

Chapter 7

The Effects of Combined Training of Web-Based Problem-Based Learning and Self-Regulated Learning

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ABSTRACT

This study explored, via quasi-experiments, the effects of the combined training in web-based problem-based learning (PBL) and self-regulated learning (SRL) on low achieving students' skill development. Two classes of 76 undergraduates in a one-semester course titled 'Web Page Programming and Website Planning' were chosen for this study. Results were generally positive, showing enhanced skills of website planning and higher levels of involvement. This study provided an illustration of a promising course design and its associated implementations in the specific context of low achieving students, for which there is lack of research in the current literature.

INTRODUCTION

A country's national competitiveness is contingent upon its quality of education system (Hong *et al.*, 2008). However, the computing education in vocational schools in Taiwan can hardly be deemed as

effective. Computing courses in Taiwan traditionally emphasize memorization by applying short, disjointed, lack-of-context examples. There is a gap between what is learned in school and what is required in the workplace (Wu, 2000). These competing forces imply that the number of qualified graduates produced by computing programs may not be sufficient to meet increasing industry

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demands (Akbulut & Looney, 2007). In order to develop students' practical skills, problem-based learning (PBL) is considered to be most appropriate. PBL uses real-world, simulated, contextualized problems of practice to motivate, focus, and initiate content learning and skill development (Dunlap, 2005). In this regard, we incorporated PBL as part of our online course designs to help students develop practical computing skills.

Through the Internet, learners are free to access new information without restrictions (Li *et al.*, 2008). However, implementing e-learning for low-academic-achieving students inevitably runs high risks. For instance, Internet addiction is quite common among low-academic-achieving students. It is also indicated that vocational students are more Internet-addicted than the general students (Yang & Tung, 2007). Many students browse shopping websites and play online games even while the teacher is lecturing in the classroom. This addiction to the Internet and the lack of on-the-spot teacher monitoring in web-based instruction makes it even more difficult for students to concentrate on online learning. Moreover, the teachers generally feel that students' lack of time management skills is the greatest problem and obstacle to learning in virtual environments. However, the students do not perceive lack of time management as a problem (Löfström & Nevgi, 2007). To respond to the challenges, we turn to an approach that can help students better regulate their learning and manage their time.

Success in online courses often depends on students' abilities to successfully direct their own learning efforts (Cennamo *et al.*, 2002). Self-regulation is particularly important when learning in Internet-supported environments (Winnips, 2000). Students' motivation may benefit from web-based instruction with self-regulated learning (SRL) strategies. Students in an online environment equipped with SRL competence become more responsible for their learning and more intrinsically orientated (Chang, 2005). However, there has been relatively little empirical research on students' SRL within complex technology-based

learning environments (Azevedo & Cromley, 2004). Therefore, we applied SRL in this study to help vocational school students concentrate on their learning, leave time for learning after their part-time jobs, and furthermore, take responsibility for their learning.

There are few studies that have discussed effective online teaching methods for university students. More, it seems that the restructuring and translation of traditional computing courses into e-learning is inevitable but has seldom been documented. Thus, we redesigned the computing course of 'Web Page Programming and Website Planning' to integrate innovative teaching methods and learning technologies to help students learn and apply what they have learned. Specifically, this study explored the potential effects of the combined training of web-based PBL and SRL on the development of students' skills on applying packaged software.

LITERATURE REVIEW

Problem-Based Learning

Problem-based learning (PBL) is a teaching method that may engage students in authentic learning activities that use professional problems of practice as the starting point, stimulus, and focus for learning (Barrows, 1985, 1986). PBL promotes student learning based on the need to solve problems. It not only emphasizes the learning of the subject area, but also provides opportunities for students to practice and apply many skills and knowledge. In the domain of Information Science, Greening *et al.* (1996) demonstrate in a teaching experiment that PBL really helps improve students' key competencies. Specifically, Yip (2001) points out that PBL can enhance competencies both in professional and information systems education. Moreover, students who learn in a realistic situation set by the web-enabled constructivist pedagogies may also experience increased involvement (Chanlin & Chan, 2004).

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