

## TOWARDS A COMMON CHARACTERIZATION OF BELIEFS AND CONCEPTIONS

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The purpose of this paper is to draw attention to theoretical deficiencies of belief research (cf. Furinghetti & Pehkonen 1999). The concept of belief (and other related concepts) are often left undefined or researchers give their own definitions which might be even in contradiction with each.

On the ground of the previous considerations we have worked out a questionnaire in which we listed from the recent literature (1987–98) nine belief characterizations which focus on one or more terms of the triad in question (beliefs-conceptions-knowledge). In March 1999 we sent via e-mail our questionnaire to the 22 specialists invited to the international meeting "Mathematical Beliefs and their Impact on Teaching and Learning of Mathematics" (see Pehkonen & Törner 1999).

Our first observation was that in the responses of the specialists, there was no clear pattern to be observed. But in some points, one can find some regularity. The answers were most unified in one characterization (*"Beliefs and conceptions are regarded as part of knowledge. Beliefs are the incontrovertible personal 'truths' held by everyone, deriving from experience or from fantasy, with a strong affective and evaluative component."*) in which 15 specialists (83 %) disagreed with the statement. Then we have singled out quite clearly two central features determining the disagreement: the adjective *incontrovertible* and the *relation between beliefs and knowledge*. In gathering the criticisms and the constructive parts of the answers that we had at disposal we realized that there are points on which future research may be based.

In summarizing the results, we propose for studying beliefs and the related terms a list of basic recommendations, which should be used flexibly according to the situation, analyzed. They are, as follows: to consider two types of knowledge (objective and subjective); to consider that beliefs belong to subjective knowledge; to include affective factors in the belief systems, and distinguish affective and cognitive beliefs, if needed; to consider degrees of stability, and to leave beliefs open to change; to take care of the context (e.g. population, subject, etc.) and the research goal in which beliefs are considered.

### References

- Furinghetti, F. & Pehkonen, E. 1999. A virtual panel evaluating characterizations of beliefs. In: Mathematical beliefs and their Impact on Teaching and Learning of Mathematics (eds. E. Pehkonen & G. Törner), 24-30. Schriftenreihe des Fachbereichs Mathematik. Gerhard-Mercator-Universität Duisburg Gesamthochschule. Preprint Nr. 457.
- Pehkonen, E. & Törner, G. (eds.) 1999. *Mathematical beliefs and their Impact on Teaching and Learning of Mathematics*. Schriftenreihe des Fachbereichs Mathematik. Gerhard-Mercator-Universität Duisburg Gesamthochschule. Preprint Nr. 457.