Effects of teaching and learning styles on students’ reflection levels for ubiquitous learning

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ABSTRACT

Ubiquitous learning (u-learning), in conjunction with supports from the digital world, is recognized as an effective approach for situating students in real-world learning environments. Earlier studies concerning u-learning have mainly focused on investigating the learning attitudes and learning achievements of students, while the causations such as learning style and teaching style were usually ignored. This study aims to investigate the effects of teaching styles and learning styles on reflection levels of students within the context of u-learning. In particular, we investigated the teaching styles at the dimensions of brainstorming and instruction and recall and the learning styles at the dimensions of active and reflective learning. The experiment was conducted with 39 fifth grader students at an elementary school in southern Taiwan. A u-learning environment was established at a butterfly ecology garden to conduct experiments for natural science courses. The experimental results of one-way ANCOVA show that those students who received a matching teaching–learning style presented a significant improvement in their reflection level. That is, matching the learning styles of students with the appropriate teaching styles can significantly improve students’ reflection levels in a u-learning environment.

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1. Introduction

The convenience and effectiveness of employing mobile devices in learning activities has grabbed the attention of educators around the globe (Uzunboylu, Cavus, & Ercag, 2009). Mobile devices and wireless Internet technology enable learners to learn using a variety of digital resources from anywhere in the world at anytime. This new way of learning is commonly known as ubiquitous learning or u-learning (Huang, Lin, & Cheng, 2010; Hwang, Kuo, Yin, & Chuang, 2010; Hwang, Tsai, & Yang, 2008; Liu & Chu, 2010; Liu & Hwang, 2010; Yang, 2006). Studies have suggested that u-learning has the potential to increase learning efficiency (Chu, Hwang, Huang, & Wu, 2008; Chu, Hwang, & Tsai, 2010; Hwang, Yang, Tsai, & Yang, 2009; Ogata & Yano, 2004; Wei & Chen, 2006).

However, when a different instruction method or approach to learning (e.g., u-learning) is introduced to students, they are often requested to adapt themselves to the new methods without consideration of their cognitive and affective preferences (Åkerlind & Trevitt, 1999). Hung, Bailey, and Jonassen (2003) mentioned that learners may experience frustration during the transition from an accustomed learning approach to a different one. This frustration is almost inevitable for students who are uncertain of their roles, their duties and the evaluation methods in their new learning processes at the early stage of transition (Jost, Havard, & Smith, 1997), but students’ discomfort lessens as they become familiar with the new approach and their responsibilities in the learning process (Chu, Hwang, Tsai, & Tseng, 2010; Hung, Lin, & Hwang, 2010; Schultz-Ross & Kline, 1999).

One possible solution that reduces the tension created by the transition from the old to the new instruction/learning approach is to carefully consider students’ learning patterns or styles and incorporate this in the design of the new instructional approach or tool (Graf, Liu, & Kinshuk, 2010; Hall & Bannon, 2006; Hunt, Thomas, & Eagle, 2002). This in turn helps students appreciate the strengths of the new approach or tool, and encourages active involvement and participation. Learning styles refer to the set of preferences individual students