

COOL : A COre Ontology for e-Learning

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Abstract. The abstract should summarize the contents of the paper using at least 70 and at most 150 words. It will be set in 9-point font size and be inset 1.0 cm from the right and left margins. There will be two blank lines before and after the Abstract. ...

1 Introduction

Many educational resources are available on the Web, but finding them and reusing them in Web Based Educational System (WBES) is not easy. First of all because even if they are described using the LOM (the IEEE standard for learning object), the semantics of the LOM is expressed in english (not a formal way) so each implementation (an application profil) makes it's own interpretation. Accordingly, many application profiles, in fact most of them, are not interoperable [?]. The use of ontologies in e-learning is not recent [?] and many distinct ontologies are developped to define concepts and relations for WBES, preventing the sharing of resources. For [?], an ontology is a formal, explicit specification of a shared conceptualisation, but the situation, currently, is an ontology for e-learning is a formal, explicit specification of a conceptualisation.

Many researchers are adresssing the problem of the interoperability of "meta-data for learning resources" ([?], [?]), it is necessary to adress the problem of the compatibility of ontologies for e-learning. Even if it is not imaginable to have an unique ontology, we must agree on a core ontology for e-learning.

In the field of e-learning an ontology can be used to give meaning to meta-data elements, but most of them are used in intelligent educational systems. Most of those systems are based on multiple ontologies as recommended by [?], for example : an instructional ontology for formalizing learning resources, a domain ontology for formalizing the domain of the learning resources and a learner ontology.

In the next section, we describe some ontologies for e-learning and after that, we propose COOL : a core ontology for e-learning.

2 Some ontologies for e-learning

Many authors refer to their own ontology but very few of them give their ontology. This practice doesn't hep for sharing ontologies.

II

Even if it is not an ontology, the LOM [?] in the element 5.2 Learning Resource Type gives a classification of learning objects.

The system described by [?] is based on three ontologies : one for the content of learning materials, one for the context of learning materials and one for the structure of learning materials. Some concepts and relations are cited, but the full ontology is not provided.

LMML, Learning Material Markup Language Framework ([?],[?],[?],[?], [?]) is an XML Schema describing e-learning contents and build up on the Passau Teachware Model. The Learning Material Markup Language Framework focuses the conceptual and modular structure of e-learning contents. To enable an efficient on-line learning, it is necessary to implement a further level of abstraction which models and describes the didactical structure of elearning contents. LMML can be combined with various pedagogical models. Some models of didactical structures of online learning content have been developped upon LMML.

Targeteam [?] is a system for supporting the preparation, use, and reuse of teaching materials. It is centered around the XML based language TeachML [?] which can be classified as an "educational modelling language". teachML makes the difference between didactical units (like example, exercice, ...) and didactical structures (like course, examination, ...).

The EUME project ([?], [?],[?],[?],) is intended to develop an Intelligent Learning Management System (ILMS) with the aim to improve the quality of traditional teaching strategies as well as to facilitate the implementation of new learning methodologies. The EUME Onto is an educational Ontology that contains concepts of learning design, learning content and learning resources.

[?] provides an ontology describing a learning resource from an instructional perspective. This ontology doesn't describe the domain (like physics or mathematics), it focus on instructional roles played by learning resources.

[?] provides an architecture for adaptable e-learning, but the ontology doesn't describe the instructional function of each learning resource.

The Courseware Authoring Tasks Ontology (CATO) [?] is a functional concept ontology. CATO consists of two main layers: base layer, which includes hierarchy of atomic authoring tasks, and metalayer, which includes hierarchy of meta-functions.

([?],[?], [?], [?], [?]) provide an ontology for adaptive e-learning based on the separation between the domain and the instructional part.

3 COOL : a COre Ontology for e-Learning

This section presents concepts and links in the first version of COOL. First of all, our ontology is build up on the Qualified Dublin Core and on the LOM, as they are well known, we don't repeat them here.

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<!ENTITY cool "http://wwsi.supelec.fr/~yb/cool#">
```

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<!ENTITY owl "http://www.w3.org/2002/07/owl#">
] >

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  xml:base   ="http://wwwsu.supelec.fr/~yb/cool#"
  xmlns:cool ="http://wwwsu.supelec.fr/~yb/cool#"
  xmlns:rdf  ="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:owl  ="http://www.w3.org/2002/07/owl#" >

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</owl:ObjectProperty>

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<!-- ***** -->

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</rdf:RDF>

```

4 Conclusions

Building high quality learning resources is time-consuming and they must be reused to decrease their cost. But in order to allow this reuse, the first step is to share the same ontology.

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