

Diversity in Mathematics Teacher Education

4 ECTS credits

Course code: UM022FN
Valid from: 2020 03 01
Approved on: 2020 01 21

Time and Place

March 31st to April 3rd, 2020, from 9:00 to 17:00
Svante Arrheniusväg 20A, E-house
Department of Mathematics and Science Education, Stockholm University

Registration

Deadline for registration is February 29, 2020.

Organizers

This PhD course/research seminar is organized within the framework of the STINT project NetDiMaTE, and in collaboration between:

- Department of Mathematics and Science Education, Stockholm University, Sweden
- Center for Advanced Research in Education, University of Chile, Chile
- Institute of Mathematics, Pontifical Catholic University of Valparaiso, Chile
- Department of Science, Environment, Society, Malmö University, Sweden
- Department of Department of Language, Literature, Mathematics and Interpreting, Western Norway University of Applied Science, Norway

Course Description

Transnational reports point to the correlation between students' disparities, including gender, socio-economic disadvantages, racial and ethnic differences, immigration background and low-performance in mathematics (e.g., OECD, 2014). Sharp inequities in mathematics education seem to undermine these students' opportunities to access higher education and to break the poverty circle in which they live. Therefore, the connection between students' position of disadvantage and the access to quality mathematics education is a problem to tackle by research in the field of mathematics education (see Valero & Meaney, 2014). This is an issue that is clear in countries such as Chile and in Sweden, which has over the past years taken in substantial number of immigrants. But it is also evident in many other countries in Scandinavia and in Europe.

Internationally, teachers' work and teacher education are key for the inclusion of disadvantaged students (Darling-Hammond, 2017). In particular, teacher's knowledge to teach with quality

and equity has received attention. Based on the different cultural, racial and social experiences between teachers and marginalized students, some researchers contend that a different type of understanding is needed to teach mathematics in diverse school settings (e.g., Gutierrez, 2013). Beyond content and pedagogical content knowledge, mathematics teachers working with marginalized students need preparation for everyday realities and complexities of schools and classrooms. However, this is not a key component of many mathematics teacher education programs, nor is it a well-researched issue (Osterling & Christiansen, forthcoming). Currently, the question that remains is how to educate teachers to support the mathematics learning of diverse student populations, so that quality and inclusion can go hand in hand. This needs to build on existing work on linking theory and practice (see Ramdhany, Venkat & Christiansen, 2018), as well as how to research quality of mathematics education.

Many countries stand in a similar predicament concerning the efforts to improve mathematics teacher education in ways in which quality for high achievement and inclusion of disadvantaged students are simultaneously possible. However, the conditions of teachers' work and teacher education differ greatly among countries. Therefore, it is of relevance to engage in an exploration of the theoretical, methodological and practical implications of research on mathematics' teachers' views and knowledge on how to deal with issues of inclusion and achievement in mathematics.

Aims

- To discuss distinctive research approaches to notions of inclusion and diversity in mathematics education and mathematics teacher education.
- To identify theoretical and methodological challenges in relation to issues of inclusion and diversity in mathematics education research.
- To unpack different ways of approaching the construction of otherness in mathematics education to rethink mathematics teacher education in different social contexts.

Program

The seminar is designed in 5 different thematic blocks. In each block, there is a variety of activities involving panel lectures from the team of guest professors, and group discussions on the students' and senior researchers' own projects. The sessions will be facilitated as to maximize conversation among participants across field of research and context of work. At the end of each block there will be a summary of main points, and some commenters will raise the general points of discussion during the sessions.

Tuesday 31st of March

Room E262

- 9:00 – 9:30** **Welcome to the seminar and presentation of program and activities**
Melissa Andrade, Paola Valero and Luz Valoyes
- 9:30 – 12:00** **Block 1: Trajectories into researching issues of diversity in mathematics teacher education**
Moderator: Lisa B. Boistrup

This block has the intention of introducing the seminar by coming close to the narratives of researchers about how they have become interested in researching issues of diversity in mathematics teacher education. Lecturer's short presentations will be followed by participants' reflections on why they are interested in this topic and what is central concern for them now. With small group discussions, an exercise of mapping central concerns of research will be carried out as a chart for the course discussions to address during the following blocks.

Speakers:

Kicki Skog

Tamsin Meaney

Manuel Goizueta

Ayse Yolcu

12:00 – 13:00 Lunch

13:00 – 16:00 Block 2: Contexts of diversity in mathematics education

Moderator: Luz Valoyes

This block focuses on unfolding the contexts for diversity in mathematics teacher education. The intention is to build an understanding of how diversity enters the scene of mathematics teacher education through the analysis of the elements that are part of the broad network of mathematics education practices and institutions. Participants are engaged in an examination of their own local contexts.

Speakers:

Troels Lange

Lisa Darragh

Eva Norén

Beatriz Fernández

16:00 – 17:00 Summarizing blocks 1 and 2

Moderator: Melissa Andrade

Commenting speakers to summarize and raise new questions.

19:00 Dinner

Wednesday 1st of April

Room E248-50

9:00 – 12:00 Block 3A: Diversity and Otherness in Mathematics Education: Theoretical and Methodological Challenges

Moderator: Anna Chronaki

This block has the intention of discussing theoretical and methodological challenges in approaching issues of diversity in mathematics education. The main focus will be the use by researchers of theories and methods to

study different markers of diversity (gender, racial, ethnic, class, ability) in the field. Lecturers' short presentations will be followed by participants' reflections on how these theoretical and methodological approaches have contributed to understand practices and discourses that contribute to the construction of otherness in the mathematics education system of practices. With small group discussions, an exercise of mapping central concerns of research will be carried out as a chart for the course discussions to address during the following blocks.

Speakers:

Ayse Yolcu

Luz Valoyes

Lovisa Sumpter

Lisa Darragh

12:00 – 13:00 Lunch

13:00 – 16:00 Block 3B: Unfolding Notions of Diversity and Otherness in Mathematics Education Research

Moderator: Troels Lange

This block focuses on the discussion of how theories and notions of diversity and otherness are unfolded in particular research projects and their results, and how they have been articulating both theoretical perspectives and methodological strategies. The core of the discussion is revisiting the findings in relation to the larger societal contexts and the possible implications of the research. With small groups, PhD students' projects will be presented and discussed. The discussion will lead to mapping central concerns of research. These will be presented in plenary at the end of the day.

Speakers:

Melissa Andrade

Petra K. Svensson

Students will be the main speakers, since their projects will be presented and discussed in this block.

16:00 – 17:00 Summarizing block 3

Moderator: Paola Valero

Retake the discussion and in block 3A and group work in block 3B.

19:00 Dinner

Thursday 2nd of April

Room E248-50

9:00 – 12:00 Block 4A: Articulating Diversity and Otherness in Mathematics Teacher Education

Moderator: Iben Christiansen

This block focuses on the discussion of how theories, methods and notions of diversity and otherness are unfolded in particular research projects and their results, and how they have been articulating both theoretical perspectives and methodological strategies. The core of the discussion is revisiting the findings in relation to the larger societal contexts and the possible implications of the research.

Speakers:

Ulrika Ryan

Anna Chronaki

Tamsin Meaney and Toril Rangnes

12:00 – 13:00 Lunch

13:00 – 16:00 Block 4B: Diversity and Otherness in Policies of Mathematics Teacher Education

Moderator: Petra S. Källberg

This block focuses on unfolding the contexts for diversity and otherness in mathematics teacher education. The intention is to build an understanding of how diversity and inclusion enter the scene of mathematics teacher education through, for example, the analysis of national teacher education policies and practices of teacher education. Participants are engaged in an examination of their contexts.

Speakers:

Iben and Lisa Ö

Alex Montecino

Natalia Ruiz

16:00 – 17:00 Summarizing block 4

Moderator: Lisa B. Boistrup

Commenting speakers to summarize and raise new questions

19:00 Dinner

Friday 3rd of April

Room E248-50

9:00 – 11:00 Block 5: Challenges to and Opportunities in Researching Mathematics (Teacher) Education

Moderator: Kicki Skog

This panel closes the seminar by discussing the challenges both for research and for bringing research into teacher education. The intention is to identify key issues for further research, but particularly think of how

there could be strategies for feeding teacher education with research results in ways that may qualify student teachers for dealing with a changed student body.

Speakers:

Iben Christiansen

Tamsin Meaney

Lisa Darragh

Luz Valoyes

11:00 - 12:00 Closing of the Seminar and Future Collaboration

Moderator: Paola Valero

This session is open to the general public and is offered as part of the series of research seminars in mathematics education at MND.

12:00 – 13:00 Lunch

Compulsory readings

Abreu, G., Gorgorio, N., & Boistrup, L. B. (2018). Diversity in mathematics education. In T. Dreyfus, S. Artigue, D. Potari, S. Prediger, & K. Ruthven (Eds.), *Developing research in mathematics education - twenty years of communication, cooperation and collaboration in Europe* (pp. 211-222). Oxon, UK: Routledge - New Perspectives on Research in Mathematics Education series, Vol. 1.

Chronaki, A. 2011. “‘Troubling’ Essentialist Identities: Performative Mathematics and the Politics of Possibility’. In M. Kontopodis, C. Wulf, and B. Fichtner. (eds) *Children, Development and Education: Cultural, Historical and Anthropological Perspectives* (pp. 207-227). New York: Springer Science.

Chronaki, A. Affective bodying of mathematics, children and difference: choreographing ‘sad affects’ as affirmative politics in early mathematics teacher education. *ZDM Mathematics Education* 51, 319–330 (2019). <https://doi.org/10.1007/s11858-019-01045-0>

Darragh, L. (2016). Identity research in mathematics education. *Educational Studies in Mathematics*, 93(1), 19–33. <https://doi.org/10.1007/s10649-016-9696-5>

Darragh, L., & Valoyes-Chávez, L. (2019). Blurred lines: producing the mathematics student through discourses of special educational needs in the context of reform mathematics in Chile. *Educational Studies in Mathematics*, (online fi. Retrieved from <https://doi.org/10.1007/s10649-018-9875-7>)

Eikset, A. & Meaney, T. (2018). When does a difference make a difference? Teaching about language diversity in mathematics teacher education. *Nordic Studies in Mathematics Education*, 23(4), 225-246.

Lange, T. (2019). Unpacking the emperor’s new policies: How more mathematics in barnebage will save Norway. *Canadian Journal of Science, Mathematics and Technology Education*, 19(1), 8-20. doi: 10.1007/s42330-019-00041-1.

- Meaney, T. (2013). Upsetting the norms of teacher education. *Educational Research for Social Change*, 2(2), 17-30. Available from: http://ersc.nmmu.ac.za/view_edition.php?v=2&n=2
- Nortvedt, G. & Sumpter, L. (2017). Are we playing Chinese whispers? Issues in questionnaire development. In: *Proceedings of the 41st Conference of the International Group for the Psychology of Mathematics Education* / [ed] Kaur, B., Ho, W.K., Toh, T.L., & Choy, B.H., Singapore, 2017, Vol. 3, 305-312 p.
- Rangnes, T. & Meaney, T. (accepted). Preservice teachers learning from teaching mathematics in multilingual classrooms. In N. Planas Reig (Ed.) *Classroom Research on Mathematics and Language*. Routledge.
- Ryan, U., & Parra, A. (2019). Epistemological aspects of multilingualism in mathematics education: An inferentialist approach. *Research in Mathematics Education* 21(2), 152-167.
- Svensson Källberg, P. (2018). Identity formations as mathematical learners in the context of transition. *NOMAD*, 23(3-4), 39-59.
- Yolcu, A. (2019). Research on equitable mathematics teaching practices: Insights into its divergences and convergences. *Review of education*, 7(3), 701–730.

Supplementary readings

- Bishop, A., Tan, H., Barkatsas, T. (2015). *Diversity in mathematics education. Towards inclusive practices*. Springer International Publishing: Switzerland.
- Kollosche, D., Marcone, R., Knigge, M., Godoy Penteado, M., & Skovsmose, O. (2019). *Inclusive mathematics education. State-of-Art research from Brazil and Germany*. Springer International Publishing: Switzerland.
- Lange, T. (2008). Lange, T., & Meaney, T. (2018). Policy production through the media: The case of more mathematics in early childhood education. In M. Jurdak & R. Vithal (Eds.), *Sociopolitical dimensions of mathematics education: From the margin to mainstream* (pp. 191-207). New York: Springer. doi: 10.1007/978-3-319-72610-6_11.
- Leonardo, Z. (2010). *Handbook of cultural politics and education*. The Netherlands: Sense Publishers.
- López-Leiva, C., Herbel-Eisemann, B., & Yolcu, A. (2018). Promoting equitable systems in mathematics education starts with us: Linking literature on allywork to the work of mathematics teacher educators. In T. G. Bartell (Ed.), *Toward equity and social justice in mathematics education* (pp. 77-98). Cham: Springer International Publishing.
- Norén, E., & Svensson Källberg, P. (2018). Fabrication of newly-arrived students as mathematical learners. *NOMAD*, 23(3-4), 15-37.
- Mukhopadhyay, S., & Roth, W. (Eds.) (2012). *Alternative Forms of Knowing (in) Mathematics: Celebrations of Diversity of Mathematical Practices*. Sense Publishers: Rotterdam.
- Ryan, U. (2019). Mathematical preciseness and epistemological sanctions. *For the Learning of Mathematics*, 39(2), 25-29.
- Ryan, U., Källberg, P.S., & Boistrup, L.B. (2020). Unpacking Language as Resource - the case of mathematics education in Sweden. *Madif conference paper*.

http://matematikdidaktik.org/wp-content/uploads/2019/12/madif12_FP_022_ryan_ok-1.pdf

- Valero, P. (2018). Challenging the assumption of the epistemic inequality in the "other". In E. Bergqvist, M. Österholm, C. Granberg, & L. Sumpter (Eds.), *Proceedings of the 42nd Conference of the International Group for the Psychology of Mathematics Education* (Vol. 1, pp. 114-118). Umeå, Sweden: PME.
- Yolcu, A., & Popkewitz, T. S. (2019). Making the able body: school mathematics as a cultural practice. *ZDM*, *51*(2), 251-261. doi:10.1007/s11858-018-1003-8