

DISCUSSION GROUP
SEMIOTICS IN MATHEMATICS EDUCATION RESEARCH

Coordinators

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For at least ten years, mathematics educators have incorporated different theoretical semiotic frameworks into an already rich set of psychological, anthropological, linguistic, and sociological theories to analyze the teaching practice and the learning of mathematics in-and-out of the classroom. The purpose of the group is to continue the discussion on how different semiotic perspectives contribute to our understanding of cognitive, linguistic, and social issues in the teaching and learning of mathematics. Six scholars, who have been using semiotics as a theoretical framework in their research activities, have been invited to contribute to the discussion.

In the first session, the contributors will discuss different semiotic aspects of classroom communication namely the role of signs for coding, indicating, and constructing mathematical knowledge; the semiotic reciprocity between referring, expressing, and addressing in educational settings that takes into account curricula, textbooks and classroom in a holistic manner; and the power of Buber's "I-Thou-We" triad to coordinate the wide spectrum of students' experiences and arguments in undergraduate and graduate courses on problem-solving and design.

1. The communicative and cognitive role of mathematical signs: An epistemological perspective on mathematical interaction
Heinz Steinbring Universität Dortmund, Germany
2. From utterances to genres in mathematics education (and vice versa): A dynamic triadic (socio-) semiotics exemplified
Sigmund Ongstad Oslo University College, Norway
3. The significance of dialogue in problem-solving using Buber's triad "I-Thou-We"
C. Jotin Khisty Illinois Institute of Technology, USA

In the second session, the contributors will pursue different semiotic venues to offer an enriched view that balances social and individual aspects of mathematical knowing and the role of signs in learning and doing mathematics. The papers will discuss the nature of the writing activity of mathematical text on the part of mathematicians in contrast to that of secondary school students; the complementarity of diagrammatic reasoning and conceptual thinking; and the pivotal role of signs in reading, writing and thinking mathematically.

1. What does social semiotics offer to mathematics education research?
Candia Morgan University of London, UK
2. How diagrammatic is mathematical reasoning?
Willi Dörfler Klagenfurt, Austria
3. A semiotic perspective on mathematical activity
Paul Ernest University of Exeter, UK

At the beginning of June 2002, the papers will be posted in the web site <<http://www.math.uncc.edu/~sae/>> that was established for the PME25 discussion group on semiotics so that participants will have the opportunity to read them beforehand. Contributors will give the participants a birds'-eye-view of the main ideas in their papers and will elicit discussion on different issues. Each presenter is allowed 25 minutes to achieve these two goals. Five minutes are saved for transition between presenters.