The complexity of support devices in learning environments

Geraldine Clarebout,

Center for Instructional Psychology and Technology

Katholieke Universiteit Leuven

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Perkins (1985) pointed out that learners do not always grasp learning opportunities when offered through information-processing technologies in learning environments. Follow-up studies have revealed that Perkin's findings do not only relate to opportunities offered through information-processing technologies. It seems to be a general issue when learners are confronted with instructional interventions. Not grasping learning opportunities has been shown in a diversity of studies ranging from research on adjunct aids (André, 1979; Greene & Land, 2000) to research on the use of student counselling at universities (Newman & Goldin, 1990; Ryan, Gheen, & Midgley, 1998).

In the case of multimedia learning, the lack of grasping learning opportunities is reflected in the non(adequate) use of tools. Tools refer to support devices that are added to a learning environment. They provide an opportunity for learners to get support in their learning process. Again, research on tool use reveals that these tools are seldom used, and if used often in an inadequate way such that it is no longer a learning opportunity (Aleven, Stahl, Schworm, Fischer & Wallace, 2003; Clarebout & Elen, 2006).

In view of establishing a solid research agenda on the optimization of the use of instructional interventions and tools, this presentation discusses four studies, each dealing with different aspects of tool use. In a first study, the impact on tool use of different types of adjunct aids, and of students' instructional conceptions was investigated. In a second study, the influence of advice on tool use is studied, while also considering various student related variables. In a third study, the different conditions of Perkins (1985) are taken as a starting point, namely (1) that the tools should be functional, (2) be recognized as such by the learner, and (3) that learners are motivated to use the tools point and are specifically addressed in the research questions. While the three first studies were more experimental, a final study is highly ecological. The use of electronic formative assessments in a regular freshmen course was analysed. Next, the overall results are discussed and some potential consequences for further research, as well as practical aspects are addressed.