

E-Learning Environment Based on Framework Composition

Sean Wolfgang Matsui Siqueira
DI / PUC-Rio / Brazil
sean@inf.puc-rio.br

Maria Helena L. Baptista Braz
DECivil / IST / UTL / Portugal
mhb@civil.ist.utl.pt

Rubens Nascimento Melo
DI / PUC-Rio / Brazil
rubens@inf.puc-rio.br

Outline

E-learning has increased on importance as people realize that the use of technology can improve the learning process. Consequently, new learning environments have been developed. However, in general they are oriented to address a specific e-learning functionality. Therefore, in most of the cases, they are not developed to interoperate with other e-learning tools, which makes the creation of a fully functional e-learning environment more difficult.

Aware of these problems, some organizations such as IMS Global Learning Consortium, Advanced Distributed Learning and IEEE Learning Technology Standards Committee are working to develop technical standards, recommended best practices and guides for learning technology. Nevertheless the main focus of their work has been on enabling content reuse especially through the description of learning content.

These standards are gaining increasing importance, but although they are advancing the goals of learning content interoperability, they do not provide a general architecture that would guide the development of flexible and configurable e-learning systems. Our work proposal provides such architecture.

The strategy is to develop systems from a “semi-complete” framework, using a mechanism for components configuration, so that it is possible to make available a set of systems with the smallest number of components to each specific application, and to allow components reuse.

This flexible and configurable environment allows that only the necessary components are defined and used according to learning methodologies and techniques that best apply to each case. Therefore, it isn't necessary to develop a new environment, but only to re-configure the environment in order to adapt to a new learning requirement. In addition, the use of framework approach allows increased software quality and reduced development effort.

The proposed e-learning framework is composed of other frameworks that are also flexible and can be configured. The figure 1 presents a general view of the proposed e-learning framework, which is composed of following components: Data and Metadata Management,

Groupware Management, Content Development Management, Assessment and Evaluation Management, Interface Management, Role and Security Management and Rule Management.

In addition there is a Control component mechanism that diminishes the number of interdependencies between

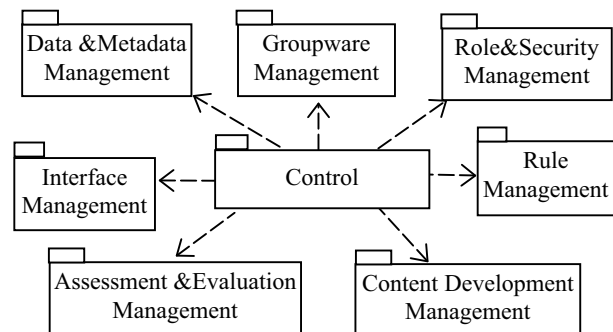


Figure 1. The proposed e-learning framework

the services. It allows the definition and validation of a static configuration as well as the management of service requests during the execution of the configured system.

As the offered services can be different from one configuration to another, it is necessary to define each service and the possible sequences that they can be executed in each configuration. In truth, the same configured system can have different scheduling in order to attend to different requests of the same application.

The Control, Interface Management and Data & Metadata Management components must exist in all configurations. Besides these three components, any combination of the leftover components can be included according to each specific e-learning application requirements.

Acknowledgements

The authors would like to thank TecBD PUC-Rio and ICIST/DECivil. This work has been partially supported by CNPq Brazil and FCT Portugal.