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TWG10: Diversity and mathematics education: Social, cultural and political challenges

Introduction to the papers of TWG10: Diversity and mathematics education: Social, cultural and political challenges

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Scope and focus

Thematic working group 10 is interested in discussing diversity and mathematics education within the realms of the societal, the cultural, and the political. In the work of the group, mathematics education is assumed to refer to more than the encounter between an individual and a mathematical object and is considered to occur in wider contexts than just classroom settings. The group is specifically interested in discussing research that addresses how diversity affects students' possibilities to learn in mathematics education. Diversity also occurs in relationship to who is doing the research and who is being researched, posing methodological issues of an ethical nature. Hence, multiple diversities intersect, and in so doing pose challenges to intended and actual learning and teaching practices in their multiple forms.

Organisation of TWG 10's work

In the seminars during CERME10, papers were presented in a similar way to what had occurred previously, in that the authors did not present their own paper. Instead each paper was presented by another author giving a description of the main ideas from the perspectives adopted in the paper. The author(s) then had a few minutes to add to or comment on the presentation, with the possibility of pointing out or emphasising important aspects. In the end of each session, there was time for discussing the presented papers. These discussions firstly occurred in small groups and then were shared in the whole group. A poster session with 5 posters was held, in addition to the general CERME poster session. Here each author had 3 minutes to describe the content of their poster. The poster authors then positioned themselves next to their respective posters to engage in discussions with group members.

The papers discussed

Below are the papers presented during our sessions with the respective presenter(s).

Papers and authors	Presenter
How Sámi teachers development of a teaching unit influences their self-determination by Anne Birgitte Fyhn, Tamsin Meaney, Kristine Nystad, Ylva Jannok Nutti	Anette Bagger
Importance and possibility of integrating gender competence as a key qualification in mathematics teacher education by Anina Mischau, Katja Eilerts	Helena Roos
Cultural diversity as a resource or an obstacle for teaching practices	Tamsin Meaney

in multicultural milieu: Experience of a training course for Italian teachers about Chinese Shuxue by Benedetto Di Paola, Giovanni Giuseppe Nicosia	
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Table 1: Session 1.

Integrating critical theory and practice in mathematics education by David Swanson, Laura Black	David Kollosche
Incepted neoliberal dreams in school mathematics and the Chilean experience by Melissa Andrade-Melina	Anne Birgitte Fyhn
Towards cultural responsiveness in mathematics education by Swapna Mukhopadhyay, Brian Greer	Hilary Povey
Content-related and social participation in inclusive mathematics education by Judith Jung, Marcus Schütte	Colin Jackson
Social class and "ability" grouping in mathematics in English secondary schools: A review by Colin Jackson	Sabrina Bobsin Salazar

Table 2: Session 2

Subjective theories of teachers in dealing with heterogeneity by Elisa Bitterlich, Judith Jung, Marcus Schütte	Benedetto di Paola
"No, it just didn't work": A teacher's reflections on all-attainment teaching by Colin Jackson, Hilary Povey	Javier Díez-Palomar
The socio-politics of teacher explanation in mathematics education by David Kollosche	Elisa Bitterlich
Diversity in an inclusive mathematics classroom by Helena Roos	John Keogh
"It is only a test": Social aspects of displaying knowledge in mathematics for Second Language Learners (SLL) by Anette Bagger	Melissa Andrade-Melina

Table 3: Session 3

Polish parents and mathematics education in Swedish preschools by Dorota Lembrér	Judith Jung
(Wanting to do) Ethical research in a shifting context by Andrea Eikset, Trude Fosse, Troels Lange, Johan Lie, Magni E. H. Lossius, Tamsin Meaney, Elena Severin	David Swanson
Mathematics at the enterprise: Industry, university and school working together to facilitate learning by Hans Kristian Nilsen,	Brian Greer

Anne Vegusdal	
The context of workplaces as part of mathematics education in vocational studies: Institutional norms and (lack of) authenticity by Lisa Björklund Boistrup, John Keogh	Alex Montecino

Table 4: Session 4

School mathematics education through the eyes of students in Ghana: Extrinsic and intrinsic valuing by Wee Tiong Seah, Ernest Kofi Davis, Monica E. Carr	Anina Mischau
Teaching practices in a mathematics classroom and their connection to race and racism in the United States by Sabrina Bobsin Salazar	Dorota Lembrér
Exploring Roma learning Mathematics: A sociomathematical view by Javier Diez-Palomar	Wee Tiong Seah
The mathematics teacher's quasi-Darwinism. Problematizing the mathematics education research by Alex Montecino	Hans Kristian Nilsen

Table 5: Session 5

Themes discussed in the TWG

As at previous CERMEs, TWG10 discussed political aspects of mathematics education intensively. One way of addressing political aspects of diversity in mathematics education is by assuming research as always, in one way or another, constituting political acts. This assumption rejects a naive idea of research as politically neutral, providing objective data that is used to rationally guide policy. An example is Fyhn, Meaney, Nystad and Nutti (this volume) who address cultural responsive teaching of mathematics in relation to Indigenous (Sámi) teachers' self-determination. The acknowledgement of the political nature of research constitutes a recognition of how the issues we write and talk about as researchers are inextricably political and framed by world-views. Political aspects also concern how the broader political context of mathematics education, as it is performed in a variety of contexts, affects the teaching and learning of mathematics. Two papers looked at the intersection of school and workplace and the impact of mathematics education (Nilsen & Vegusdal, Boistrup & Keogh). Kollosche (this volume) discusses the role of teacher explanation for student passivity, also in relation to the discipline of mathematics. Another example of addressing political aspects derives from Sweden, where Bagger (this volume) addresses the effects from national testing on students "in special need". Political aspects present in TWG10 also concern how diversity among learners may have consequences in terms of unequal access to the learning of mathematics. This research may include critical investigations of the impact of socio-economic or cultural backgrounds, as well as other background factors, as grounds for unequal mathematics education, because of a sorting of students so they receive different learning opportunities (e.g. Salazar, this volume). A tension here is previously presented research to the group which confronts "the official discourse, which posits inclusion and equity as fundamental goals of mathematics education" (Straehler-Pohl & Pais, 2013, p. 1792, see also Valero, 2013). There are more recent papers

addressing ways of overcoming such tensions in research through collaboration between researchers adopting complementary perspectives, with teachers and students (Black & Swanson, this volume), hearing the voice of parents (Lembrér, this volume) or bringing individuals' voices to the discussion, highlighting potential opportunities to overcome such tensions (Díez-Palomar, this volume). Still, the work in the TWG, with its developments and tensions, can be viewed as constituting part of a resistance to a rampant global homogenization that is central to the neoliberal agenda, which stands in ideological opposition to the group's commitment to valorizing diversity (Mukhopadhyay & Greer, this volume).

The ethics of doing research, in relation to diversity of various forms, has been addressed in the TWG (e.g. Eikset et al., this volume). The TWG is united in a strive for social justice, inclusivity and variety. Consequences of an engagement in ethical considerations is reflexivity in research, where also the researcher's acts are critically observed (Montecino, this volume). Ethics also includes the impact of our actions within the context in which we are conducting our research and many addressed that we must pay attention to the consequences of our research on the end-users' (students, teachers, families, etc.) opportunities to improve their chances to learn mathematics and/or to legitimize their own social and cultural knowledge about mathematics (Mukhopadhyay & Greer, this volume). Diversity as a concept, and the connotations hereof, were problematized in the TWG (e.g. Roos, this volume). One aspect here is that diversity as a concept may assume a norm that there is something normal from which, for example, diverse students deviate, while "diversity" instead should be viewed as the norm itself. A connected matter here are words that mean something similar to diversity, but perhaps with other connotations; difference, heterogeneity, multiplicity, variety, and connected words: democracy, inclusion/exclusion, segregation/integration, empowerment. With an interest in the broader context of settings for mathematics education, the political times of today with neoliberal agendas affecting the framing of mathematics education, has been part of the work of the group during the last CERMEs (e.g. Andrade-Melina, this volume). Aspects here are political decisions governing towards mathematics education to be effective and market based, which are forces where diversity among students may be disturbing, rather than part of the responsibility of the system. We expect such issues to be elaborated more during future meetings, while also addressing the roles of mathematics education in times where populist policy making is becoming more common.

References, which are not found in this volume

- Straehler-Pohl, H., & Pais, A. (2014). To participate or not to participate? That is not the question. In B. Ubuz, Ç. Haser, & M. A. Mariotti (Eds.), *Proceedings of the Eighth Congress of the European Society for Research in Mathematics Education* (pp. 1794-1803). Ankara: Middle East Technical University and ERME.
- Valero, P. (2013, January). Mathematics for all and the promise of a bright future. In B. Ubuz, Ç. Haser, & M. A. Mariotti (Eds.), *Proceedings of the Eighth Congress of European Research in Mathematics Education* (pp. 1804-1813). Ankara: Middle East Technical University and ERME.