Enterprise Content Management System for IT Training

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ABSTRACT

Information Technology (IT) training is undergoing rapid changes around the world, creating inter-institutional partnerships between IT training centers as well as software and hardware vendors to promote new products and training to users. Online training has resulted in an increasing enrolment of a wider spectrum of learners with more diverse technical skills and needs that must be served. Enterprise content management (ECM) enables IT training centers to deliver education beyond company walls, supporting a range of tools to improve information dissemination, communication, and creating collaborative virtual classrooms. In this article, the authors propose a learning platform with both Web 2.0 and mobile interfaces that supports IT training for nourishing busy workers with the latest IT technology knowledge and skills. Alerts are used as a mechanism to facilitate communications among students, instructors, and administrators. It also reminds students to keep track on their learning progress. The content flow management (such as content editing, content approval, use of content, perform training exercise, practical tests, and examination) as well as external access control for the Web portal can be easily controlled through the e-platform. Besides, the authors also demonstrated how to systematically specify document classifications and tagging of training materials by using the modular design of an integrated IT Training Enterprise Content Management System (ITTECMS) together with ontologies from the Semantic Web. Watermarking technology will be deployed for further protection of the training materials, both online and offline. It also allows the flexibility to create match-making of training content according to user interests. Not only users can retrieve matched contents effectively, vendors can also obtain multi-dimensional analysis of user problems and comments to form a comprehensive knowledgebase and achieve cross-sale of education products to target customers.

KEYWORDS

Enterprise Content Management (ECM), Information Technology (IT) Training, IT Training Enterprise Content Management System (ITTECMS), Web 2.0

1. INTRODUCTION

Researchers suggested that Enterprise Content Management (ECM) is a collection of tools, methods, and strategies used for creating, storing, managing, and delivering contents that associate with organizational processes (AIIM, 2010), no matter the information is in either paper or electronic forms. As knowledge and organizational memory can be captured in the ECM systems, effective
access method to the system content enables us to gain knowledge more effectively (Küng et al., 2001). Hong Kong is such a dynamic society that is striving to become a knowledge-based economy (KBE) in the 21st Century. A KBE is featured by the trends towards greater dependence on knowledge and information as well as the increasing needs for high skills from the business and public sectors. It is also characterized by the drive of continuous learning. According to a study by the Census and Statistics Department in 2005, about 23.3% of those 109,000 higher education students had taken Engineering and Technology as their major field of study (Census, 2005). Moreover, the report from Graduates of UGC-funded Programmes by Institution, Level of Study, Mode of Study and Academic Programme Category 2011/12 indicated that there are 5,080 out of 30,051 (17%) of students graduated in Engineering and Technology related subjects (UGC, 2012). Furthermore, according to the Hong Kong Qualification Register established by the Secretary for Education under the Accreditation of Academic and Vocational Qualifications Ordinance for entering qualifications recognised under the Qualification Framework, there are 688 courses registered in the area of computing and information technology as at July 2013 (HKQR, 2013). In a nutshell, these figures indicate that there is a vast demand of IT training, especially in the form of continuous learning.

Integration, instead of building from scratch, is a preferred strategy in building large ECMs as demonstrated in case studies of IT training organizations (Kitayama et al., 1999; Edwards et al., 2000). In the context of IT Training, contents refers to the pieces of information including curricula, learning materials, exercises, assessments, examinations, etc. However, the management of such large volume of training-related contents with complex structure is non-trivial. Nevertheless, an important requirement is that content developers must check content publication against errors and different languages for different countries. The content flow management (such as content editing, content approval, content use, training exercises, practical tests, and examination) as well as external access control for the Web portal should be effectively controlled. The contents should be systematically specified by document classification and tagging based on ontologies from the Semantic Web. It allows the flexibility of match-making of training contents according to user interests and preferences. Furthermore, another important aspect of our approach is the use of SCORM (Sharable Content Object Reference Model) (ADL, 2001) as guideline for content development and implementation of IT training models for the ontology. We also demonstrate how contemporary Web service technologies can facilitate such objectives of integration and control.

After the integrated ITTECMS was deployed, security risks will appear if control is inadequate. As such, we also design a comprehensive access control scheme with digital watermarking for the system. For example, high level of security in protecting unauthorized access to contents and personal information is required. In particular, legal requirements such as the Personal Data (Privacy) Ordinance (Cap 486) of Hong Kong should be considered.

In this article, we present a holistic approach to address the problem based on our previous framework of Chiu et al. (2010). The following key issues will be covered: (1) requirements and technical problems of ECM for the IT training industry, (2) an adapted methodology to elicit such requirements, (3) an enhanced ITTECMS architecture, (4) the design of ITTECMS components for secured internal content flow management and external access, (5) use of ontology in IT Training, (6) a comprehensive case study with detailed illustration on how various Web service technologies can streamline the main objectives of integration and control, and (7) analyze how Customer Relationship Management (CRM) activities can be facilitated.

To achieve these objectives, we organize our article as follows. Section 2 introduces an overview of the ITTECMS background and related work. Section 3 presents the overall system architecture and integration, and Section 4 describes the use of ontology in the IT Training model. Section 5 details the design and implementation of ITTECMS components. Section 6 presents our approach
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