

Reusing and delivery E-content based on learner desires and style

Omar Abdullah Batarfi, Fathy Elbouraey Eaassa and Mostafa El-Sayed Saleh, *KAU*

Abstract—One reason for the separation between learning resources and learning activities is to facilitate reusability of learning resources. In this research, we built software agents to help instructors to search for learning objects in metadata, based user learning style and desires, hence to enable authoring adaptive course(s). The research also helps the authors of learning courses in reusing the learning objects and integrating them by using the mobile agents. We built mobile agents to travel to all nodes in a distributed system to gather learning objects created based on different e-learning standards and different formats, and return back to a server to unify the different formats of learning objects into one preferred learner format. Finally, the proposed model delivered the collected and unified learning objects to the learner based on his desires. To prove the research goal, a prototype was implemented using Java programming language and using the Aglet environment.

I. INTRODUCTION

Adaptive hypermedia and other adaptive Web systems (AWS) belong to the class of user-adaptive software systems [1]. One distinctive feature of an adaptive system is a user model. The user model is a representation of information about an individual user that is essential for an adaptive system to provide the adaptation effect, i.e., to behave differently for different users. Sleeman [2] suggested classifying user models by the nature and form of information contained in the model as well as the methods of working with it. Following his suggestions, we analyze user models along three layers: what is being modeled (nature), how this information is represented (structure) and how different kinds of models are maintained (user modeling approaches). Student Model represents information about the student's knowledge and learning profile. The importance of student modeling and its role in the education process has been recognized since mid 80's, and since then it has magnetized researchers. Rambally [3] in 1986 have presented one of the early attempts for student modeling. Student's models can be classified according to different criteria such as: the nature of the contents, the type of representation and the methods used to initialize, construct and exploit student models. Three types of content-based models are distinguished [4]:

The Domain-dependent knowledge model: contains knowledge the system assumes that the student has about the domain. The Domain-independent-knowledge model: contains general or not domain-specific knowledge as well as areas of interests and general background of the student. The Psychological or Cognitive Model: is concerned with preferences, disabilities, abilities, and personality traits. For example, the system has to know the student's preferences if it adapts its instruction to: The learning style or strategy preferred by the user (global vs. sequential, exploratory vs. directed learning), The motivation technique that is more effective for the user (curiosity, competition or confidence), The type of thinking – inductive (learning by examples) or deductive (logical deductions, problem-solving), The degree of concentration (recognized e.g. by typing errors, misuse of commands).

A. Student's Learning Style

A learning style is defined as the unique collection of individual skills and preferences, that affect how a student perceives, gathers, and process learning materials. Each individual has his/her unique way of learning. Learning style greatly affects the learning process, and therefore the outcome [5]. We have reviewed about 30 learning style models, which have been developed over the past three decades. Only four of these models will be briefly reviewed in the following sections. Those models are chosen as they are the most commonly used recently. These models are Kolb's Learning Style Model [6],[7], Dunn and Dunn's Learning Style Model, Herrmann Brain Dominance Model (Whole Brain Model) [7], and Felder-Silverman Learning Styles Model (FSLSM) [5], [6], [7]. Felder-Silverman Learning Styles Model (FSLSM) categorizes an individual's preferred learning style by a sliding scale of five dimensions: sensing-intuitive, visual-verbal, inductive-deductive, active-reflective and sequential-global [5], [6], [7]. Currently, the inductive-deductive dimension has been deleted from the previous theory, because of pedagogical reasons. As shown in **Error! Reference source not found.**, this theory defines student's learning styles by basing on a sliding scale of four dimensions: active-reflective, sensing-intuitive, visual-verbal, sequential-global, and induction-deductive.