

## **Communicative Interaction and Qualitative Reasoning**

***Bert Bredeweg***

University of Amsterdam

Department of Social Science Informatics (S.W.I.)

Amsterdam (The Netherlands)

The importance of qualitative reasoning for computer-based learning environments is often associated with the need for generating explanations. In this presentation we claim a much wider and partly different role for qualitative models in software artefacts for education. Such a wider role for qualitative reasoning is not obvious, on the contrary. A few problems can be pointed out.

An important contribution of research on qualitative reasoning has been the emphasis on making implicit notions explicit. But what used to be an insightful idea at the time seems to have become unclear over the years. What does it exactly mean to be explicit, to be articulate? Is there a norm to evaluate the explicitness of a model or a simulation?

Another problem concerns the idea of common-sense reasoning and the notion of naive physics. Again, at the time it seemed obvious that intelligent problem solvers would be equipped with such reasoning capabilities. Not anymore.

The idea of wanting to develop such an inferior physics has been condemned by physicists and experts from other disciplines. They considered it naive, and not very serious. A third problem originates from research on education. There was a time that many of us thought that it was feasible to construct artificial artefacts that would be able to replace human teachers, so called intelligent tutoring systems. Not only is there doubt about the intellectual capabilities of computer software, there is also the idea that such 'know-it-all' programs are not the kind of teachers we want for our students. Instead, learning is seen as an active process, in which learners discover insights and construct their knowledge. The teacher should become a facilitator.

These problems cannot be ignored when studying the use of qualitative reasoning for educational purposes. We have to analyse our initial research goals and see how they compare to the current scientific insights. In this presentation we will therefore investigate the notion of 'communicative interaction', a modern concept that highlights fundamental aspects of learning. Using that concept, the original ideas underpinning qualitative reasoning will be analysed for their accurateness. We will also search for new goals and stress alternative uses of the technology. A considerable part of the talk will discuss the potential of qualitative reasoning for the construction of knowledge articulation and knowledge communication tools. Software artefacts that we believe have a high potential for facilitating the knowledge construction process of modern learners.