Application of cognitive load theory to the evaluation of the effectiveness of alternate learning methods when real-time assessment and learning assistance is available (Learning with real-time self-assessment)

Paul Blayney - University of Sydney

This study will analyse the data from a spreadsheet assignment system that provides students with the ability to access immediate answer assistance and correctness. It will use cognitive load theory as the theoretical foundation for explaining the differential effectiveness of alternate assignment completion strategies. The expectation is that learner preparedness will interact with topic complexity in the determination of the most effective learning method. The study will compare short term learning effectiveness as evidenced by the speed and accuracy of assignment completion with long term learning outcomes as measured by student performance on equivalent final exam questions.

A key aim of this research is to investigate the learning effect of the provision of immediate feedback in conjunction with the preparedness of the learner. The research hypothesis is that learning methods will be substantially improved with the provision of immediate feedback. However, a further expectation is that the learning gains from such immediate feedback will be modified by the level of learner preparedness and by the complexity of the topic material.Participants for this study were undergraduate students enrolled in a second year management accounting course at the University of Sydney. This course was comprised of 320 students with approximately equal proportions of male and female students ranging in age from 18 to 25 years. The conceptual framework for this study is provided by cognitive load theory. Other research in this area has shown that the most effective instruction is modified according to the degree of learner expertise. While this outcome has been validated experimentally on many occasions other research has demonstrated that additional variables such as topic complexity may modify this result.

There are several potential significant outcomes from this study. Previous research (e.g. the expertise reversal effect) has shown that the best instructional methods are altered according to the learner's level of expertise and that the provision of immediate feedback is beneficial. This study should provide evidence on how and when to provide learners with informal assessment and thus allow instructors to design more effective learning instruments. This study will provide data to determine the levels of knowledge at which time it is desirable to alter instructional procedures. Furthermore the immediate feedback data will provide an opportunity to investigate the most beneficial means of providing such feedback.