

Chapter 17

How Much Can Computers and Internet Help?

A Long-Term Study of Web-Mediated Problem-Based Learning and Self-Regulated Learning

Chia-Wen Tsai
Ming Chuan University, Taiwan

ABSTRACT

Computing education in Taiwan is ineffective. Most teaching efforts in private vocational schools have been devoted to helping students pass tests through a “spoon-feeding” teaching method. Under such constraints, students may lose their long-term competence in practical terms. In this study, the author conducted a series of quasi-experiments to examine the long-term effects of web-mediated problem-based learning (PBL), self-regulated learning (SRL), and their combinations on students’ computing skills over three years. The author re-examined students’ long-term computing skills three years after the start of the related course. Results reveal that effects of web-mediated PBL, SRL, and their combinations on students’ long-term computing skills are significant. The implications for scholars and teachers engaged in online learning were also discussed.

INTRODUCTION

The challenge of maximizing students’ learning has been paramount in many nations (Sablonnière, Taylor, & Sadykova, 2009). In Taiwan, professionals with a vocational degree represent a major portion of the work force (Shen, Lee, & Tsai, 2008). It is particularly important to develop

practical skills for vocational students in Taiwan (Tai, Chen, & Lai, 2003). However, vocational school curricula in Taiwan have historically been based on the National Curriculum Guidelines. Thus, schools in this context did not have much freedom in curriculum development (Hsiao, Chen, & Yang, 2008). At the bottom tier of Taiwan’s education system are newly recognized private

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institutions that are mainly teaching-only institutes (Wu, 2009).

Most teaching efforts in private vocational schools have been devoted to helping students pass tests through a “spoon-feeding”, or didactic, teaching method. This traditional teaching method puts students’ attention less on mastering application software and more on preparing for tests through memorization. Consequently, a student who has passed the exam may still be unable to apply what was learned in school, and worse, lacks motivation to learn more in the future (Shen et al., 2008). In addition, the computing courses in Taiwan traditionally emphasize memorization by applying short, disjointed, lack-of-context examples. Learning from only such examples may result in uncompetitive employees. In this regard, computing education in vocational schools in Taiwan can hardly be deemed as effective (Lee, Shen, & Tsai, 2008). Students under such constraints may even lose their long-term competence and practical computing skills when they enter the workplace.

A country’s national competitiveness is contingent upon the quality of its education system (Hong et al., 2008). Technical and vocational skills development should be fully utilized by all in the labour market (Palmer, 2009). The importance of employees having a substantial foundation in basic skills and the ability to use technology to solve important problems has been indicated in other research (Bottge et al., 2009). However, the application software education in vocational schools in Taiwan can hardly be regarded as practically oriented.

In order to develop students’ practical and long-term computing skills, problem-based learning (PBL) is considered to be a most appropriate pedagogical choice. PBL is a method of organizing teaching by introducing relevant problems at the beginning of the instruction cycle to provide the context and motivation for the learning that

follows (Barrows & Tamblyn, 1980; Hussain et al., 2007). In PBL settings, students are required to collaborate in the same way as people tend to solve problems in real life (Oliver, 2008). Therefore, PBL was applied in this study to develop students’ long-term computing skills.

The topic of technology in higher education and online learning has for many years received increased attention among higher education researchers (Renn & Zeligman, 2005). However, institutions of higher education that provide online learning are currently being challenged by increasingly complex changes, including new demands for networked participation, the rapid development of new communication technologies, demand for emphasis on learning outcomes instead of teaching input and content, and postmodern ways of knowing (Kanuka et al., 2008). One major disadvantage of online learning cited by students is their sense of isolation and loss of personal interaction with instructors and peers (Billings, 2000; Buckley, 2003). In online learning environments, the physical absence of the instructor and the increased responsibility demanded of learners to effectively engage in learning tasks may present difficulties for learners, particularly those with low self-regulatory skills (Dabbagh & Kitsantas, 2005). 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). Therefore, there is a continuing debate about effective design of online learning environments (Azevedo, 2005; Jacobson, 2005).

Online learning is primarily self-directed learning because the learner attends lectures only to register time, place, subject, and to alter the order of attending future lectures (Lee & Lee, 2008). Success in online courses often depends on students’ abilities to successfully direct their own learning efforts (Cennamo, Ross, & Rogers, 2002). Therefore, it is suggested that students should have

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