

# Topic Study Group No. 31: Language and Communication in Mathematics Education

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## The Program

Language and communication are recognized to be core components in the teaching and learning of mathematics, but there are many outstanding questions about the nature of interrelationships among language, mathematics, teaching, and learning. Recent research has demonstrated the wide range of theoretical and methodological resources that can contribute to this area of study, including those drawing from cross-disciplinary perspectives influenced by, among others, sociology, psychology, linguistics, and semiotics. In this topic study group participants presented and discussed the latest research in language and communication in mathematics education internationally.

This TSG invited presentation, discussion, and reflection on the latest research on language and communication related to learning and teaching mathematics. We use “language and communication” in its broadest sense to mean the multimodal and multi-semiotic nature of mathematical activity and communication, using not only language but also other sign systems. We thus welcomed contributions focusing on all modes of communication—oral, written, gestural, visual, etc. The TSG built on the strong body of research in mathematics education that addresses these issues and also considered important questions that remain.

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**Co-chairs:** Judit Moschkovich, David Wagner.

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Several themes described in the TSG31 description were addressed during the main sessions: the role of theory in understanding language and communication in mathematics education; multiple methods for researching mathematics education; relationships among language (and other sign systems), mathematical thinking, and learning mathematics; language, communication, and mathematics in classrooms and communities; and using theoretical and methodological tools from other disciplines such as linguistics, semiotics, discourse theory, sociology, etc.

The aim of TSG31 at ICME-13 was to examine and discuss research on mathematics education focused on language and communication. The TSG had 13 presentations in the main TSG sessions and 16 oral communications. Each main session concluded with a period of discussion of cross-cutting themes. A joint session was also organized with TSG32 (Mathematics education in a multilingual and multicultural environment).

***Panel: “Trajectories of Research on Language and Communication in Mathematics Education: Where We Have Been, Where We Are Going”***

The panel include the following three presentations:

**Some sixty years of language data in mathematics education: A brief and skewed history**

David Pimm, Simon Fraser University, Canada

**Recommendations for research on language and learning mathematics**

Judit N. Moschkovich, University of California, Santa Cruz, CA, U.S.A.

**Subject specific academic language versus mathematical discourse**

Marcus Schütte, Technical University Dresden, Germany

***TSG Session 2***

This session included the following three presentations:

**Identity fostered language communication in a mathematics classroom: An Analysis**

- Arindam Bose, University of South Africa, South Africa
- K. Subramaniam, Tata Institute of Fundamental Research, India
- Mamokgethi Phakeng, University of South Africa, South Africa

**A teacher’s use of revoicing in mathematical discussions**

- Kaouthar Boukafri, Universitat Autònoma de Barcelona, Spain
- Marta Civil, University of Arizona, USA

- Núria Planas, Universitat Autònoma de Barcelona, Spain

**The significance of linguistic negotiation in inclusive learning of mathematics in primary school**

- Judith Jung & Marcus Schütte, Technical University Dresden

### *TSG Session 3*

This session included the following three presentations:

**How can teachers provide learning opportunities for oral explanations?**

- Kirstin Erath, TU Dortmund University, Germany

**Four-year old language repertoire in a counting situation**

- David Wagner, University of New Brunswick, Canada
- Annica Andersson, Stockholm University, Sweden

**Making student explanations relevant in whole class discussions**

- Jenni Ingram, Nick Andrews & Andrea Pitt, University of Oxford

**From a question to questioning within context**

- Jin-Woo Cho, Seoul National University
- Eun Jung Lee, Korea Foundation for the Advancement of Science & Creativity
- Min-Sun Park, Seoul National University
- Kyeong-Hwa Lee, Seoul National University

### *TSG Session 4*

This session included the following three presentations:

**How learners communicate their mathematics reasoning in a mathematics discourse**

- Benadette Aineamani, Pearson Holdings, South Africa

**Authority and politeness: A combined analysis of a teaching episode**

- Konstantinos Tatsis University of Ioannina, Greece
- David Wagner, University of New Brunswick, Canada

### **“I am sorry: I did not understand you”: The learning of dialogue by prospective teachers**

- Raquel Milani. Federal University of Rio Grande, Brazil

## **Joint Session with TSG32**

The joint session of TSGs 31 and 32 provided the opportunity for participants in the two TSGs to discuss common concerns and significant distinctions in mathematics education research on language considering (or not) multi-lingual and multi-cultural dimensions. The joint session consisted of a panel and discussion focused on the theme: “Intersections and differences in work on language in monolingual and multilingual/multicultural classrooms and settings”. The panelists were Richard Barwell, Arindam Bose, Aldo Parra, Jackeline Rodrigues Mendes, Dave Wagner and Lena Wessel. The panel was chaired by Judit Moschkovich and Marcus Schütte. As a prompt for the discussion, the panelists provided a handout of some provocative statements related to the TSG foci (which we do not have the space to include in this report) and participants were invited to discuss the following questions:

- What do you see or experience as points of intersection between these two foci: mono and multilingual/multicultural?
- What do you see or experience as differences between these two foci: mono and multilingual/multicultural?
- Why do you think these two topics are treated as separate?
- How can insights from one focus contribute to the other focus and vice versa?

A productive discussion of these questions involving panel members and the audience then ensued.

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