



## **TSG 20    Visualisation in the teaching and learning of mathematics**

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TSG 20 focuses on issues in visualization in the teaching and learning of mathematics at all levels. This group welcomes studies that tackle any of the following issues below.

- What is the role of visualization within and across mathematical knowledge disciplines?
- Are there kinds, qualities, and/or hierarchies of visualization and visual skills?
- What does progressive visualization mean? How does it emerge in mathematical activity?
- How do learners from different cultural contexts and of varying levels of ability and disability employ visualization in learning mathematics?
- Considering recent advances on embodied cognition in mathematics, what theoretical frameworks could link visual and haptic modalities in an effective manner?
- What theories on visualization can take into account the specific cognitive nature of mathematical activity and thinking?
- What methodological considerations must be accounted for in investigations that focus on visualization? For example, when are observations significant enough to make a strong claim that true understanding and acquisition from visual-mediated learning and/or teaching have taken place? What are the relevant variables in a stipulated theoretical framework that will provide the means to organize an experiment and interpret collected data and results? How should tasks, instruments, and measures be designed that will enable investigators to assess changes in students' understanding and learning?

- What aspects of mathematics teacher education programs will help teachers understand the affordances and challenges of using visualization as a learning tool in mathematics?
- Creativity in visualization and mathematics learning often yields adaptive knowledge for students and in some cases provides support towards growth in routine knowledge. What visual-based tasks can foster creativity leading to meaningful mathematical knowledge? Further, are visual-driven students more creative than nonvisual and other types of learners?

Syntheses of reports and other issues will also be considered. In particular, we note how recent and emerging technological tools and digital mathematics media enable learners to perform visual engagement and interaction. They integrate animations, interactive diagrams, interactive visual examples, and visual demonstrations. We seek to understand the challenges driven by the above and other similar examples.

At ICME-13 all the TSGs will have four 90-minutes timeslots at their disposal. This makes TSGs the prime forum for participation. Post-conference publications by Springer are also planned in the form of special volumes for each TSG.

Activities of TSG 20 will include:

- One to two special invited presentations (sessions I and IV)
- Regular research paper presentations and follow up brief discussions (sessions I through IV)