Chapter 10
Facilitating Students to Earn Computing Certificates via Blended Learning in Online Problem-Solving Environment: A Cross-Course-Orientation Comparison

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ABSTRACT
The vocational schools in Taiwan regard professional certifications as a badge of skills achievement. However, due to a national policy, pure online courses are not permitted. Moreover, it remains unclear whether every subject is suitable to be delivered via online courses. In this regard, the author conducted a quasi-experiment to examine the effects of applying blended learning (BL) with different course orientations on students’ computing skills, and explored the appropriate combination for teachers who teach computing courses. Four classes in successive semesters, with a total of 195 students from the courses of ‘Database Management System’ and ‘Packaged Software and Application’, were divided into 2 (Design-oriented vs. Procedural-oriented) × 2 (BL vs. Traditional Learning) experimental groups. The results showed that students from both design-oriented and procedural-oriented courses delivered in BL environment, had significantly higher grades on the examination for certificates than those who learned in traditional learning environment.

INTRODUCTION
Computing certification verifies that one is able to use a computer and apply common computer applications at a certain level of competence (Pfefer, 2002). These computing certifications, such as Microsoft Office Specialist (MOS), assist companies to increase the potential that a job candidate has the technical capabilities, skills, and other competencies to make a valuable employee (Anderson, 2007). These certifications exist to varying levels elsewhere in the world (McGettrick, Boyle, Ibbet, Lloyd, Lovegrove, & Mander, 2005), and are nationally or internation-
ally standardized as they provide a unique measure of computer skills (Vakhitova & Bollinger, 2006). In this regard, many private vocational schools, facing the high pressure of market competition, often emphasize the proportion of students awarded technical/vocational certificates before they graduate. Teaching in this partition usually focuses on helping students to pass certification examinations (Shen, Lee, Tsai, & Ting, 2008). The quality and quantity of a student’s certificates is an important criterion when applying for admission to universities or graduate schools. Therefore, how to help students enhance their professional skills and pass the examination for certificates is the major concern to many teachers in vocational schools in Taiwan.

In many educational settings, it may be inappropriate to ask students to work on actual problems in limited time, space, and context for evaluation. Thus, it is critical to find the evidence that students possess ability in solving particular classes of problems through a suitable assessment format (Wang, Chang, & Li, 2008). In the courses that target professional certifications, teachers usually focus their course content on problem-solving processes, and evaluate students’ skills of solving simulated problems as examinations. That is, students have to learn and practice the problem-solving processes for earning professional certifications. Technological problem-solving skills provide students with the opportunity and facility to fulfill the various requirements of the technological design process, regardless of learning environment type (Walmsley, 2003). However, different certifications or courses may focus on design-oriented or procedural-oriented computing skills. For example, a course on Java or website planning may focus more on the design content and thinking, while those of Word or PowerPoint may emphasize more on manipulation. In this regard, the author attempted to explore whether courses of different natures are similarly appropriate to be conducted in online learning environment.

Universities and colleges across the United States have experienced an exceptional growth in the demand for online course instruction in the recent years (Ray, 2009). Nevertheless, the policy of e-learning in Taiwan is relative conservative in contrast with that in the U.S. For example, earning an academic degree entirely through online courses is still not allowed at present. Moreover, some universities only allow a teacher to deliver online classes for less than fifty percent of the whole semester’s course. Thus, teachers in some nations with conservative institutions, such as Taiwan, have to adopt a mode of blended learning (BL) rather than pure online learning when implementing e-learning.

BL is a flexible approach to course design that supports the blending of different times and places for learning, offers the convenience of fully online courses without the complete loss of face-to-face contact. With regard to the effects of BL in previous research, a positive effect of blended e-learning on students’ attitude toward computer and mathematics was found (Yushau, 2006). Moreover, students in a BL group attained significantly higher average scores than those in a traditional teaching group. The BL group had a significantly higher percentage pass rate than the traditional teaching group. It is believed that BL is more effective than traditional teaching (Pereira, Pleguezuelos, Meri, Molina-Ros, Molina-Tomás, & Masdeu, 2007). Therefore, BL is applied in this study to help students learn and develop their skills in using application software, and be examined as to its potential effects.

As more and more 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). However, one of the main reasons for this real or perceived low impact of ICT-based tools on students’ learning is that technology has often been introduced as an addition to an existing, unchanged classroom setting (De Corte, 1996; Bottino & Robotti, 2007).
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