Chapter 25
The Learning Style-Based Adaptive Learning System Architecture

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ABSTRACT

In the current study of learning process that show learners will take a different way and use different types of learning resources in order to learning better. Any many researchers also agree that learning materials must be able to meet the various learning styles of learners. Therefore, let learners can effective to improve their learning, for different learning styles of learners should be given different types of learning materials. In this paper the authors propose a learner's learning style-based adaptive learning system architecture that is designed to help learners advance their on-line learning along an adaptive learning path. The investigation emphasizes the relationship of learning content to the learning style of each participant in adaptive learning. An adaptive learning rule was developed to identify how learners of different learning styles may associate those contents which have the higher probability of being useful to form an optimal learning path. In this adaptive learning system architecture, it will according to different learning styles given different types of learning materials and will according to learner's profile to adjust learner's learning style for providing suitable learning materials.

1. INTRODUCTION

As with new information technology continues and new advances in multimedia file formats, learning designer when design relevant digital learning that may provide varied different type of learning resources for learners to access. This means learn may obtain the digital curriculum to have the diversification on present. With the emergence of multimedia technology, digital teaching resources have evolved to include

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sight and sound, video animation rendering mode. Certainly, under such framework the learner has the richer learning resources to be possible to utilize and through these different formats of multimedia files used to render the production of different themes of the learning content, it also let the leaner be easier to understand the curriculum content. However, two problems arise, the first problem is to give each person the same academic materials (Chiu, Kuo, Huang, & Chen, 2008; Hsieh, Chiu, Chen, & Huang, 2010); the second problem is caused information overload by a huge amount of information (Pisha & Coyne, 2001; Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, 2007). Therefore, the adaptive learning in recent years has been more attention (Haste, 2009; Lombardi, Murray, & Gerdes, 2011). The adaptive learning has two characteristics: Diversity - learning content for some of the learners, but may not be suitable for other learners; Interactive - in many cases, individual learners can learn to do. Therefore, adaptive learning can provide a single material different from the traditional way for all learners, so learners will never find unsuitable learning materials. Therefore, given according to different learning styles of different materials is very important, and many teachers and scholars also notices that must be the characteristics and needs of learners with different learning styles to define the learning materials content (Hwang, Sung, Hung, & Huang, 2013; Lo, Chan, & Yeh, 2012).

The current study on intelligent learning technology can be used to assess the efficiency of learning, and can recommend a learning path for the next. These intelligent technologies have been developed in the following proposed several directions: Dynamic learning recommendation (Chen, Chiu, Huang, & Wang, 2014; Huang, Chiu, Liu, & Chen, 2011; Huang & Chiu, 2014), Intelligent learning contents suggestions (Downing, 2006; Yeung & Lee, 2000), Concept map automatic construction, and Adaptive pedagogical path (Andreou, Papastavrou, & Merkouris, 2014; Baleghizadeh & Shayeghi, 2014; Gulbahar & Alper, 2014). Above the intelligent learning method undoubtedly to the individual learner's learning path is not the newest method, but adaptive technology for the development of the learner's learning behavior is very important (Arthanat, Curtin, & Knotak, 2013; Blanchet et al., 2013; Boyce, Fekety, & Smither, 2013; Faria, Vasconcelos, Reis, & Lau, 2013; Kaber et al., 2014). When the learner wants to obtain the learning recommendation, adaptive system will accord to the special learning style and preparation appropriate learning path for this special learning style (Hagan & Thompson, 2014; Holmes & O'Loughlin, 2014; Reynolds & Field, 2013). Currently used to automatically find the next best course order there are many techniques can use, such as dynamic fuzzy petri net, multi-criteria decision marking, and ant colony system.

Most learning systems ignore the individual differences between learners, such as learning capability, background knowledge, learning goal and learning style. In other words, learning systems typically provide a unique and standardized material to all learners, with no regard to the learner's learning style and background knowledge (Harma, Gombert, & Roussey, 2013; Lancaster & Auhl, 2013; Ohtake, Kawai, Takeuchi, & Utsumi, 2013; Zhang, 2013). If we can offer learning materials which closer to the learner's learning style, the learning will be able to make more easy and natural, and reduce learning time. This paper will present a learner's learning style-based adaptive learning system architecture. The system will give the different learning material according to the different learning style to provide appropriate learning materials to learners.

2. RELATED WORK

In view of the evolution of information technology and the availability of many electronic media, from the late 90s there have been many related research on how to make electronic media with the appropri-

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