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Come and be counted

Topic Study Group 2.1: Mathematics education for students with special learning needs

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Team details*

Co-Chairs

Anette Bagger (Örebro University, Sweden; Anette.bagger@oru.se)

Karen Karp (Johns Hopkins University, United States; kkarp1@jhu.edu)

Members

Eugénie Kestel (Academic Clinics for Exceptional Students, Australia)

Cathery Yeh (University of Texas, United States)

IPC Liaison

Inge Schwank (Universität zu Köln, Germany)

Overview

Why some students find mathematics more difficult to learn than others has been a longstanding problem of concern to their teachers, families, and especially the students themselves. Researchers have also been concerned with finding solutions to these learning challenges. For students with learning difficulties with mathematics, in times past, the solution for many was placement in segregated settings, such as special schools or a single room within the school. Aside from separating these students from their peers and general education teachers, and in some cases the general education curriculum, the practice led to an insulated research focus in the special education field resulting in limited engagement with researchers from mathematics education research in

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general. Fortunately, in recent times, the two research fields are more connected, allowing considerable progress in the field. TSG2.1 aims to bring together current research and look for new directions to support low attaining students in mathematics.

This TSG seeks to explore early-stage projects, studies that are longitudinal, as well as research syntheses about what is known about supporting neurodiverse students with special learning needs in mathematics in inclusive settings (that is, the general mathematics classroom). More than just finding meaningful ways to have students engage in important mathematical ideas or how and why particular methods and strategies enhance student learning, this is an area of interest for students' long term success in schools, careers, and life where competency with mathematics concepts is essential.

There is a need to establish and study the difficulties learning mathematics that some students face. For some, these can be due to developmental differences (such as dyscalculia, ASD or ADHD), or disabilities (including intellectual, physical, sensory). For others, the direct cause is unknown but manifests in low performance levels. Learning difficulties in mathematics can have similar outcomes but arise from many factors. Teasing out these factors and finding ways to ameliorate their impact is of current concern for mathematics education researchers, and a focus of this TSG.

Areas of interest

In this TSG, we welcome both theoretical and empirical contributions that are focused on mathematics education for students with special learning needs. We are especially interested in contributions that investigate:

- The overrepresentation of some groups of students receiving learning support for mathematics, some of whom are excluded from inclusive settings.
- Pedagogies that emphasize problem solving, using multiple representations, and building patterns and generalizations over pedagogies that emphasize memorization and rote learning of procedure.
- Ways to enable students requiring intensive support to engage with the mathematics curriculum for their year level.
- Effective inclusive mathematics learning environments.
- Supporting mathematics and learning support teachers in co-teaching and in knowing the content of the "other".
- Promising co-teaching practices.

- Humanizing the mathematics educational experience for students with special learning needs.
- The impact of the pandemic on outcomes and practices for students with special learning needs.
- Developing and/or implementing effective mathematics assessments for students with special learning needs.
- Reframing neurodiversity as a strength rather than using a deficit model.
- Research paradigms (i.e., qualitative or quantitative, single-subject studies, classroom action research projects, systemic approaches that analyze the interaction between the teacher, the learner, and the mathematical content that works across a variety of learning settings (i.e., one-on-one, small group, whole class, resource room).
- Developing and/or implementing instructional strategies that are effective and broaden student access to important ideas.
- Effective curriculum materials and technologies.
- The role of cognitive science and brain research in supporting learners with exceptionalities (i.e., developing school-based interventions).
- Effective elements of teacher preparation programs that support preservice candidates to teach each and every student in mathematics classrooms.
- The characteristics of effective interventions across the grades.
- Connecting family and community knowledge in the support of students with special learning needs in mathematics.
- The role of multiple representations in supporting students' understanding of mathematical concepts.
- Professional development models for inclusive teaching for in-service teachers, interventionists, teacher aides and mathematics coaches.
- Diversity issues pertinent to sociopolitical and cultural aspects of teaching and learning.

How to make a submission to this Topic Study Group

Submissions for Topic Study Group Papers and proposals for Posters open 28 April 2023 via the official ICME-15 website, icme15.org. The website also contains a timeline of dates for the activity of the Topic Study Groups in the lead up to the Congress.

For questions about this TSG, please contact the Co-Chairs using the email addresses provided.