenges. Human intervention has led to the contested designation that we have now entered a new era of geological time, the Anthropocene. The label ‘Anthropocene’, from a post-human reading, signals the shift from hopes of ‘saving nature’ and ‘solving’ problems, to living with precarity as our permanent condition. This paper asks what awareness of the precarity of the world means for mathematics education and offers some partial, fragmentary responses, including the need for a de-centring of the human, and an acceptance of paradox, uncertainty and the uncanny. Two possible, contrasting, classroom approaches are offered, which share a commonality of attempting a dramatization of mathematics education.

3. 19:45 — 19:50

The cultural politics of mathematics education in the “new climatic regime”

**Paola Valero**

Stockholm University, Sweden

This philosophical paper raises the question of how political research in mathematics education faces the challenges posed by the present situation of climate change that makes visible how the Earth cannot bear anymore the human project of Modern progress. Mathematics education, being historically connected to such project, is called to question its allegiance with the rationalities that are at the base of the very same forms of life and thinking that are cracking nature and humans alike. What possible new standpoints can generate a new political commitment for mathematics education?

4. 19:50 — 19:55

Promised ‘land’ of mathematics education: towards a sociomaterial tracing of research on children’s mathematics

**Ayşe Yolcu**

Hacettepe University, Turkey

Sociopolitical turn in mathematics education has enabled diverse theories and methodologies to analyze the power relations in the field. By bringing the historical, social and political conditions to the front, the promises of research, reform and pedagogies are investigated and the effects on diverse communities are studied. Nevertheless, the critiques have yet to trace the material practices, including research apparatuses and objects, to make visible how those effects are made possible. By providing an example through the research on children’s mathematics where (hypothetical) learning trajectories become active agents in making of future spaces, the aim is to initiate a theoretical-methodological move to think these material tools that are inspecting children’s mathematics as the materiality of the social that goes beyond human intentions.

5. 19:55 — 20:00

Thinking about mathematics education and the political with Laclau and Mouffe

**Dionysia Pitsili-Chatzi**

University of Ottawa, Canada

Questions about the political aspects of mathematics education are considered increasingly important in mathematics education research. However, there is not necessarily a shared understanding regarding the notion of the political in relation to mathematics and mathematics education. This paper presents some aspects of Laclau and Mouffe's framework in the context of mathematics education and explores some implications of this lens. In particular, I discuss how mathematics is political, by suggesting that it is a space in which antagonisms take place. I conclude by proposing that Laclau and Mouffe's framework might be a useful (discursive, post-Marxist) epistemological perspective for viewing the political in mathematics education.

6. 20:00 — 20:05

Critical, reflexive, justice-informed mathematics education: troubles of justice and decolonial possibilities

**Dalene Swanson**

University of Stirling, Scotland

Mathematics education is still dominantly justified as political in so far as it appears to accord with supporting the economic and nationalist ambitions of the nation state, yet the dominant fallback position is that it is apolitical when the argument is advanced that mathematics education holds a responsibility to address the democratic crises of this global political moment. While this has direct implications for the way policy is framed and directed, and the way in which policy is interpreted and enacted by practitioners within relations of power, it also has implications for what we believe mathematics 'is', what it can do, for whom, how and why. This has implications for disenfranchised communities suffering under the effects of climate change, ecological, political, economic and social, and the role of mathematics and mathematics education theories and practices with/in those communities. A reflexive mathematics education practice, that looks in upon itself while looking out towards and within the world, needs conceptualizing as a matter of responding to 'what matters', as a double entendre, in the historical present of climate change and global democratic crises.

7. 20:05 — 20:30

Small group discussion

8. 20:30 — 21:00

Plenary discussion on the topic of the panel, and questions to all participants.

## **Session 2: Friday 16 July**

9. 21:30 — 21:35

Welcome back to the group and the sessions of the day

10. 21:35 — 21:40

Within-school tracking and mathematics learning outcomes: a case study in Yogyakarta

**Shintia Revina**, Goldy Fariz Dharmawan, Florischa Ayu Tresnatri

The SMERU Research Institute, Indonesia

This paper reports the practice of ability grouping and its impact on students' mathematics achievement in two public junior secondary schools in the City of Yogyakarta, Indonesia. In the past, public schools in Yogyakarta, under the merit-based student admission scheme, only admitted students with excellent record of academic performance. Under the new zoning-based admission policy, the composition and the ability of students admitted in public schools changed. Aiming to reduce classroom heterogeneity, one school employs inter-class ability grouping (tracking) consisting of high- and low-track classes. In contrast, another school, which represents most schools in Yogyakarta, did not track students based on their abilities and opted for heterogeneous classes (detracking). Our finding showed that low-ability groups in heterogeneous classes is superior to low-track classes, but the high-ability groups in heterogeneous classes are inferior to the high-track classes. Despite tracking, this study shows that there is no difference in test score changes between tracking and detracking groups in both schools, even after controlling for prior measured achievement.

11. 21:40 — 21:45

Teacher conceptions on social justice and democracy in mathematical education

Natalia Ruiz-López and **José Bosch Betancor**

Autonomous University of Madrid, DICEMA-GICE Research group, Spain

This paper presents an ongoing research into teacher conceptions about the role of Mathematical Education for the construction of a socially just world. The pilot study has been carried out in Madrid (Spain) interviewing 8 Primary Teachers selected according to the characteristics of their school: 4 centers of favorable socioeconomic environments and another 4 centers of challenging environments (in both cases 2 public and 2 private schools) have been chosen. Results show the generally accepted idea that it is difficult to contribute to the democratic and social formation of students from mathematics. Teachers see it more natural to work this approach from other subjects or through certain methodologies. They also identify Mathematical Education for social justice almost exclusively with the idea of equity or “math for all “. Besides that, teachers declare that they need more training in this subject since they have not received it throughout their teaching career or further training. As teacher trainers we believe that we must face this challenge.

12. 21:45 — 21:50

Maths vs. Letters: A systematic delirium

**Gustavo Nicolas Bruno** and Natalia Ruiz-Lopez

Autonomous University of Madrid, Spain

In this presentation we propose an operational framework, with the notion of social imaginaries, to address the apparent socio-political-cultural division Science vs. Letters". Then, a brief example of this framework in action: a descriptive study with a group of students of secondary education, especially in relation to their mathematical schooling. This paper is an extract of the PhD work of one of the authors, interested in the socio-political perspectives in Mathematics Education (ME).

13. 21:50 —21:55

Making mathematical talk possible: a case of teaching calculus in our contemporary world

**Sabrina Bobsin Salazar**

Universidade Federal de Pelotas, Brazil

The gatekeeping role of calculus in higher education set the context to study a calculus section in Brazil in which the teaching practice of building relationships with students is

investigated. This paper presents an investigation of one's own teaching practice. Results presented are only preliminary, but already points to how respectful relationships supports all students in participating and engaging in mathematical discourse.

14. 21:55 — 22:00

Black holes in Chilean teachers training programs: mathematics Teacher practices and educational policies

**Melissa Andrade-Molina**

Pontificia Universidad Católica de Valparaíso, Chile

This paper aims to argue on the formation of a supermassive black hole in mathematics teacher training programs for pre-service teachers in Chile. These programs—for math teachers training—are completely disconnected from educational policies. However, the know-how to adapt educational policies to successfully implement them in the classroom is a desirable ability math teachers should have, since the success of educational policies depends on the ability of adapting policies of teachers. An exploration of mathematics teacher training programs in Chile shows the lack of lectures dedicated to read educational policies for the teaching of mathematics in schools. A deficit that is recognized in the lack of tools pre-service and in-service mathematics teachers have to adapt and, properly, implement educational policies in their practices.

15. 22:00 — 22:05

About the mathematics that we teach

**Yasmine Abtahi**

Western Norway University of Applied Science, Norway

Critical mathematics education is a domain that challenges both mathematics and its different ways of teaching and learning. For example, Valero (2018) asks what is mathematics in relation to society, what does mathematics do as part of the school curriculum, and what are the potentials of mathematics education to produce or challenge inequalities in society and among students (p. 103); Pais (2013) challenges the universality of mathematics and Valero (2004) focused on oppression of what is not Eurocentric mathematics. In this paper, I like to challenge the types of experiences that are provided to students, by investigation the kind of mathematics that we teach.

16. 22:05 —22:10

Crests and troughs: the use of trigonometric modeling towards a critical and realistic mathematics education

**Dale Aldrinn Pradel**, Catherine Vistro-Yu

Xavier School, Philippines; Ateneo de Manila University, Philippines

Using lenses from critical mathematics education (CME) and realistic mathematics education (RME), this study makes use of lessons on technology-aided sinusoidal modeling to investigate the possible role that mathematics plays in shaping perspectives of senior high school students of privileged backgrounds on select issues from the Philippine martial law era under Ferdinand Marcos (1972-1986). Pre-lesson focus group interviews revealed that students entered classrooms not only with limited conceptions of mathematics in the real world, but also with difficulty in relating with the thoughts and feelings of others. Post-lesson interviews, however, showed more promise in encouraging students to use insights from mathematics lessons to engage in dialogue that leads to discerned action in challenging oppressive structures in society.

17. 22:10 — 22:30

Small group discussion

18. 22:30 — 23:00

Plenary discussion on the topic of the panel, and questions to all participants.

### **Session 3: Saturday 16 July**

19. 14:30 — 14:35

Welcome back to the group and the sessions of the day

20. 14:35 — 14:40

Mathematics education, citizenship and the commons in our global world?

Effie Manioti 1, Anna Chronaki 1&2, **Eirini Lazaridou** 1

1 University of Thessaly, Greece; 2 Malmö University, Sweden

The purpose of this paper is to revisit mathematics education, citizenship through the view of the need to protect and reclaim our taken as shared commons in our assumed as global world. Empirically, this will come through a series of creative pedagogic experimentations with teachers and students in state-schools in the area of Volos. The paper will attempt to discuss and problematize how the theory of commons may support our attempts to revisit mathematics and mathematics education today. At the same time, the paper will present and discuss several case studies from the field where teachers and children in and out of the school-classroom tend to disrupt and queer normative ways of approaching citizenship competences in the contemporary mathematics curriculum.

21. 14:40 — 14:45

The Presentation of core Socialist Values in Chinese Junior Middle School Mathematics Textbooks : Based on the Analysis of Five Series of PEP Textbooks

**Jian Li**<sup>1</sup>, Lili Song<sup>1</sup>, Na Tang<sup>2</sup>, Zhentian Mao<sup>2</sup>, Yueyuan Kang<sup>2</sup>, Hong Yan<sup>3</sup> and Han Yu<sup>4</sup>

<sup>1</sup>People's Education Press <sup>2</sup>Tianjin Normal University <sup>3</sup>Guizhou Normal University

<sup>4</sup>Chifeng Erzong International Experimental School

The CSVs shown in mathematics textbooks are an important manifestation of China's national will. Based on the five series of PEP junior high school mathematics textbooks since the reform and opening up in China, this paper analyzes the characteristics of the problem contexts that embody the CSVs in the textbooks. The study found that the context of embodying CSVs in Chinese mathematics textbooks attaches great importance to keeping pace with the times and can set up national identity and value benchmarks for students through the context, but the setting of CSVs at the social level still needs to be strengthened.

22. 14:45 — 14:50

Interrogating the promise of online mathematics instructional programs

**Lisa Jean Darragh**

University of Auckland, New Zealand

The politics of neo-liberalism have shaped New Zealand education since the mid-1980s. Over the past few years, privatisation of New Zealand's public system has happened overtly and covertly - by way of underfunding public education and by the outsourcing of

public services (Powell, 2014), a form of hidden privatisation (Ball & Youdell, 2007). This process has enabled commercial entities to insert themselves into schools via particular curriculum areas and make profits from their services. Mathematics is one such curriculum area and online mathematics instructional programs are the service provided. In this paper, I draw on a study into New Zealand primary schools use of online mathematics instructional programs, such as: Mathletics, Study Ladder, Maths Buddy, Sumdog, and Prodigy. I present a discursive analysis of these programs websites to interrogate the promise of these popular online programs. I argue the websites, pitched at teachers, parents, and learners of mathematics, promote a deficit view of public education (mathematics) and produce learners of mathematics as neoliberal subjects.

23. 14:50 — 14:55

Contextual barriers to the integration of problem solving in the Egyptian mathematics classroom

**Mariam Makramalla**, Andreas J. Stylianides

University of Cambridge, United Kingdom

This paper presents a contextual investigation of social, cultural and political factors hindering the integration of mathematical problem solving in Egyptian classrooms. Centered around a one-size-fits-all mathematics curriculum and examination scheme, the current national agenda for schooling seeks to govern all schools in Egypt. Using the Goodson Change Model and based on six teacher focus groups, this study seeks to map out school-government power relations and to use this mapping as a basis to explore, from the teachers' perspective, barriers to the classroom integration of mathematical problem solving. The study also seeks to explore the degree to which reported barriers are socio-culturally bound. Results re-emphasise the importance of a powerful school microculture. The ability of a school to enforce its own mathematical pedagogy despite external pressures and cultural norms turns out to be less a question of a school's socio-cultural standing and more a question of the strength of the school's microculture.

24. 14:55 — 15:00

Teaching critical mathematics: Obstacles from the teacher's perspective

**Daniela Steflitsch**

Alpen-Adria University Klagenfurt, Austria

Engaging students in critical thinking is a major demand on mathematics education that many researchers called for in the last decades. To not leave this a theoretical claim and to introduce it in classroom practice, it requires a deep understanding of possible obstacles a teacher may face in the implementation of a critical pedagogy. This article provides an overview of the different areas in which teachers may face obstacles, such as organizational, content-related, classroom-environment-related issues, or issues on student or teacher level. This should create awareness of the hurdles that can arise on the path of conversion to a critical pedagogy and it offers a starting point for future research in this area as it indicates the questions and challenges that have to be mastered to make critical mathematics education a matter of course.

25. 15:00 — 15:05

The Globalisation of Testing and Learning Outcomes

**Anita Rampal**

University of Delhi, India

The socio-political dimensions of the policy discourse of 'learning outcomes' are analysed for the Programme of International Student Assessment - PISA 2021, which has mathematics at its focus, in view of the Indian government's education policy proposals and decision to selectively enter the next cycle. The implications of the shift in 2021 towards computational thinking as central to mathematical reasoning, to address future employment needs in the global North, are discussed for countries of the South, where the increasing use of technologies for individualised instruction, surveillance and deskilling of teachers is a matter of deep concern.

26. 15:05 — 15:10

Transition of Mozambique's Primary Mathematics Intended Curriculum in post-colonial period: A focus on Adaptation from Exogenous Curriculum

**Satoshi Kusaka**

Hiroshima University, Japan

It is indisputable that one of the factors connected to improvements in the quality of education is the implementation of relevant curricular reform that is pertinent to the

culture and needs of the given country. This study aimed to comprehensively investigate how the adaptation from an exogenous curriculum was attempted through analyzing the three mathematics curriculum, year 1983, 2004 and 2015 that have been applied after independence, reports and policy papers issued by the Ministry of Education (MINED), and interviews with technical officials involved with the curriculum revision in 2015. The result shows that Mozambique has been steadily and appropriately adapting away from the exogenous curriculum in a cycle of 10 years through the accumulation of their own experiences. The series of observations that we attained could be relevant to other African nations from the viewpoint of transitioning away from an exogenous curriculum.

27. 15:10 — 15:15

A southern perspective on sociopolitical mathematics education research in the new climatic regime

**Kate le Roux**

University of Cape Town, South Africa

The growth of sociopolitical mathematics education research is accompanied by calls for the community to engage critically with its own practices, including asymmetries in global knowledge production. Research concerned with the role of mathematics and mathematics education in the contemporary world requires collaboration across contexts. Southern Theory scholarship, with its commitment to democratising knowledge and its orientation to place, relations, theory and identity, offers tools for critical analysis of research practice. I draw on this scholarship to conceptualise a collaborative, South-North relation in which mathematics education researchers from various contexts (inter)act to produce knowledge that matters locally and globally. Creating such a relation requires giving new emphasis to place in research, acknowledging all places as sources of knowledge, seeing value in thinking from the South, and recognising the agency of researchers who do so.

28. 15:15 — 15:40

Small group discussion

29. 15:40 — 16:00

Gathering general points from the sessions and connecting back to the theme of the Topic Study Group

**Kate le Roux and Paola Valero**

30. 16:00 — 16:30

Final general discussion