

ABSTRACT

Title: Renderings & Reasoning: Studying Artifacts
in Human Knowing
Language: English
Keywords: science education, representations, interactive
learning environments, cognitive development
ISBN: 41-7346-490-2

Today, we are in the midst of a rapid development of digital technologies. Following this development in our communicative infrastructure, many far-reaching claims about the promises of multimedia learning have been, and are still, made. For instance, in research on multimedia and interactive learning environments one will typically find claims to the effect that modern technologies offer radically new and innovative forms of presenting and communicating information. These instructional technologies are sometimes claimed to be *interactive*, to have *real-time* features, to offer rich *animations* in a *multimodal* environment and so forth. Such descriptions, however, risk oversimplifying and concealing much of the variation that characterise the *use* of technologies.

Accordingly, one aim of this thesis is to go beyond the employment of general categories and abstract analytical concepts when discussing the relation between technologies and learning. Through four separate studies, practical actions and practical reasoning performed in technology-mediated learning environments are scrutinized. The outcomes of the empirical investigations are illustrations of some of the aspects that can go unnoticed if handling these matters in the abstract.

As a theoretical contribution in the longstanding debate on human knowing, the research further illustrates how human reasoning is dependent on tools. One general observation is that when people are familiar with a particular tool (e.g., maps), they can accomplish sophisticated modes of reasoning that they seem unable to perform without such support in external devices. At a methodological level, the results point to the gains of investigating the *interactions* between people, and between people and technologies. Some concrete aspects of the interaction with explicit pedagogical consequences are attended to. In one analysis, it is shown how the use of a visually driven learning environment can become an interactive puzzle that keeps the students in a local and non-conceptual world. The results suggest that the mastery of conceptual knowledge that the students develop is tied to local features of the situation that they operate in. A different analysis shows how two instructional technologies – which have been described in similar terms – afforded different courses of action. It is argued that this difference is of crucial importance for what experiences the students had and, hence, for what they learned.