

*Epistemological beliefs and communication in mathematics education
at upper secondary and university levels*

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This short report presents the outline for a project that will commence in 2008.

Beliefs of many kinds, and perhaps especially epistemological beliefs, are often described as an important factor in relation to learning – both from a more general perspective and also in particular when it comes to learning mathematics. However, the study of people’s beliefs is not a trivial matter. McLeod and McLeod (2002) note several different types of definitions of the term belief that are being used within the research community, but they also see a “general agreement on the core commonalities of the construct” (p. 115). In order to discuss methodological problems one needs a more in-depth discussion about the definition of beliefs (which there is not much room for here). As an example, if we limit ourselves to a cognitive perspective, we can on the one hand distinguish between knowledge and beliefs (Abelson, 1979), where beliefs are of a more subjective nature, for example that you are aware that different persons can have different beliefs about the same matter, while knowledge is something that is more collectively in common. On the other hand, we can focus on similarities between beliefs and knowledge, for example that both can affect how you express yourself when communicating with others or how you interpret situations you are faced with. Using this latter perspective, my study about students’ interpretations of mathematical texts yielded complex relationships between beliefs, prior knowledge and reading comprehension, where beliefs did not have a clear and independent effect on reading comprehension (Österholm, 2006).

This project will study the communication in mathematics education at upper secondary and university levels, where focus is on epistemological beliefs. Thereby, the mathematical content in itself is not primarily in focus, but the questions focus on how the mathematical content is treated, from an epistemological perspective. Regarding epistemological beliefs and communication, the following perspectives will be studied:

- How epistemological beliefs can be seen as a part of communication; what types of beliefs are mediated in different situations?
- How epistemological beliefs can affect communication; how can beliefs affect how you express yourself and how you interpret what others have expressed?
- How epistemological beliefs can be affected by communication; how can beliefs be affected by how someone expresses oneself and how you interpret this?

Existing differences between upper secondary level and university level regarding mathematics education have been attended to in research, both internationally and also specifically for Sweden. Thunberg and Filipsson (2005) noted a gap between the content that is covered at the different levels in Sweden, and also a kind of cultural gap was noted (e.g., regarding the use of calculators). Whether such differences stem from differences in epistemological beliefs is unclear, and also if and how these differences affect the students' epistemological beliefs.

Regarding mathematics education at the university level, the teacher education could be of special interest to study, since student teachers not only go through the transition from upper secondary to university level, but also go through a transition from being a student to becoming a teacher. Therefore, student teachers can be exposed to different epistemological perspectives through different kinds of courses; content courses focusing on the students' own learning of mathematics and didactical courses focusing on their development as future teachers of mathematics.

The perspectives and questions mentioned above will be studied at different educational levels:

- At university level, the variation of communicational situations that the students face will be studied; the communication between students and other persons (such as lecturers, teachers, and tutors) and the communication in different types of courses within teacher education (such as content courses and didactical courses).
- Upper secondary level is studied for comparison with university level.

This project aims at producing results that are of interest from different perspectives:

- Theory: To deepen the knowledge about beliefs, in order to create more in-depth models about how beliefs can affect or are affected by different educational situations.
- Methodology: To develop existing methods for studying beliefs.
- Practice: To deepen the knowledge about possible differences between upper secondary and university levels. To gain knowledge about possible variations within teacher education programmes and how these can affect students.

References

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