Integrated Learning Approaches Based on Cloud Computing for Personalizing e-Learning Environment

Noha Ezzat El-Attar, Faculty of Engineering, Delta University for Science and Technology, Dakahlia, Egypt
Niveen Abo El-Ela, Technical Institute, Port Said, Egypt
Wael A. Awad, Faculty of Science, Portsaid University, Portsaid, Egypt

ABSTRACT

Improving the performance of e-learning services to provide a scalable and effective e-learning system is a big challenge for the educational organizations. The e-learning system faces many challenges in pedagogical services (e.g. learning design and learning content problems), and technical services (e.g. resource provisioning and financial cost). This article presents an e-learning environment based on cloud computing (PCLE) in attempt to enhance the e-learning services’ by customizing the contents of the course’s material depending on the students’ knowledge, experiences, and requirements. Also, the system focuses on supporting and achieving reusability, interoperability, adaptation and personalization in order to overcome the passive role of the student and transfer it into an interactive and useful participation. On the other hand, PCLE is built over the cloud computing environment trying to overcome the traditional web-hosting challenges as scalability, availability, and cost.

KEYWORDS
Cloud Computing, E-Learning, E-Learning Approaches, Learning Design

1. INTRODUCTION

Fundamentally, it can be deduced that E-learning relies on merging information and communications technology into the learning process to share and deliver specific curriculum material in all kinds of formats (e.g. videos, slideshows, documents, etc.) synchronously or asynchronously (Epignosis, 2014). There are many features in the E-learning system, which distinguish it from the traditional learning. E-learning adopts techniques that fit with different learning styles, including the use of complex digital content and innovative methods, to increase students’ role in the learning process and to improve the quality of the interaction between students and instructors. On the other hand, e-learning does not restrict the student in time or place during the learning process.

In order to build an effective e-learning system, there is a need to integrate between the suitable information technology, learning contents and learning approaches as shown in Figure 1.

Technologies have a significant impact on improving the quality of electronic learning content; it can make the content presentations more slick and interesting, with high quality, graphically rich. Furthermore, the development of technologies led to develop variety types of the E-learning approaches (Epignosis, 2014). E-learning approaches represent all the theories, strategies, skills and attitudes that involved in teaching and learning environment. The appropriate e-learning approach has been chosen by the teacher or instructor according to the situation, students’ needs, learning styles, and the...
Figure 1. The main components of e-learning system

particular learning context (Faraday, 211). Variety of the technologies can produce different e-learning approaches such as collaborative learning and social learning approaches that are based on using communication technologies as messaging and social networks, while other types of approaches can rely on the use of gaming technology such as micro-learning and gamification (Epignosis, 2014).

Thus, migration of the e-learning from solid media to interactive environment leads to generalize the next-generation of e-learning platforms which is based on applying service frameworks to their modular design, and supporting interoperable services (Zaslavsky, 2004) The Cloud computing is considered one of the best environments for sharing the services. In Cloud computing the computational resources and services reside in geographically distributed data centers, and dynamically provisioned and shared to achieve significant economies of scale. Cloud computing systems depend on the idea of the virtualization, and automated provisioning of services that increase the availability and connectivity with the Cloud’s users (El Attar, 2014; Shawish, 2014).

Therefore, integration between the learning approaches and the modern technologies has supported many aspects of E-learning. This integration reinforces and facilitates the social and collaborative activities among distant students while applying adaptive learning electronically addresses the cognitive differences among students. Thus, effective e-learning environment should base on integrating various approaches rather than adopting a single approach as well as, having a powerful and scalable infrastructure that accommodates the increasing growth of workloads. This paper presents a novel personal cloud-based learning environment that is based on benefiting from several e-learning approaches (e.g. collaborative, social, and personalized learning) and integrating them into an effective virtual learning environment hosted over cloud computing infrastructure to overcome the most popular challenges that face the e-learning systems.

2. E-LEARNING CHALLENGES

Most of educational institutions seek to have reliable and scalable infrastructure to deploy an effective E-learning platform that is accessible by a wide range of students, whether from the inside of institution or outside. Until now, there are many types of challenges face the education service providers; some of these challenges can be classified as pedagogical issues (e.g. learning approaches and learning contents) and the others are technical (e.g. web hosting, and resource provisioning). In this article, we will focus on five significant challenges which may obstruct most of educational institution from having effective E-learning environment. These challenges can be summarized in Figure 2.
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