Effects of Adaptive Reflection Teaching Strategies on Learners’ Reflection Levels in a Web-based Learning Environment

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Abstract—Reflection plays an important role in improving learning performance. Hence, this study attempts to explore whether learners’ reflection levels can be improved when reflection teaching strategies fit with learners’ thinking styles in a web-based learning environment. Three reflection teaching strategies, namely constructive, guiding, and inductive, were designed to match with three thinking styles, namely legislative, executive, and judicial respectively. A web-based reflection learning system was subsequently developed for this purpose. An experiment was then conducted where the learners were classified into fit or non-fit group according to analyze whether there was a good fit between the given reflection teaching strategies and learners’ thinking styles. A total of 223 graduate and undergraduate students participated in the experiment. The results revealed that the reflection levels of the fit group had better improvement of reflection levels than the non-fit group.

Keywords—reflection, adaptive reflection teaching strategy, thinking style, web-based learning

I. INTRODUCTION

Reflection plays an important role in such knowledge construction based learning process and helps to improve learning performance [1]. The concept of ‘reflection’ has been defined by Dewey [2] as an “active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends.” This study considers reflection as a process where learners think over and analyze the learning process and learning content in depth when they are learning. As a result, learners examine, test, and modify their own thoughts by reflecting during the learning process and finally yield better understanding of the knowledge.

The obvious advantage of web-based learning is that the learners have possibility to learn anytime and anywhere. However, it is not feasible for the instructors to be present in online classrooms all the time in order to guide learners in the process of engaging in reflective practice [3]. Moreover, the learning materials are also rarely designed to suit different learners individually in online classrooms [4]. In such situation, the lack of consideration of individual learners’ different characteristics has the potential for ineffective engagement in the reflection process. Hence, providing adaptive learning is a promising solution for improving learners’ reflection levels.

A web-based reflection learning system has been employed in this study. The system makes use of adaptive reflection teaching strategies to accelerate learners’ engagement in the reflection process. Many studies have demonstrated that the use of prompts could be an appropriate strategy to improve learners’ reflection levels effectively [3]. Besides, Sternberg [5] pointed out that people’s thinking styles can affect the way people prefer to use their abilities. Sometimes when learners demonstrate inefficient performance, the real problem may be a mismatch between the way learners think and learn, rather than their lack of ability [6].

Human mental functions can be discussed in terms of five mental self-government dimensions: function, form, level, scope, and learning. The function dimension involves preferences for formulating ideas, carrying out rules initiated by others, and the processes of comparison and evaluation. The form dimension concerns with various goal-setting and self-management behavioral styles. The level dimension distinguishes between preferences for dealing with problems at relatively abstract or detailed levels. The scope dimension includes a preference for working alone or with others. The learning dimension addresses a preference for working on tasks that involve novelty and ambiguity or tasks that require adherence to existing rules and procedures [7]. These different ways of using our abilities are called thinking styles. The mental self-government theory connects our daily activities and management tasks together. People flexibly use their mind for mental self government to form a variety of thinking styles. Reading is an important activity in web-based learning. Since the learning task designed in this study was for reading-oriented self-determination learning, the function dimension of thinking styles was the focus of this study.

The aim of this study is to explore whether learners’ reflection levels could be improved when reflection teaching strategies are matched with their thinking styles in web-based reflection learning system. Three adaptive reflection teaching strategies with specific reflection prompts and supplementary learning materials were designed for matching with learners’ different thinking styles.

II. RESEARCH METHOD

In this study, constructive, guiding, and inductive types of reflection teaching strategies have been designed for legislative, executive, and judicial thinking styles respectively, using combinations of reflection prompts and