Chapter 5
Development of Adaptive Social Network Based on Learners' Thinking and Learning Styles

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ABSTRACT

Adaptive social network sites (ASNS) are an innovative approach to a web learning experience delivery. They try to solve the main shortcomings of classical social networks—"one-size-fits-all" approach and "lost-in-hyperspace" phenomena—by adapting the learning content and its presentation to needs, goals, thinking styles, and learning styles of every individual learner. This chapter outlines a new approach to automatically detect learners' thinking and learning styles, and takes into account that thinking and learning styles may change during the learning process in unexpected and unpredictable ways. The approach is based on the Felder learning styles model and Hermann thinking styles model.

INTRODUCTION

A distinct feature of an Adaptive Social Network Site (ASNS) is the learner model it employs, that is, a representation of information about an individual learner (De Bra, Aroyo, & Cristea, 2004; Henze & Nejdl, 2004). Learner modeling and adaptation are strongly correlated, in the sense that the amount and nature of the information represented in the learner model depend largely on the kind of adaptation effect that the system has to deliver. In fact, we see a problem arising when group formation assumes similar learning styles, thinking styles, levels of knowledge and abilities for learners (Ruiz, Díaz, Soler, & Pérez, 2008). This is because learners that are less able will feel that it is too difficult for them to follow and those that are more capable will feel as though the learning method is too easy. Thinking style, learning style, level of knowledge, preferences and ability of learner are part of learner's characteristics, which have significant influence on the learning activity in the group formation. In this chapter we focused

our attention on the learner model, which allows for the discovery of thinking and learning styles of learners that have access to an ASNS.

The chapter has been structured as follows: The background knowledge on the research subject is given in the next section. The proposed approach is explained subsequently, and some experimental results related to the subject area are analyzed in the succession of sections. Finally, future research directions and conclusion are given at the end.

BACKGROUND AND RELATED SCIENTIFIC WORK

This section is organized in three subsections; firstly, the general context of the educational social networks is briefly introduced. Secondly, we focus on the thinking style. We conclude with learning styles models.

Social Networks for Education

Social networking is widespread in today's society. In Web-based education systems context, social networking sites have been used for establishing relationships with peers, providing social support, creating information, and maintaining contact (Yu, Tian, Vogel, & Kwok, 2010; Pimmer, Linxen, & Grohbiel, 2012; Rambe, 2013). Hwang, Kessler, & Francesco (2004) demonstrated that college students' social networking with professors and peers boosts their knowledge acquisition and improves their academic performance. Social networks have been investigated to be a better learning environment in higher education than other commonly used learning management systems in facilitating interaction, communication, collaboration, and learning motivation (Chen, 2014) (Gabarre, Gabarre, Din, Shah, & Karim, 2013, Pimmer et al., 2012). Social networks provide a learning environment more suitable than other Web-based education systems that educators are already familiar with especially in facilitating opportunities for interaction, dissemination of learner-created content, student engagement, and immediateness (Gabarre et al., 2013).

Here are some examples of the social networks that are used in education:

- In Jernej, Matevž, Andrej, Félix, & José (2012), the authors proposed an integration of e-learning systems with social networks and display its supporting software. The authors solved the low level of interaction between users through direct relationship between learning content and communication between users and teachers in e-learning systems. Suggested use of social networks increases the interaction between users in e-learning environments. The approach depends on the virtual classroom, integrating e-learning system COOME (an internet-based system for production) with Facebook.
- In Du, Fu, Zhao, Liu, & Liu (2013), the authors proposed an interactive and collaborative e-learning platform which integrates social software with a Learning Management System (LMS). This platform provides personalized space for users where they can interact and collaborate with others. The personalized space of users contains their course network, social network and knowledge network. This platform connects course network of users with his/her social network and knowledge network. Furthermore, users are able to build their personalized social network and knowledge network during the process of learning.

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