Chapter 8
Towards an Ontology-Based Educational Information System

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ABSTRACT

Nowadays in higher education, we create lots of documents and datasets for every activity. We have to maintain course, program, and syllabus information, and also the connections between the course themes. We can download some documentation for this information, but there are many questions difficult to answer. Also we can find some HR related or organizational issues. The authors are working for an ontology which is able to picture the connections between the actors of a higher education system. Their ontology is built with integrating some existing one, for example AIISO (Academic Institution Internal Structure Ontology), FOAF (Friend of a Friend) and DC (Dublin Core). The ontology has four connected parts. These can describe an organization with its internal structure, the program and courses of a University, the people connected with the organizations, the courses or some documents. The authors can also characterize course materials, such as documents, books, or multimedia contents and can connect the knowledge base with ERP systems also.

INTRODUCTION

At education, mainly at higher education all of the participants (executives, funders, students, teachers and researchers) need a lot of information. In the meanwhile the information system should cover all the processes of the institution. The sharpening competition in the education, the lifelong learning and the spreading of e-learning based education require an adaptation and a new way of administration – first of all – from the universities. The information needed to the more effective operation and decisions requires up to date ERP system and an integrated educational
Towards an Ontology-Based Educational Information System

system as well as the more efficient operation and management decision require faster, up-to-date, accurate information. In the near future not only for higher education but all educational institutions are concerned.

In today’s educational environment, large amount of data are generated each day, which management is more and more a serious challenge for the education. In order to the effective operation the further utilization, of the stored data is required. In a typical educational institute the structured access to the information can increase the efficiency of data processing.

In such an integrated system there are some issues that can answer by using a training-related ontology-based component.

For example, some common situations:

1. Skills management issues
   a. What are the competencies and skills that the student is able to learn by graduating on a course or training?
   b. How the knowledge elements are grouped (the precognitions are enough for the course, the new knowledge elements are corresponds to the official expectations, etc.)?

2. HR system related questions
   a. What does industry needs of the training (the abovementioned skills and knowledge requirements are enough for a certain job, or a task)?

3. Organizational issues
   a. What kind of resources are available in the educational institution?
      i. Is there enough adequate knowledge of the instructors for teaching a course?
      ii. Which areas of teacher capacities are defective or where are some oversupplies?
   b. Is there enough efficiency?
      i. What is the ratio of the overlapping knowledge?
      ii. Where we can find shortage?
      iii. Where overlaps are shown, are obligate or not?
      iv. The deficit is corrige by keeping the training capacity; does the university need some new colleagues?
      v. Is there any task, which would be suitable by using the existing resources?
      vi. Which industry or educational institutes are linked with the university? These connections are accessible in the training (there are fellowship agreements, traineeship in the industry, industry-education projects are available, etc.).

4. Course management issues
   a. What kind of resources are available for a student for learning (classes, books and notes, available samples, demo solutions, trial software etc.)?

For answering the questions we need to create a multiple knowledge base which may be useful for human-resource or other decision support.

Such a knowledge base can be divided into several parts. First of all, the terms and the concepts of field of science have an important role to formalize the basis of the industrial - requirements. These linked with the special filed of a knowledge help characterize the individual institutions and the trainings they provide. The structure of the institutions, the provided trainings, the contents of the courses can be described in a uniform structure. The materials used for the courses, the literature referenced can be connected to the system. The knowledge base may relate to the persons (teachers, students, employee of any project) took part in the life of the university. These relationships may be useful on making various human resource management decisions, designing educational strategies or creating different statements.
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