



## Effect of Disfluency on Learning Outcomes, Metacognitive Judgements and Cognitive Load in Computer Assisted Learning Environments

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### Abstract

*It is important to confront with cognitive difficulties and sustain the cognitive activity level while executing learning tasks. Therefore, cognitive difficulties that are generated through extending traditional design boundaries can be innovative and instructionally fruitful. One of challenges leading individuals to deeper processing is the Disfluency Effect. According to this effect, interventions on instructional materials interfere with the fluency of perception that may reveal better learning outcomes. The probability of reaching better outcomes through slight modifications on instructional materials lead researchers to investigate this notion further. Thus, the role of disfluency on learning processes is a topic yet to be investigated. The aim of the current study was to investigate the effect of fluency-related interventions on learning outcomes, metacognitive judgements and cognitive load across undergraduate students in a computer-based learning environment. A recent search in the literature revealed that animations have not been investigated with regard to the disfluency. Besides, there have been few studies involving materials with varying fluency levels on the same screen. Thus, the current study is original in terms of employing varying fluency levels and addressing animations. A true experimental design was implemented with 314 undergraduate students in Fall 2017. Participants' working memory capacity and prior knowledge were measured before the intervention. Cognitive load and metacognitive judgements were addressed during and after the experiment. Findings revealed no significant differences with regard to learning outcomes and metacognitive judgements whereas significant differences were observed with regard to extraneous cognitive load. Significant relationships were observed across cognitive load, number of animations watched and learning outcomes. Findings were discussed in the light of the relevant literature followed by implications and suggestions for further implementations.*

**Keywords:** *Disfluency, Learning Outcomes, Metacognitive Judgements, Cognitive Load;*

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