

The 4th International Cognitive Load Theory Conference 2010
Proposal Data

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Title of the Proposal: The negative effect of guidance on learning based on primary knowledge

Session Format: Paper presentation

Abstract:

Aim.

Recent works in Cognitive Load Theory interpret previous empirical results in the light of the concepts of biologically primary and secondary knowledge (Sweller, 2008; Geary, 2008). If we apply this CLT's new formulation to the effect of guidance on learning, then guidance interferes with learning based on primary knowledge, or at least, unnecessary increases cognitive load, that is normally low for this type of knowledge. Instead, guidance would facilitate secondary knowledge learning. This type of learning involving a greater cognitive load, guidance would lead to decrease this load and promote learning, particularly for novices. The aim of this study is to test this general hypothesis. Two experiments were designed to test the first part of the hypothesis: guidance would impede learning based on primary knowledge. We also wanted to test two types of guided learning, mentioned in the "minimal guidance debate" (Kirschner et al. 2006; Schmidt et al., 2007): *strong guidance*, that can be opposed to problem based learning, and *feedback based guidance* that is not opposed to problem based learning (its provides a flexible adaptation of guidance, Schmidt et al., 2007).

Method.

150 students of the 6th grade participated to the experiment. Learning involved the determination of living beings (the first experiment focuses on flora, the second on fauna), which requires the expression of primary knowledge: categorization (Geary, 2007). Each experiment consists of four phases (learning, assessment, conceptualization and transfer) and three guidance modalities (strong

guidance, feedback based guidance, free exploration). At each step, we evaluated performances and cognitive load.

Results.

The first experiment showed that free exploration leads to a better learning than guided learning.

Guidance increases cognitive load and seems to inhibit the use of primary knowledge.

The second experiment involved a more complex task. Strong guidance has a small positive effect on learning and increases cognitive load. Feedback based guidance has a positive effect on learning.

Conclusion.

The results are coherent with our hypothesis. We are currently testing the role of guidance in secondary knowledge learning: phylogenetic classification of living beings (Geary, 2007).