Effective self-regulated science learning through multimedia-enriched skeleton concept maps

Title

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Abstract

This study combines work on concept mapping with scripted collaborative learning.
Purpose: The objective was to examine the effects of self-regulated science learning through scripting students' argumentative interactions during collaborative 'multimedia-enriched skeleton concept mapping' on meaningful science learning and retention.
Programme description: Each concept in the enriched skeleton concept map (ESCoM) contained annotated multimedia-rich content (pictures, text, animations or video clips) that elaborated the concept, and an embedded collaboration script to guide students' interactions.
Sample: The study was performed in a Biomolecules course on the Bachelor of Applied Science program in the Netherlands. All first-year students (N=93, 31 women, 62 men, aged 17–33 years) took part in this study.
Design and methods: The design used a control group who received the regular course and an experimental group working together in dyads on an ESCoM under the guidance of collaboration scripts. In order to investigate meaningful understanding and retention, a retention test was administered a month after the final exam.
Results: Analysis of covariance demonstrated a significant experimental effect on the Biomolecules exam scores between the experimental group and the control, and the difference between the groups on the retention test also reached statistical significance.
Conclusions: Scripted collaborative multimedia ESCoM mapping resulted in meaningful understanding and retention of the conceptual structure of the domain, the concepts, and their relations. Not only was scripted collaborative multimedia ESCoM mapping more effective

than the traditional teaching approach, it was also more efficient in requiring far less teacher guidance.