

BAR-ILAN UNIVERSITY

**The Effects of Online 'Powerful Learning Environments' on Self-Regulated Learning,
Technological Pedagogical Content Knowledge and Self-Efficacy about Technology
Integration among Preservice Teachers**

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ABSTRACT

Studies show that self-regulated learning improves academic performance and achievement. Educational research explores ways to promote it among learners. It is argued that teachers can promote it directly by teaching strategies and indirectly by designing powerful learning environments. Focusing on the latter, studies reveal that online educational settings foster self-regulation among learners. Nonetheless, teachers rarely exhibit self-regulation practices and also fail to effectively integrate technology in their teaching. Thus, the purpose of the study was to examine the effects of designing powerful learning environments (DeCorte) adapted to four sequential online environments: YouTube, WebQest, Wiki and Blog on the promotion of self-regulated learning, technology pedagogical content knowledge and self-efficacy about technology integration among preservice teachers.

The study had four hypotheses. First, there would be significant differences in the promotion of self-regulated learning. Second, there would be significant differences in the promotion of technology pedagogical content knowledge in these environments. Third, there would be positive correlations between self-regulated learning, technology pedagogical content knowledge and self-efficacy about technology integration. Fourth, there would be predictive relationships between the two last variables.

The study used convenience sampling of 43 preservice teachers enrolled in a compulsory online course of technology integration as part of a teacher training program. The study utilized aptitude and event measures: The Online Self-Regulated Questionnaire, Survey of Preservice teachers' Teaching and Technology and Computer Technology Integration Survey, Technology lesson Design Rubric,

"Moodle", a learning management system, activity logs and a reflective task. Data was analyzed by analyses of repeated measures, Pearson Correlations and Regression.

Data revealed significant differences in self-regulated learning. Preservice teachers' *Help Seeking* practices were significantly higher in the beginning of the course. Event measures detected that *Help Seeking* and *Goal Setting* practices were the highest after WebQuest. *Self Monitoring* practices were found the highest after YouTube- representing the first encounter preservice teachers had with the course academic requirements.

Data found no significant differences in technology pedagogical content knowledge of preservice teachers between the four environments. However, aptitude data detected that preservice technology content knowledge was significantly higher at all environments compared with the beginning of the course. Additionally, event data showed that preservice teachers got higher scores integrating technology into teaching practices represented in their lesson plans compared to their score in the beginning of the course.

Pearson Correlation Analyses revealed positive correlations between self-regulated learning, technology pedagogical content knowledge and self-efficacy about technology integration. The more preservice teachers perceived themselves capable to self-regulate the more they perceived themselves able to integrate technology onto their teaching practices and obtain this knowledge.

Regression analyses data found predictive relationships between self-regulated learning, technological pedagogical content knowledge and self-efficacy about technology integration. Specifically, *Time-Management* and *Help-Seeking* subscale measurements of self-regulated learning (Aptitude) and self-efficacy beliefs measured in the beginning of the course predicted technological pedagogical content knowledge

ratings. Moreover, technological content knowledge predicted technological pedagogical content knowledge total score- indicating that preservice knowledge about the way to utilize technology to present content knowledge is an important component. Lastly, content knowledge and technological content knowledge predicted the total average self-regulated learning ratings.

Findings confirm that designing online learning environments may facilitate self-regulated and technology pedagogical content knowledge among preservice teachers. Moreover, it highlights the practices and features that are mostly involved in these processes. It is suggested that to better facilitate these processes, instructors should consider providing learners with scaffolding. Scaffolding may be exhibited in rubrics, learning management tools such as forums and task feedbacks as well as reflective assignments. Moreover, as self-regulated learning, technology pedagogical content knowledge and self-efficacy about technology were found interrelated, instructors should consider developing self-efficacy beliefs about technology integration among preservice teachers a priority. Lastly, when designing a learning environment, instructors may want to consider including reflective tasks to enable learners to take an active role in the processes of developing self-regulation and technological pedagogical content knowledge and to allow instructors adapt these environments for maximum effect.

From a researcher point of view, the current study sheds light on the dynamic nature of self-regulated learning and technology pedagogical content knowledge promotion only to emphasize the need to consider utilizing quantitative and qualitative event measures to get a comprehensive understanding of these processes.