

Second Announcement of the Tenth ERME TOPIC CONFERENCE (ETC10)

on

Mathematics Education in the Digital Age (MEDA)

16-18 September 2020 - ONLINE

Webpage: <https://www.jku.at/linz-school-of-education/steam/meda-conference-2020/>

The fifth ERME Topic Conference for Mathematics Education in the Digital Age (MEDA-1), held in September 2018 in Copenhagen was inspired by the contributions to the Thematic Working Groups 15 and 16 at CERME 10 in Dublin, which highlighted the diversity of current research and its overlaps with other TWG themes. MEDA-1 was an interdisciplinary, multifaceted collaboration that brought together participants who would normally attend a range of CERME Thematic Working Groups to provide the opportunity for further in-depth discussion and debate. The successful experience resulted in intensive communication and collaboration during the Conference, which continued through collegial work towards a publication of a post-conference book in the ERME Series published by Routledge.

The conference MEDA-2, hosted by the University of Linz will be a virtual conference!

Nevertheless, we will keep the spirit of MEDA-1 through interesting online presentations that will inspire discussions and collaborative work during the online-sessions.

Rationale of the Conference

The rationale for the conference is as an interdisciplinary, multifaceted collaboration that will bring together participants who would normally attend a range of CERME TWGs according to the following four themes:

Theme 1 - Mathematics teacher education and professional development in the digital age

- The specific knowledge, skills and attributes required for efficient/effective mathematics teaching with digital resources, to include digital mathematics resources, which we define as *resources that afford or embed mathematical representations that teachers and learners can interact with by acting on objects in mathematical ways*.
- The design and evaluation of mathematics teacher education and professional development programmes that embed the knowledge, skills and attributes to teach mathematics with digital resources.

Theme 2 - Mathematics curriculum development and task design in the digital age

- The design of resources and tasks (e.g. task features, design principles and typologies for e-textbooks);
- The evaluation and analysis of resources and tasks (e.g. determining quality criteria for curricular material, resources and methods of analysis);
- The interactions of teachers and students with digital curriculum materials (e.g. appropriation, amendment, re-design), both individually or collectively. This includes the consideration of teacher learning/professional development in their work with digital resources.

Theme 3 - Assessment in mathematics education in the digital age

- New possibilities of assessment (formative, summative, etc.) in mathematics education brought by digital technology
- Use of digital technology to support students to gain a better awareness of their own learning
- Assessment of learners' mathematical activity in digital environment

Theme 4 - Theoretical perspectives and methodologies/approaches for researching mathematics education in the digital age

- Theories for research on technology use in mathematics education (e.g. design theories, prescriptive theories, theories linking research and practice, theories addressing the transfer of learning arrangements to other learning conditions etc.)
- The linking of theoretical and methodological approaches and the identification of conditions for productive dialogue between theorists, within mathematics education and beyond (e.g. developing collaborative research with educationalists, including teachers and educational technologists).

Cross-theme Relationships

Whilst we propose these four themes to support more focused work during the conference, we are acutely aware of the overlaps and relationships between all four.

Keynote Speakers

We will have three contributions from members of CERME Thematic working groups beyond the technology groups.

- **Paola Iannone (Loughborough University, UK): Digital Technologies and Assessment in Mathematics Education**

Assessment is a big component of the students' learning cycle, and has a big impact on the way in which students engage with mathematics. In this talk I will investigate the role that digital technologies can have to support the design and delivery of assessment of mathematics and I will refer to any type of assessment which is supported by a digital technology as computer aided assessment. I will focus on summative assessment, but I will also discuss the potential of digital technologies to provide formative feedback to

students. I will conclude by posing some questions which should be at the forefront of research on the potentiality of computer aided assessment for mathematics.

- **Birgit Pepin (Eindhoven University of Technology, The Netherlands): Quality of (digital) resources for curriculum innovation**

If we define 'curriculum' as 'design for learning' (Van den Akker 2020), then 'curriculum resources' can be those designs for learning (e.g. mathematical tasks, lesson plans), or the tools that help us to design (and evaluate) learning (e.g. design tools). What do we know about the *quality* of such curriculum resources, in particular if they are digital, and how can we (re-)conceptualize the 'quality' of (digital) curriculum resources (DCR), in particular in times of curriculum renewal?

Leaning in particular on research in mathematics education (e.g. Trgalova, et al. 2013; Pepin, Choppin, Ruthven & Sinclair 2017) and in curriculum thinking (e.g. Nieveen, 1999; Van den Akker 2013), in this presentation I re-conceptualize the *quality* of DCR in terms of a number of criteria, and illustrate them in two studies: one in French lower secondary education; and one in Dutch higher engineering education. Both contexts could be characterized as oriented towards curriculum reform.

References

- Nieveen, N. (1999). Prototyping to reach product quality. In J. van den Akker, R. Branch, K. Gustafson, N. Nieveen, & T. Plomp (Eds.), *Design approaches and tools in education and training* (pp. 125-36). Dordrecht, the Netherlands: Kluwer Academic Publishers.
- Pepin, B., Choppin, J., Ruthven, K., & Sinclair, N. (2017) Digital curriculum resources in mathematics education: foundations for change. *ZDM- Mathematics Education*, 49(5), 645- 661.
- Trgalová J., & Jahn A. P. (2013) Quality issue in the design and use of resources by mathematics teachers. *ZDM - Mathematics Education*, 45(7), 973–986.
- Van den Akker, J. (2013). Curricular development research as a specimen of educational design research. In T. Plomp & N. Nieveen (Eds.), *Educational design research - Part A, An Introduction* (pp. 52-71). Enschede, The Netherlands: SLO (Netherlands Institute for Curriculum Development).
- Van den Akker, J. (2020). Designing the curriculum for the future. In *Drivers of the future of education* [Proceedings from the Regional Center for Educational Planning 5th International Conference] (pp. 30-39). Sjarjah University City, UAE: RCEP-UNESCO.

- **Mariam Haspekian (Université Paris Descartes, FR): The research on teaching practices with technology through the prism of the theories"**

In the spirit of MEDA 2 whose objective is to interlink the TWGs of CERME on digital technologies with other TWGs, we are interested here in the link with the TWG on the **theories**: "Theoretical Perspectives and Approaches in Mathematics Education".

Anchoring it in the theme of this conference and in what is called today the "digital age" leads to the theme 4 titled: "Theoretical Perspectives and Approaches for Research in Mathematics Education in the Digital Age".

Even focusing on the digital context only, Theme 4 embraces a fairly broad set of issues. I propose here to limit the question of Theoretical Perspectives and Approaches to research on teachers and teaching practices with digital technologies: indeed, in continuation of research on student learning, many research on teachers and classroom practices has emerged and then developed considerably over time. Among this teacher-oriented research, a growing number focus on issues specifically related to technologies. It is therefore interesting to stop now and take stock. In that purpose, one or more (non

independent) angles can be chosen: that of the questions raised by this research corpus that of the methodologies used, that of the results obtained... The choice in this plenary is to revisit the theme of research on teaching practices in the digital age from the very perspective of the “*theories*”. I will examine these theories, themselves flourishing, through different axes inspired by other TWGs -theories in research on the teacher, on classroom practices, on training and professional development-, or still through the networking of theories.

Proceedings and Publications

Accepted papers and posters will be published as peer reviewed digital proceedings on the HAL Archive (<https://hal.archives-ouvertes.fr/>).

Following MEDA-1, invited extended papers have been published in the book “Mathematics Education in the Digital Age” by Routledge. We think about possible options for publications resulting from the MEDA-2 conference in addition to the standard conference proceedings.

Ways of working during the conference

Accepted papers will be grouped according to the relevant themes to synchronous online sessions structured and mediated by a session-leader. In addition, parallel sessions will focus on sub-themes or enable work by sub-groups.

Paper presentations will be in the CERME-style, that is 10 minutes of presentation followed by 10-15 minutes of discussion associated with the session theme(s).

Ideas will also be shared and discussed with participants’ in the other three themes to foster exchange between the four ETC groups.

For all accepted papers there will be

Live presentations (10 minutes) via ZOOM with presentation slides and a follow-up discussion.

There will also be a poster session in a virtual poster presentation room.

Special discussion groups

- There will be a special workshop or webinar for “**Remote Teaching and Learning Modalities during the Pandemic Crisis**” which gives the opportunity to discuss this topic.
- There will be a special discussion group for **early career researchers** (this is a participant who is either a PhD student or finished her/his PhD no longer than three years ago) to discuss some issues and questions concerning new developments in mathematics education with some experts in their fields.

The deadline for submissions of papers and posters is already over. However, see the paragraph “Proceedings and Publications”.

Important Dates

Confirmation of accepted papers: **18 July 2020**

Registration of participants with accepted papers or posters before **01 August 2020**

Proceedings available on the website: 01 September 2020

Only papers of registered participants can be published in the Proceedings.

Registration:

See the link on the Homepage.

Conference fee for regular participants: 60 €

Conference fee for PhD students: 40 €

Students have to send a student confirmation to meda2020@jku.at.

If you submitted a paper or poster and it was accepted for presentation, you have to register until 01. August 2020

Planned programme structure

	Wednesday, 16.09.20	Thursday, 17.09.20	Friday, 18.09.20
9.00		Plenary by Mariam Haspekian	Session 4: Working Group Parallel sessions WG1, WG2, WG3, WG4
09.45		Break	
10.00		Session 2: Working Group Parallel sessions WG1, WG2, WG3, WG4	Break
10.30			
11.00		Break	Plenary: Results and Summaries of the Working Group sessions
11.30		Presentation of some ideas of the book "Mathematics Education in the Digital Age"	Discussion concerning the on-going work
12.00			
12.30	Welcome, aims and objectives	Break	Plenary – Closing Session
13.00	Opening plenary by Paola Iannone	Plenary by Birgit Pepin	
13.45	Break	Break	
14.00	Session 1: Working	Session 3: Working	

	Group Parallel sessions WG1, WG2, WG3, WG4	Group sessions WG1, WG2, WG3, WG4	
15.30	Break	Break	
16.00	Poster presentations	Discussion group for early career researchers	
17.30	Break		
19.00	Discussion group: Remote teaching		

Members of the International Program Committee (IPC):

Chair of the IPC: Hans-Georg Weigand (Germany)

Co-chairs: Ana Donevska-Todorova (Germany/Macedonia)
Alison Clark-Wilson (UK)
Eleonora Faggiano (Italy)
Jana Trgalova (France)

Members: Andreas Eichler (Germany) – member of the ERME board
Ghislaine Gueudet (France) – member of the ERME board
Paola Iannone (UK) – link with TWG 21 (CERME12)
Birgit Pepin (Netherlands) – link with TWG 22 (CERME12)
Mariam Haspekian (France) - link with TWG 17 (CERME12)
Bärbel Barzel (Germany)
Annalisa Cusi (Italy)
Niels Grønbæk (Denmark)
Ornella Robutti (Italy)
Melih Turgut (Norway)
Osama Swidan (Israel)

Members of the Local Organizing Committee (LOC):

Chairs of the LOC: Zsolt Lavicza (Austria)
Robert Weinhandl (Austria)

Members: Markus Hohenwarter (Austria)
Sara Hinterplattner (Austria)

Venue:

Place: Online

Time: 16 – 18 September 2020

Intended number of active contributions: 80