

Chapter VIII

Ontology-Based Approach to Formalization of Competencies

April Ng, Simon Fraser University Surrey, Canada

Marek Hatala, Simon Fraser University Surrey, Canada

Abstract

Competency-based learning has been used in training employees to acquire the necessary skills for an organization to be successful in a dynamic and ever-changing environment. One of the core activities in competency-based training is learning material acquisition. Standardization efforts have made the retrieval of educational materials, also called learning objects, easier by describing them in pre-defined metadata schema. However, the existing standardized metadata schema and practices of learning object metadata annotation do not support automatic selection of resources by specific competency requirements in the competency-based learning. We propose an ontology-based competency formalization approach as a way of representing competency-related information together with other metadata in ontology in order to enhance machine automation in resources retrieval. The approach represents competency with properties of definition, knowledge reference, evidence of proficiency, and level of proficiency. The effectiveness of resource selection from each of the properties is evaluated.

Introduction

Organizations are under increasing pressure from competitors, new products introduction, and new market entrants on a daily basis in the era of globalization. Successful businesses understand that strengthening employee attitudes and enhancing the capabilities of staff members is the key for gaining a competitive advantage (Sanchez & Heene, 2000). At the same time, individuals adjust to role changes during downsizing, merging, or organizational cultural changes (Dubois & Rothwell, 2004) in a dynamic and ever-changing world. Human resources and operation managers fully recognize that staff performance is highly correlated to the competencies they possess and the way they use competencies to achieve work outcomes (Dubois & Rothwell, 2004). Competency or competencies are the knowledge and skills that are required to perform a task successfully. In this environment, competency-based training offers a wide range of benefits. By focusing on building individual competence, it is highly customizable for the learner's personal needs. Learners are more proactive and take initiative in finding out how to improve their existing competencies in order to reach the competencies defined by a career or by an organization. Competency-based training also helps define and clarify the expected outcomes of any strategy implementation and therefore contributes to the organization's success. One of the cost-effective ways to provide personalized learning experience according to widely varied competency requirements is to use learning objects in multiple contexts. As a reusable resource that supports learning, a set of learning objects can be shared or reused to create different combination of instruction sequences in various circumstances fitting personal needs. Examples of learning objects include a section of a book about intangible assets appearing in a four-month as well as a one-year accounting course. Finding learning objects for competency requirements starts from looking at the metadata of learning objects. Metadata describes information about a learning object such as title, author, created date, and purpose. However, businesses that apply learning objects on competency-based training are not able to take full advantage unless learning objects are described with the competencies that they are designed for, so as to allow a machine to automatically acquire and select those with the required competencies.

Personalization by Competency Requirements

A key commonality of competency-based training is to personalize learning experience with matching resources that fit individual competency requirements of learners. One of the benefits of using learning objects in personalization is reduced cost by reusing and sharing them individually and widely from a large repository. Learning management systems add a higher level of personalization by discovering learning objects that fit personal ability and requirements, including learners' competency requirements (Blackmon & Rehak, 2003; Martinez, 2002; Karampiperis & Sampson, 2004; Schmidt, 2004; Shen & Shen, 2004; Woelk, 2002). Learners are able to tell what they need by performing competency gap analysis based on individual existing and desired levels of skills and knowledge (Schmidt, 2004; Shen & Shen, 2004; Woelk, 2002). The difference in each learner's experience level, education level, and requirements ensures no single learning object fits all. A number of appropriate

20 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/ontology-based-approach-formalization-competencies/6753

Related Content

Can Person-Centered Technology Enhanced Learning Contribute to Develop Project Management Soft Skills in an Academic Context?

Renate Motschnig-Pitrik and Michael Derntl (2008). *Technology Enhanced Learning: Best Practices* (pp. 284-303).

www.irma-international.org/chapter/can-person-centered-technology-enhanced/30199

Collaboration and the Use of Three Dimensional Interface within a Virtual Learning Environment

Brian G. Burton, Barbara Martin and Doug Thomas (2011). *Adaptation, Resistance and Access to Instructional Technologies: Assessing Future Trends In Education* (pp. 168-181).

www.irma-international.org/chapter/collaboration-use-three-dimensional-interface/47258

First-Timer Learning Experiences in Global Game Jam

Mikko Meriläinen (2019). *International Journal of Game-Based Learning* (pp. 30-41).

www.irma-international.org/article/first-timer-learning-experiences-in-global-game-jam/220081

From Web to Web 2.0 and E-Learning 2.0

Clara Pereira Coutinho and João Batista Bottentuit Jr. (2010). *Handbook of Research on Practices and Outcomes in E-Learning: Issues and Trends* (pp. 19-37).

www.irma-international.org/chapter/web-web-learning/38344

Using Biometric Measurement in Real-Time as a Sympathetic System in Computer Games

Stephanie Charij and Andreas Oikonomou (2013). *International Journal of Game-Based Learning* (pp. 21-42).

www.irma-international.org/article/using-biometric-measurement-in-real-time-as-a-sympathetic-system-in-computer-games/95080