Title: Editorial: Analyzing (Self-)Monitoring in Computer Assisted Learning

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Recent generations of empirical research have emphasized the role of cognitive (cf. Dijkstra, Krammer & van Merrienboer, 1992; Lewalter, 2003) as well as metacognitive strategies in computer-assisted learning (Simons & De Jong, 1992; van den Boom, Paas, van Merrienboer & van Gog, 2004; Veenman, 1993). Especially the ability of self-monitoring has been shown to be a major moderating variable in self-directed learning with technology (e.g., Herrington & Oliver, 1999; Lan, 1996). However, there still is a need in development as well as application of methods to analyze and improve self-monitoring in individual as well as collaborative computer-assisted learning (CAL). Within this special issue, we combine methods from analysing self-monitoring within individual and collaborative CAL showing foundational similarities as well as diversities in application.

Three papers in this special issue contribute to analysis and fostering of individual CAL focussing on metacognition. The paper provided by Elmar Stahl, Stephanie Pieschl and Rainer Bromme addresses the influence of epistemological beliefs on metacognitive calibration during hypermedia learning. The effect of different epistemological instructions and beliefs on metacognitive calibration and learning outcomes is examined. Therefore, authors investigate in their study if learners are able to differentiate between tasks of different complexity, perform task and goal analyses and adapt their learning progress behaviour to these self-monitoring outcomes. Furthermore, the role of epistemological beliefs on this self-directed, adaptive process is analysed. Stahl et al. were able to show that there is a significant relationship between task complexity and epistemological beliefs as well as students' judgments. Their results indicate that students are able to monitor the complexity of tasks and are able to adapt their goal setting and planning accordingly. In addition, Stahl et al. show that learners with more sophisticated epistemological beliefs do better in task difficulty monitoring and calibration of their goal setting as well as planning.

John Nesbit, Philip Winne, Dianne Jamieson-Noel, Jillianne Code, Mingming Zhou, Ken MacAllister, Sharon Bratt and Wei Wang present a study analysing the correlation of students' achievement goal orientations and learning tactics as well as learning strategies in multimedia learning. Log-file analyses of learners' study tactics during studying a multimedia document revealed several relationships between goal orientation and cognitive engagement. Nesbit et al were, e.g., able to show that mastery goal orientation (approach or avoidance) was negatively related to the amount of highlighting. Furthermore, authors provide a methodological suggestion, claiming that the use of deeper learning tactics could be measured by counting notes or words in notes as traced during their hypermedia learning environment.

The contribution of Maria Bannert examines the influence of metacognitive prompting on hypermedia navigation. An experimental study is presented testing if prompting for reflection enhances hypermedia learning and transfer. Outcomes reveal that learning with reflection prompts leads to better transfer performance than without such an instructional strategy. However, this intervention did not automatically lead to increased metacognitive and strategic behaviour during hypermedia learning. Bannert explains this with methodological shortcomings of assessing metacognitive behaviour post-hoc. She rather suggests to combine offline subjective rating-scales with on-line assessment methods in further research.

Leaving the individual level of CAL, two contributions are concerned with analysis and enhancement of collaborative learning. Bernhard Ertl, Birgitta Kopp and Heinz Mandl focus on facilitating learners' collaborative knowledge construction in computer-mediated videoconferencing scenarios. They present two methods in order to facilitate collaborative case-based learning. The first approach is to scaffold collaborative online learning by means of collaboration scripts. The second method is to provide a modelling support using content schemes relevant for problem-solving. Ertl et al. were able to show on one hand that the use of a collaboration script reduced the level of learners' content-specific negotiation. On the other hand, the provision of the content scheme method reduced the level of strategic

negotiation during collaboration but significantly improved the collaborative case solution. The contribution of Joerg Zumbach, Peter Reimann and Sabine C. Koch provides a methodology for monitoring and fostering collaborative behaviour in computer supported collaborative learning by means of several feedback techniques. Authors developed specific feedback-based mechanisms in order to support group functions of well-being, member support, and productive learning outcomes. The authors present two studies analyzing the effects of collaborative online learning environments that are enriched by functions such as tracking, analyzing, and feeding back parameters of participation, collaboration, motivation, and emotional state to group members. Both studies showed advantages of feedback on processes of group well-being, parameters of participation, interaction and collaborative behaviour.

The final contribution and general discussion of the articles in this special issue is provided by Ingo Kollar and Frank Fischer. They present a theoretically and empirically based framework for using computer-supported learning environments in enhancement of self-regulated learning.

Taken together, the contributions in this special issue provide diversity in design of learning environments, studies and intervention techniques. But they also show homogeneity in analysing and fostering monitoring and self-monitoring in order to enhance self-regulated educational computing.

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