

# Ontologies Development for IT Project Risk Management Teaching

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**Abstract.** The paper presents one practical approach aimed at developing teaching ontologies. The methodology that will scaffold the process of knowledge structuring and ontology design is described. Moreover, special stress should be placed on visual design as a powerful learning mind tool. The described process is used for developing of a practical ontology from the domain of IT project risk management.

**Keywords:** ontology, visual knowledge engineering, knowledge acquisition, knowledge sharing and reuse.

## 1 Introduction

The idea of using visual structuring of information to improve the quality of student learning and understanding is not new. Teachers are used to work with concept maps, mind maps, brain maps, semantic networks, frames (Conlon 2002), (Sowa 2000) and other conceptual structures. A teacher operates as a knowledge analyst by making the skeleton of the studied discipline visible and showing the domain's conceptual structure called an ontology.

This paper proposes a clear, explicit approach to practical ontology design. The proposed algorithm for ontology design is used for the risk management teaching in the course in IT project management.

### 1.1 Using ontological engineering for teaching purposes

The different types of teaching ontologies can aid effective learning: main concepts ontology, historical ontology (genealogy), partonomy of the discipline, and taxonomy of the theories, methods and techniques, etc. The concrete set of ontologies depends on personal vision, teaching subject and awareness level of the students. Generalizing our experience in developing different teaching ontologies for e-learning in the field of artificial intelligence and neurolinguistics (Gavrilova & Voinov 1996), (Gavrilova 2007), (Gavrilova 2010), we propose a five-step algorithm that may be helpful for visual ontology design.

The project management course is based on the studying of Project Management Institute standard. The ontologies developed for such concepts as “project”, “risk” and etc help the students to better understand the structure and relations under study.

## 1.2 Developing Practical Ontology

In this section we describe the 5-step algorithm for the ontology development.

- *Step 1 - Glossary Development*  
To build a glossary for teaching project management course, we collected the terms from PMBOK (Project Management Body of Knowledge, 2008) and software development area. The specifics of IT project risks were considered.
- *Step 2 - Laddering: Building an Initial Mind Map Structure*  
The main goal of this step is the creation of a set of preliminary concepts and the categorization of those terms into concepts.
- *Steps 3 & 4 - Disintegration/Categorization: Building a Concept map with more Precise Hierarchy*  
Using the bottom-up strategy we tried to fit the terms and concepts into the meta-concept. Moreover, we created the relationships between the concepts.
- *Step 5: Refinement*

## 1.3 Discussion

The ontology design may be also used as an assessment procedure for expressive as opposed to exploratory learning. For both formative and summarizing assessment purposes, students can clearly indicate the extent as well as the nature of their knowledge and understanding through creating ontology and explaining the involved processes.

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