

Mitigating Self-Regulation Issues in the Online Instruction of Math

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Abstract : Mathematics is one of the core subjects taught in the Australian K-12 education system and is considered an important component for future studies in areas such as engineering and technology. In addition to this, Australia has been a world leader in distance education due to the vastness of its geographic landscape. Despite this, research is still needed on distance math instruction. Even though delivery of curriculum has given way to online studies, and there is a resultant push for computer-based (PC, tablet, smartphone) math instruction, much instruction still involves practice problems similar to those original curriculum packs, without the ability for students to self-regulate their learning using the full interactive capabilities of these devices. Given this need, this paper addresses issues students have during online instruction. This study consists of 32 students struggling with mathematics enrolled in a math tutorial conducted in an online setting. The study used a case study design to understand some of the blockades hindering the students' success. Data was collected by tracking students practice and quizzes, tracking engagement of the site, recording one-on-one tutorials, and collecting data from interviews with the students. Results revealed that when students have cognitively straining tasks in an online instructional setting, the first thing to dissipate was their ability to self-regulate. The results also revealed that instructors could ameliorate the situation and provided useful data on strategies that could be used for designing future online tasks. Specifically, instructors could utilize cognitive dissonance strategies to reduce the cognitive drain of the tasks online. They could segment the instruction process to reduce the cognitive demands of the tasks and provide in-depth self-regulatory training, freeing mental capacity for the mathematics content. Finally, instructors could provide specific scheduling and assignment structure changes to reduce the amount of student centered self-regulatory tasks in the class. These findings will be discussed in more detail and summarized in a framework that can be used for future work.

Keywords : digital education, distance education, mathematics education, self-regulation

Conference Title : ICELDL 2019 : International Conference on E-Learning and Distance Learning

Conference Location : Sydney, Australia

Conference Dates : January 30-31, 2019