Education/Industry Collaboration Modeling: An Ontological Approach

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One of the main suppliers of the workforce for the engineering industry and the economy in general is the higher education sector. The higher education sector is consistently being challenged by the fast evolving industry and hence it is under constant pressure to fulfill the industry’s ever-changing needs. It needs to adapt its academic curricula to supply the industry with students who have up-to-date and relevant competencies. Nevertheless, the gap still exists between what education curricula offer and the skills that are actually needed by the industry. Therefore, it is crucial to find an efficient solution to bridge the gap between the two worlds. Bridging the gap helps the industry to cut the costs of training university graduates and assists in higher education advancement. In response to these issues, competency-based education was developed. It was first developed in the United States, in response to the growing criticisms towards traditional education that was seen as more and more disconnected from the societal evolutions, especially changes within the industry. Despite some criticisms, the competency-based education pedagogical approach has been employed by several western countries to improve their upper-secondary vocational curricula. In recent times, it started to be more and more adapted to the higher education, as a way to update and improve academic courses. In this research work, a semantic ontological model is presented to model the competencies in the domains of education and the industry. It illustrates the use of ontologies for three identified end users: Employers, Educators, and Students. Ontologies are best used to solve problems of interoperability between different domains, provide a shared understating of terms across domains and are helpful in avoiding the wasted effort when translating terminology.
between domains. They also provide opportunities for domain knowledge reuse in different contexts and applications. Ontologies can also act as unifying framework between software systems and eliminates interoperability and communication issues that are faced when trying to translate concepts between systems. The scope of the research work is to build an ontology representing the domain concepts and validate it by building competency models. The competencies from the domains of education and industry are defined and classified in the ontology. Then by using a set of logical rules and a semantic reasoner, we would be able to analyze the gap between the different education and industry profiles. We will propose different scenarios on how the developed ontology could be used to build competency models. This paper describes how ontologies could be a relevant tool for an initial analysis and focus on the assessment of the competencies needed by the engineering market as a case study. The research questions this work investigates are: 1) Are semantic web ontologies are the best solution to model the domain and analyze the gap between industry needs and higher education? 2) What ontology design approaches are more suitable for representing the competencies model? 3) What are the limitations of ontology modeling? Two main limitations are discussed: The Open World Assumption and the Semantic Reasoner limitations. This work is part of the Qatar Foundation NPRP Pro-Skima research project. Keywords— Education, Competency models, Ontology modeling. Profile matching