

Chapter 11

The Application of Web and Educational Technologies in Supporting Web-Enabled Self-Regulated Learning in Different Computing Course Orientations

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ABSTRACT

Many educational institutions provide online courses; however, the question whether they can be as effective as those offered in the face-to-face classroom format still exists. In addition, it also remains unclear whether every subject is appropriate to be delivered in web-based learning environments. Thus, the authors redesigned two courses with different orientations and conducted a quasi-experiment to examine the effects of web-enabled self-regulated learning (SRL) in different course orientations on students' computing skills. Four classes with 173 students from the courses 'Database Management System' and 'Packaged Software and Application' were divided into 2 (Design-oriented vs. Procedural-oriented) × 2 (SRL vs. non-SRL) experimental groups. The results showed that students who received the intervention of web-enabled SRL had significantly higher grades on the examination for certificates than those that did not receive this intervention, whether in design-oriented or procedural-oriented computing courses. Moreover, students in the two different courses had very similar scores, which resulted in non-significant differences in their end-of-term computing skills.

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INTRODUCTION

Innovative technologies, such as Internet, provide teachers with many interesting and useful tools that can be used to improve their teaching and students' learning (Martin-Blas & Serrano-Fernandez, 2009). The emergence of e-learning introduced substantial improvements in the way courses are taught and delivered, making this new channel of education widely accepted (Lykourantzou, Giannoukos, Mpardis, Nikolopoulos, & Loumos, 2009). However, as learners are free to access new information without restrictions through the Internet (Li, Tsai, & Tsai, 2008), a problem emerges regarding how to focus students' attention and regulate their learning. For example, it is indicated that many students do not perceive lack of time management skills as a learning problem (Löfström & Nevgi, 2007). Providing students with opportunities to integrate their knowledge through web-enabled instruction may not be effective if they lack the skills needed to regulate their learning (Chang, 2005).

It is commonly argued that a key challenge for online learning is to encourage learner participation (Hrastinski, 2008). E-learning requires more maturity and self-discipline from students than that in the traditional classroom (Zhang, Zhao, Zhou, & Nunamaker, 2004). Online learning differs from didactic presentation, where the student has few opportunities to deviate from the teacher's presentation of the material (Greene & Azevedo, 2007). How to improve students' regulated participation and help them achieve better learning effects may challenge many teachers who plan to implement e-learning for students (Lee, Shen, & Tsai, 2010). The learning strategies that prepare students for the rigors of learning at a distance and increase the probability of retention and success must be put into practice (Chang, 2005). In this regard, the authors applied the approach of self-regulated learning (SRL) to help students manage their time better and benefit from educational technologies and web-based learning environments.

Computing courses are diverse, and the teaching and content in different course types is also divergent. Some computing courses may emphasize Design-oriented skills, while others may focus more on Procedural-oriented skills. For example, a course on C++ may focus more on programming skills and require higher-order thinking, while those on document processors (e.g. Word) may emphasize more on operation and application of functions. Some researchers indicate that course type is a critical variable in the online learning context, raise the importance of course type in online learning environments and explore the effectiveness of online learning in different courses (Abel, 2005; Benbunan-Fich & Hiltz, 2002, 2003; Carnwell, 2000). Thus, the authors apply web-enabled SRL in this study to help students learn from different type courses, and also explored SRL effects on enhancing students' computing skills.

Many institutions of higher education provide online courses; the question remains as to whether they can be as effective as those offered in the traditional classroom format (Shelley, Swartz, & Cole, 2007). Educational researchers should explore what kinds of subjects are appropriate to be delivered through the Internet, and achieve the same levels, or even better learning effects than delivering the course in a traditional classroom. More studies are needed to provide references for teachers when technologies are used to enable students learning if teachers are to be able to reduce risk when introducing such new aspects into the learning experience (Ellis, Hughes, Weyers, & Riding, 2009). Therefore, the authors apply web-enabled SRL and innovative teaching technologies in two courses of 'Packaged Software and Application' and 'Database Management System', to develop students' regulated participation in online courses, and also explore the effects of web-enabled SRL on enhancing students' computing skills in using different application software.

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