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Proceedings of the Annual Meeting of the Cognitive Science Society

Title
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Permalink

Journal

ISSN

Authors
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Publication Date
2007

Peer reviewed

The Effectiveness of Modeling on Learners' Motivation and Self-Regulated Learning of Science with Hypermedia

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Introduction

Although hypermedia environments offer learners the potential to build deep conceptual understanding of complex and challenging topics, this potential can be limited by learners' ability to utilize self-regulated learning (SRL) processes such as setting and working towards suitable learning goals, monitoring their varying level of understanding, and deploying effective learning strategies (Azevedo, 2005). Because few learners in America develop the kinds of skills essential for achieving deeper understanding, rather than shallow declarative knowledge, it is important to investigate the possible benefit that modeling holds for facilitating acquisition of SRL skills.

According to the social-cognitive theory (SCT) of self-regualted learning (SRL), one can develop competence in self-regulated learning by observing human and non-human (e.g., pedagogical agents) deploying the same processes (Zimmerman, 2001). According to the SCM model of SRL, self-regulated competence develops throughout four levels: the observational level, the emulative level, the self-controlled level, and the self-regulated level. As such, the current research is aimed at fostering learners' SRL competence through cognitive modeling (i.e. observation). Research has demonstrated that in addition to increasing participants' actual performance on academic tasks, cognitive modeling can increase learners' self-efficacy toward a given task (Zimmerman & Kitsantas, 2002). The experiment will compare performance and self-efficacy perceptions of learners in two modeling conditions: a Skilled Self-Regulated Learning modeling condition (SSRL) and a No Self-Regulated Learning modeling (control) condition.

Method

All participants were randomly assigned to either the SSRL or NSRL condition. The two condition videos were made by recording screen capture and audio 'think-alouds' from a 'learning session' on the digestive system using a commercial hypermedia environment. A research team member was given a script to follow for modeling several self-regulated learning activities while navigating through the environment. The SSRL modeling condition includes the audio from this script, which models skillful use of planning, monitoring, strategy use, and handling task difficulties and demands throughout. The NSRL (control) condition involves the exact same screen capture from the SSRL condition, without any audio 'think-aloud' provided.

The participants first are given 5 minutes to complete the pre-task version of the on-line motivation questionnaire (OMQ; Boekaerts, 2002), followed by 30 minutes to watch the condition-specific modeling video. Participants are then given 5 minutes to fill out another administration of the pre-task version of the OMQ and 20 minutes to complete the pretest on the circulatory system. Participants then have 30 minutes to use the same hypermedia environment to learn about the circulatory system, during which time think-aloud protocols are collected (Ericsson & Simon, 1993) and learner responses to 6 selected questions from the OMQ are collected every eight minutes. Finally, the participants are given 20 minutes to complete the posttest on the circulatory system, and 5 minutes to fill out the post-task version of the OMQ.

Expected Findings

With respect to the motivation measures, we expect results to demonstrate participants in the SSRL condition as having higher levels of self-efficacy immediately following exposure to the modeling video, when compared to the other group. We also expect that, at the end of the learning session, these participants will report self-efficacy ratings closer to their reported levels before attempting to learn. We anticipate that participants in the SSRL condition will deploy a greater number of effective SRL processes during learning and demonstrate greater shifts in mental models and learning measures from pre- to posttest.

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