

Chapter 5.24

The Effects of Web-Enabled Self-Regulated Learning and Problem-Based Learning with Initiation on Students' Computing Skills

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ABSTRACT

Vocational degree earners represent a major portion of the work force in Taiwan. However, the reality of computing education in Taiwan's vocational schools is that it's not so practically oriented, revealing much room for improvement. In this context, we conducted a quasi-experiment to examine the effects of applying web-based self-regulated learning, web-based problem-based learning with initiation, and their combination to enhance students' computing skills. Four classes in successive years, with a total of 177 third-year students, were divided into 2 (SRL vs. non-SRL) $\times$ 2 (PBL with initiation vs. PBL without initiation) experimental groups. Results were generally positive. Results revealed that the effects of web-enabled SRL, web-enabled PBL with initiation,

and their combinations on students' computing skills have significant differences. We hope that the online teaching method applied in this study is also useful for those teachers engaged in e-learning, specifically, in vocational schools. [Article copies are available for purchase from InfoSci-on-Demand.com]

INTRODUCTION

The vocational education system in Taiwan constantly evolves to meet needs such as: the new demands for highly skilled manpower, continued progress of modern technology, worldwide economic development, changing industrial structure, and social/cultural changes. However, vocational education in Taiwan is highly competitive in that it must attract sufficient student enrollment in

the face of continually decreasing birth rate and rapidly increasing number of schools. Students' technical skills and the number of professional certifications earned are the main criteria when judging teachers' teaching performance and students' learning effects. However, students in these schools tend to have lower levels of academic achievement. They have low interest and negative attitude toward their learning (Chen & Tien, 2005), spend more time on part-time jobs, do not adequately get involved in their schoolwork, and don't care so much about their grades (Shen, Lee, & Tsai, 2007a). Teaching in such a context, particularly teaching courses in application software – with the target on earning certificates – is a great challenge to most educators.

Web-based instruction seems to be an ideal learning environment because students can access an almost unlimited amount of information and apply it in multiple ways (Kauffman, 2004). However, implementing e-learning for students with low self-regulatory skills inevitably runs high risks. It is a big challenge for teachers to help college students, who are often addicted to the Internet, engage in an online course in an environment with filled with millions of interesting websites, free online games, and online messenger. 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, 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). In this context, it is very important to develop students' skills of self-regulated learning (SRL) to manage their learning in web-based learning environments (Winnips, 2000). Therefore, SRL was applied in this study to help students develop regular learning habits.

Courses in application software traditionally emphasize memorization by applying short,

disjointed, lack-of-context examples. Even the professors in National Open University in Taiwan who teach on-the-job students Microsoft Office through television also tend to use short, inappropriate examples in their curricula. The lack-of-context examples in textbooks and used by lecturers may result in uncompetitive employees. There is a gap between what is learned in school and what is required in the workplace (Wu, 2000). In this regard, the computing education in vocational schools in Taiwan can hardly be deemed as effective. In order to increase students' learning motivation and to develop practical skills, problem-based learning (PBL) is considered to be one of the most appropriate solutions. PBL uses real-world, simulated, contextualized problems of practice to motivate, focus and initiate content learning and skill development (Boud & Feletti, 1991; Bruer, 1993; Williams, 1993). It is believed that PBL would help less academically inclined students to develop practical computing skills.

However, students with low academic achievement usually lack the ability to seek essential information and solve the problems they face, particularly in a web-based course without the teacher's on-the-spot assistance and monitoring. Thus, in a PBL environment, these students have to climb a stiff learning curve and overcome much resistance that might pose challenges to both instructors and students, particularly in the initial stage. This stiff learning curve may become a bottleneck and limit the potential effects of PBL. In this regard, we believe that a teacher should provide assistance to his/her students as they adapt to PBL. For example, establishing students' background knowledge and developing required skills is especially important before asking students to solve simulated problems. This could help students be more confident and more involved in the PBL environment and expand the effects of PBL.

As more and more institutions of higher education provide online courses, the question arises whether they can be as effective as those

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