TSG 54   Semiotics in mathematics education

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The aim of TSG 54 at ICME-13 is to explore the significance—for research and practice—of semiotics for understanding issues in the teaching and learning of mathematics at all levels.

The following are possible topics that are relevant:

- **Semiotics and the significance of signs of various types in mathematics education:**
    - semiotic perspectives within mathematics education, including teacher education;
    - sign use and mathematics meaning-making processes;
    - modes of mathematical narrative through different sign systems;
    - relationship between sign systems (e.g., natural language, diagrams, pictorial and alphanumeric systems) and transformations between sign systems in mathematics thinking and learning;
    - inventing and generalizing with visual, alphanumeric, and other sign systems;
    - semiotics and intersubjectivity.

• Semiotics as the focus of innovative learning and teaching materials:

Digital mathematics textbooks, instructional materials integrating interactive diagrams, interactive visual examples and visual demonstrations animations are included in this category.

In an attempt to understand the challenges driven by these and other examples our discussion will look at issues such as:

- Innovative visualization tools for teaching and learning;
- Design of activities and tasks that are based on interactive visual examples;
- Patterns of reading, using and solving with interactive linked multiple representations;
- Roles of diagrams, animations and video as instructional tools with new technologies.

• Components of various semiotic theories.

- Embodiment, gestures, and artifacts in mathematics education;
- Linguistic theories and their relevance in mathematics education;
- Social, cultural, and historical aspects of semiosis;
- Characteristics of semiosis, including semiotic chaining and the use semiotic nodes and bundles.

Keynote speakers and titles of presentations:

Candia Morgan, UK: *Using social semiotics to explore institutional assumptions about mathematics, students and teachers.*

Michael Otte, Germany and Brazil: *Mathematics, natural science and generalization.*

Adalira Sáenz-Ludlow, USA: *Diagrammatic and inferential reasoning: An illustration in geometry.*

Luis Radford, Canada: *The ethic of semiosis and the classroom constitution of mathematical subjects.*

Michael Roth: *Birth of signs: From triangular semiotics to communicative fields.*