Skill oriented Training Activity as a Service: An Approach based on the e-Competence Framework to overcome the Fast Changing IT Profession

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ABSTRACT

In this paper, the authors address the problem of fast changing Information and Communication Technology (ICT) profession which hampers efficiency of ICT professionals and practitioners as well as businesses. For instance, ICT practitioners increasingly need support and training activities to adapt their skills or to acquire new ones in order to deal with ICT technology changes. The authors attempt for that aim to provide a generic training Framework based on Intelligent Tutoring Systems’ configuration and adaptation to ICT professionals and practitioners needs. In this framework, the Intelligent Tutoring System’s components are e-skill oriented training services using corresponding resources all together deployed in the cloud accordingly to a Software as a Service model. More specifically, they proposed Framework adopts the European e-Competence Framework, the European Qualification Framework as well as the Instructional Management System portfolio standard.

Keywords: Dynamic Adaptability, E-Competence Framework, E-Portfolio, E-Skill Based Training Activity, ICT Enterprise Context, ICT Skills, Intelligent Tutoring Systems, Ontology, Training Resource as a Service

INTRODUCTION

Nowadays, every business and modern company is continuously seeking to become more and more competitive to be better positioned within an open market with a rude concurrency. To do so, it continuously works on enhancing and improving its business processes and relies more and more on ICT (Information and Communication Technology) to operate its business processes, products and services innovation and provision.

Besides, it focuses on its Human Resources development and continuously works on motivating and encouraging them to stay, avoiding consequently the brain drain phenomena.

In a faster trend, especially during these last few decades, ICT companies including ICT

DOI: 10.4018/ijhcitp.2014100104
professionals and practitioners are facing the continuous flow of technological innovations which has a strong impact on ICT related skills. For instance, with the advent of the Internet, the Web and pervasive computing technologies, there is an increasing need not only for ICT specialists but also for those specialists who could rapidly adapt their skills and demonstrate willingness to learn in a rapid and sustained pace.

However, both business and ICT companies cannot always avoid employees’ departures for many different reasons. They may not also have sufficient time and money either to find relevant e-skilled persons or to deeply train novice employees. In one hand, brain drain problems could be partially addressed by the well known knowledge management or organizational memory systems (Atwood, 2002) where companies store employees’ knowledge and expertise and also well established business processes, methods and procedures or use Web2.0 technology for knowledge transfer (Colomo-Palacios, R., Casado-Lumbreras, C., Soto-Acosta, P., & Misra, S., 2014). In the other hand, the fast rate of e-skills evolution and underlying technologies could best be addressed by e-training solutions for delivering and deploying e-training services within relevant environments.

Those e-training services should take advantages of new learning trends to allow employees to learn without constraints related to time and place. More specifically they should adapt to one’s employee’s needs and one’s company competencies development strategy. Nonetheless, they should take account e-learning as well as ICT skills standards.

In this paper, we attempt to provide a generic e-training Framework based on several Intelligent Tutoring Systems’ (ITSS) configuration and adaptation to ICT professional and practitioners’ needs. The Framework’s ITSS’ components (i.e. training activities or services) are e-skill oriented training services using corresponding resources all together deployed in the cloud accordingly to a Software as a Service (SaaS) model.

More specifically, each e-skill training activity will be based on the European e-Competence Framework (e-CF), the European Qualification Framework (EQF) and the Instructional Management System (IMS) e-portfolio standard which we consider in the present work as the most relevant standards and to which we will provide an ontological representation.

In order to ensure automatic configuration and adaptability of the overall Framework we have adopted a technical solution which is inspired from specifications and frameworks based on Semantic Web Services. It is particularly based on: (1) the OSGi technology which provides an efficient solution for automatic configuration and re-configuration of software components at run-time, on (2) the Semantic Web technologies providing means for modular, efficient and reusable knowledge models and (3) an efficient way for semantically describe, discover and compose OSGi services at run-time.

This software infrastructure will serve as a semantic auto-configurable middleware. However, we should stress that it has been previously developed in (Mastour.T & Khemaja.M, 2013) and we are attempt, in the present paper, to extend it for distributed deployment across enterprises.

Therefore, the rest of the paper is structured as follows:

In section 2, we provide an overview of the software infrastructure that we are using and extending in the context of this work. In section3, we attempt to give our general vision of the proposed Framework and outline its principal requirements. In section 4, we provide ontological as well as service models’ definition related to the Global layer of the proposed Framework and we highlight their relationships. This Global Layer contains all shared and generic elements. In section 5, we present the Specific Layer which mainly focuses on the architecture and software components of the ITSS provided by our Framework. This section highlights relationships between the Global Layer components and those of the Specific Layer. This will guide us through the definition of the most relevant architecture for our proposed Framework. In section 6, we present the Framework implementation and il-
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