Chapter 14

Business Intelligence in Higher Education:
An Ontological Approach

Constanta-Nicoleta Bodea
Academy of Economic Studies, Romania

ABSTRACT

The chapter presents an ontology-based knowledge management system developed for a Romanian university. The starting point for the development knowledge management system is the classic Information Management System (IMS), which is used for the education & training and research portfolio management. The knowledge management system has a general ontology, containing terms which are valid for a public institution, and specific ontology for the main two process categories, didactical and research. The ontologies were implemented using Protege. The chapter presents the usage scenario of the knowledge management system for the research area. The results are very encouraging and suggest several future developments.

INTRODUCTION

Higher education institutions are acting in a very high competitive environment. In order to become competitive, the universities should extensively use knowledge for better assessment, evaluation, planning and decision making. Knowledge management can lead to better decision-making capabilities, shorter development cycle for curriculum development and research, better academic and administrative services, and, finally, reduced operational costs.

The universities are deeply involved in achieving knowledge-based society following four directions: *(i) producing knowledge as a result of scientific research; (ii) communicating*

knowledge using education and training; (iii) dissemination of knowledge using information and communication technologies; (IV) using knowledge in technical innovation. The universities have the key of knowledge-based society because they are at the cross of the research, education and innovation (World Bank, 2004). Although universities are deeply involved in the knowledge related processes, they have not necessarily developed and articulated a systemic approach to knowledge management. This is a critical weakness that should be corrected. In fact, it would seem that universities, research and development laboratories and public organizations funding and directing the research, should play a leading role in developing the theory, practice, and tools for knowledge management.

In (Davenport, 2001) the study of 31 knowledge management projects across 24 universities is presented. This study relived the following four broad types of objectives with different subtypes:

- Create knowledge repositories with external knowledge (competitive intelligence, market data, and surveys), internal knowledge (reports, marketing materials, techniques and methods) and informal internal knowledge (discussion databases of "know-how" or lesson learned"). In an educational setting, curriculum aids might be thought of us knowledge repositories. For example, the Milwaukee Public Schools Curriculum Design Assistant – CDA is both a source of documentation – standards, learning goals and a repository for instructional plans based on this documentation. These lesson plans are stored in the system and shared with others electronically to provide a Knowledge base for a wider audience.
- Improve knowledge access through technical expert referral, expert networks used for staffing based on individual competencies and turn-key video conferencing to foster

easy access to distributed experts. An example of this type f project is Community of Science online database, a communication recourse that functions well in education research. It links researchers, research institutions and founders together.
- Enhance the knowledge environment
- Managing knowledge as an asset.

Tables 1 through 5 illustrate how knowledge management applications could benefit a number of university processes and services: the research process, curriculum development process, student and alumni services, administrative services, and strategic planning (Serban & Luan, 2002).

ONTOLOGICAL APPROACH IN HIGHER EDUCATION

Ontology is an explicit specification of a conceptualization for a domain (Gruber, 1995). A conceptualization is a simplified view of the abstract world that we wish to represent. The ontology ccomponents are: the domain terms of vocabulary (concepts, instances, relations) specific definitions associated with each term and a set of axioms that restrict the possible interpretations of the terms defined. Basically, ontology enables knowledge sharing in a particular area, so the terms used in knowledge representation have the same meaning for both knowledge-based system and its users (humans and artificial intelligent systems). Also, the ontology allows reuse of domain knowledge.

There are a variety of ontology applications in higher education, including: academic disciplines, online resources, organizational structure. Disciplinary taxonomies, such as: NCES (National Center for Education Statistics) and NSF (national Science Foundation) classification schemes, existing already for many years are the starting point for educational ontologies development.

Higher education institutions, perceived from the organizational perspective were mapped into

Related Content

Alleviation of Delay in Tele-Surgical Operations Using Markov Approach-Based Smith Predictor
Ratish Kumar, Rajiv Kumarand Madhav Ji Nigam (2022). *International Journal of Business Analytics (pp. 1-14).*
www.irma-international.org/article/alleviation-of-delay-in-tele-surgical-operations-using-markov-approach-based-smith-predictor/292057

A Strategic Analysis of Mixed Channel Structure: Retail Store Ownership
Xiaowei Linda Zhu, Xingxing Zu, Lei Zhuand Huafan Ma (2015). *International Journal of Business Analytics (pp. 39-59).*
www.irma-international.org/article/a-strategic-analysis-of-mixed-channel-structure/124181

Digital Watermarking Techniques for Images: Survey
Channapragada R. S. G. Rao, Vadlamani Ravi, Munaga. V. N. K. Prasadand E. V. Gopal (2014). *Encyclopedia of Business Analytics and Optimization (pp. 737-746).*
www.irma-international.org/chapter/digital-watermarking-techniques-for-images/107277

Using Artificial Neural Networks to Forecast Market Response
Leonard J. Parsonsand Ashutosh Dixit (2004). *Neural Networks in Business Forecasting (pp. 23-46).*
www.irma-international.org/chapter/using-artificial-neural-networks-forecast/27243

Data Mining and Statistics: Tools for Decision Making in the Age of Big Data
Hirak Dasgupta (2017). *Handbook of Research on Advanced Data Mining Techniques and Applications for Business Intelligence (pp. 15-33).*
www.irma-international.org/chapter/data-mining-and-statistics/178095