
ERME Column

Paola Iannone (Loughborough University, UK) and Jason Cooper (Weizmann Institute of Science, Israel)

ERME Thematic Working Groups

The European Society for Research in Mathematics Education (ERME), holds a bi-yearly conference (CERME), in which research is presented and discussed in Thematic Working Groups (TWG). We continue the initiative of introducing the working groups, which we began in the September 2017 issue, focusing on ways in which European research in the field of mathematics education may be interesting or relevant for research mathematicians. Our aim is to extend the ERME community with new participants, who may benefit from hearing about research methods and findings and who may contribute to future CERMEs.

Introducing CERME's Thematic Working Group 21 – Assessment in Mathematics Education

Group leaders: Paola Iannone, Michal Ayalon, Johannes Beck, Jeremy Hodgen and Francesca Morselli

TWG21 is concerned with the role of assessment in the teaching and learning of mathematics at all educational levels and has so far met twice, at CERME10 (Dublin, IRL) and CERME11 (Utrecht, NL). Given the importance that mathematicians, researchers in mathematics education, students and teachers ascribe to assessment it is surprising that, prior to CERME10, there had been no TWG dedicated to this theme since 2001. Instead, the assessment of mathematics had been previously discussed in other working groups such as TWG14 for assessment at university level, TWG15–16 for computer aided assessment, and many others. With TWG21 we intend to offer our communities a forum to focus specifically on the assessment of mathematics and to gauge

what are the issues that most concern our communities when talking about assessment.

As TWG21 is a new TWG, we have intentionally kept the brief for the paper submissions very broad, including any type of assessment at any educational level. At CERME11 we received 14 research papers and three posters representing a wide variety of methodologies and foci. Papers presented in TWG21 have reported both large quantitative studies on the validity and reliability of standardised tests in school settings as well as small qualitative case studies of the impact of formative assessment on student learning at university level. The importance of focusing on assessment originates from the pervasive impact that assessment has on the learning of mathematics at all levels. For example, what we assess indicates to the students what we value, and the mode in which we assess our students can change the way in which they interact with the mathematics we teach. Indeed, students may engage superficially with mathematics learning if they perceive the assessment to require only memorisation.

When thinking about assessment, the first definitions that come to mind are those of *summative assessment* and *formative assessment*, as posed for example by Wiliam and Black (1996). In this framework, summative assessment is the assessment that has a feed-out function: results of summative assessment are used for certification, to progress through educational stages or to enter the workplace, while formative assessment has a feed-in function in that it informs subsequent teaching and learning and it is characterised by feedback. Indeed, formative assessment is an integral and necessary part of the teaching and learning cycle and supports students and teach-

ers in bridging the gap between actual achievement levels and desired achievement levels (Knight, 2010).

The way in which both formative and summative assessment impact and provide information about student learning has been one of the central issues of discussion in TWG21. More specifically, four topics recurred in both the TWG21 meetings: the design, purpose and use of large-scale standardised tests; the implementation, affordances and drawbacks of computer-aided assessment (CAA), especially at university level, aspects of assessment that are germane to mathematics, e.g. how to best assess procedural and/or conceptual understanding in mathematics, and the impact of assessment on students' engagement and teachers' actions at all educational levels.

There are at least two aspects of the work of this group that are of relevance to university mathematics. The first is the discussion on the issues which are germane to assessing mathematics, which also links to the use of CAA. The papers discussed as part of these themes addressed both the nature of the reasoning that can be assessed by CAA and the way in which CAA systems can provide tailored feedback to students. This is of particular relevance to university mathematics because, in this setting, classes can be very large and assessment very time-consuming. The research in this field so far indicates that there are CAA systems which are suitable for the assessment of mathematics at university level when the assessment is of procedural proficiency. Some of these systems, as the ones presented in the papers of TWG21, can also offer formative feedback tailored to students' responses. The possibility of obtaining formative feedback makes these systems suitable for formative tasks which can also be very time-consuming for large classes. The ready availability of the outcomes of the formative tasks may allow university teachers to review such tasks and take into consideration the outcomes for subsequent teaching.

The second aspect relevant to assessing university mathematics is the investigation of affordances and

drawbacks of assessment methods, both formative and summative, which are different from the standard closed book, timed written exam. The closed book exam is ubiquitous in university mathematics across all countries, but increasingly those who teach mathematics are encouraged to introduce small-scale assessment innovations for their students to include some variety. Part of the TWG21 work could be a discussion regarding the effects of these small assessment innovations on the students' experience, both in terms of what reasoning skills are assessed by these new methods and what the impact is of the new assessment on student engagement, both with the mathematics and more generally with their university studies. Papers of this sort could report on evaluation of assessment innovations designed collaboratively between mathematicians teaching the courses and mathematics educators, and could help our communities to understand the role of small evaluations of assessment interventions and how to design them. Studies like the ones outlined above also foster the much needed collaboration between mathematicians and mathematics educators.

TWG21 will meet for the third time in Bolzano, Italy, at CERME12. We are looking forward to consolidating our work, and hope to attract mathematicians, as well as mathematics education researchers, to contribute to the work of the group.

References

- Knight, P.T. (2010) Summative Assessment in Higher Education: Practices in disarray. *Studies in Higher Education*, 27(3), 275–286.
- William, D., & Black, P. (1996). Meanings and consequences: a basis for distinguishing formative and summative functions of assessment? *British Educational Research Journal*, 22(5), 537–548.

Paola Iannone's photo and CV can be found on page 47 in this Newsletter issue.

Jason Cooper's photo and CV can be found in previous Newsletter issues..