

An Adaptive and Collaborative e-Learning Environment for the New Generation Web

Abstract: Adaptive Hypermedia Web-based learning was introduced more than 10 years ago and yet the penetration and adoption of Adaptive Educational Hypermedia Systems (AEHS) into 'real world' teaching has been poor so far. This is believed to be due to be a result of a number of limitations, among them is their architectural design failing to answer the overall needs of Web-enhanced learning, rather than their actual adaptation performances. On the other hand, *Web 2.0* emerging trends and technologies are transforming the whole field of e-Learning into one known as "e-Learning 2.0". In this new generation of e-Learning, the learning process becomes a social and collaborative activity. Modern Learning Management Systems (LMS) provide the tools and the environment to enable this social learning experience. However, typical LMS lacks adaptation functionality. This research introduces an adaptive LMS framework: WHURLE 2.0, which integrates both e-Learning systems (AEHS & moodle LMS) using *Web services* to present the user with a learning environment that combines the social aspects of an LMS with the adaptive functionality of an AEHS.

In WHURLE 2.0, the user is presented with a *learning space* rather than a single document and the system is composed of five independent services and an open source LMS. The system's *Portal* (LMS: moodle) provides the single login point to this learning space or environment. When a user logs in, the portal will act as a client and communicate in the background with other system components and will perform the required task of getting adaptive or personalised learning content.

Since the proposed architecture describes a distributed environment, where many different services are communicating with each other constantly, it is important to provide an *Aggregator Service* (AGS). The AGS deals with different requests and responses and manages the system's communications.

The *User Model Service* (UMS) is the user profile repository service. It communicates with the AGS to either respond to a request from it by providing a user

profile or by accepting a user's updates after each session. Therefore, it creates or updates his/her profile after or during interaction with the system.

The *Lesson Plan Service* (LPS) is where the teacher's default pathway is specified. A teacher states, which concepts(s) (or chunks) should be taught to each type of user and in which order (i.e. designs the adaptation).

The *Adaptive Filtering Service* (AFS) implements the user model according to the lesson plan. It receives a request from the AGS that will also provide the AFS with both a user's profile and a lesson plan. The AFS responds by providing a filtered list of the lesson's chunks, which will then be pulled out from the *Chunk Management Service* (CMS).

The following figure shows a conceptual diagram of WHURLE 2.0 framework:

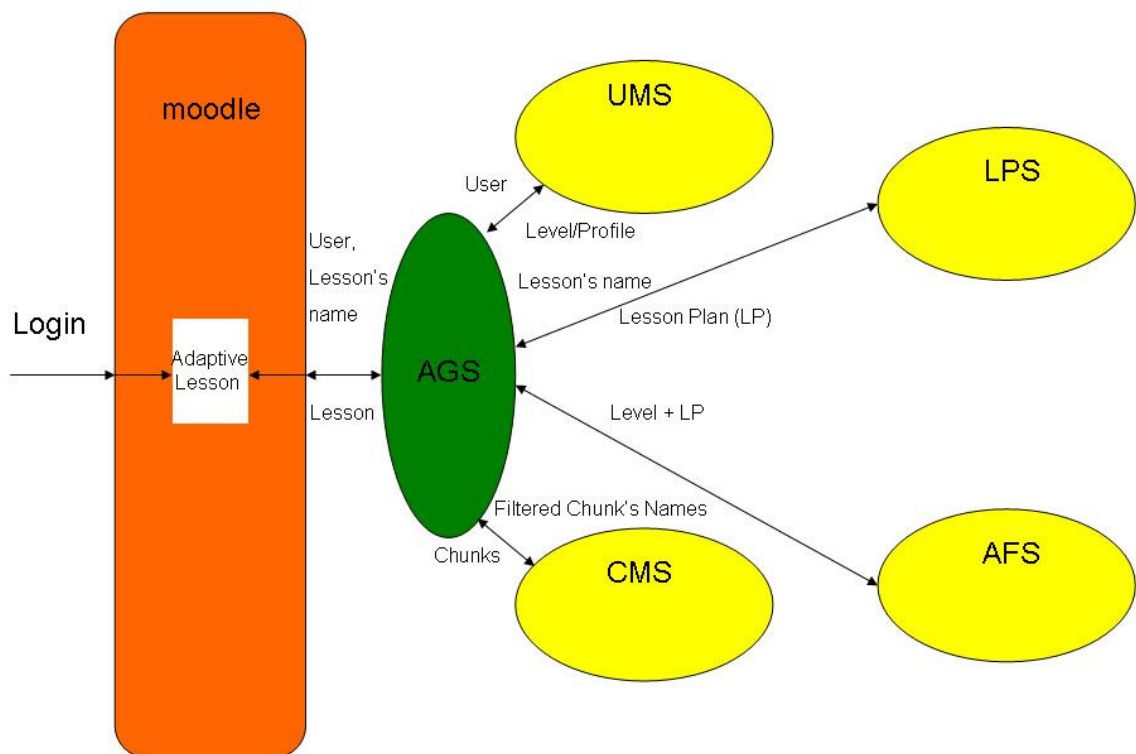


Fig. 1. WHURLE 2.0 Conceptual Design