

SEMANTIC WEB-BASED E-LEARNING SYSTEM

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Introduction

- Why Semantic Web technologies and E-learning:
 - They meet the most important e-learning requirements: quickness and just-in-time learning;
 - users can make semantic searches for desired online documents;
 - the Semantic Web allows annotation of knowledge for human and machine-readable form.
- Many research works had studied the implications of Web-based applications in the learning process: a group of researchers from the Qatar University developed a semantic web-based e-learning system that offers the ability to annotate, share and discuss the e-learning content.
- We try to provide a model for an e-learning system in which the learning knowledge is structured using semantic web languages for an adaptive and intelligent system.

E-learning and Semantic Web

- The advantage of using Semantic Web technology is the capability of representing the huge quantity of data in a machine interpretable form.
- Computers only present the hypermedia information, they do not understand or reason about it.
- We must represent the data in such way that computers can parse the text and process the data.
- Using Semantic Web technologies the learning material distributed on the web is structured and tagged upon an agreed vocabulary enabling semantic queries.

E-learning and Semantic Web

The components of the e-learning system can be described using metadata—data about data.

- a concept defined and described by a specific semantic markup is a member of a class, has properties, and is associated with other defined concepts.
- To associate metadata we used the eXtensible Markup Language – XML.

E-LEARNING SYSTEM BASED ON SEMANTIC WEB

- We describe a proposed e-learning system based on the Semantic Web technology which intends to provide registration for students and teachers, online courses, different announcements, evaluation tests and semantic search to find associated resources of the topic requested.
- First, we must describe the resources about their content with associated metadata through Resource Description Framework statements.
- Metadata represents the formal representation of knowledge on specific domain of study.

E-LEARNING SYSTEM BASED ON SEMANTIC WEB

- Representation means: semantically encoding knowledge within the application
 - creating SKOS documents about the name, description, field of study for every course
- An example of a SKOS document where we modeled three courses (concepts) with description about their content and association with other courses:

E-LEARNING SYSTEM BASED ON SEMANTIC WEB

xmlns:e = "http://www.e-learningExample.ro#" <!-- designating the namespace of XML syntactic constructions to express the metadata associated with each course -->

```
<skos:Concept
  rdf:about="http://www.e-learningExample.ro /WebSemantic">
  <skos:prefLabel> Semantic Web course </skos:prefLabel>
  <e:description> The course about Semantic Web ...
  </e:description>
  <e:category> WEB Technologies </e:category>
  <e:credits> 6 </e:credits>
  <skos:narrower>
    <skos:Collection>
      <skos:member
        rdf:resource=" http://www. e-learningExample.ro /XML"/>
        ...
      </skos:Collection>
    </skos:narrower>
  </skos:Concept>
```


CONCLUSIONS

- Semantic web technologies represents the best method to exchange information in a distributed system because:
 - Interpreted both by man and by machine;
 - Capable of self – validation;
 - Easily converted and adapted to change;
- The main contribution of the new proposed e-learning system is to provide semantic association between concepts/related information about a concept and a well defined hierarchical structure for learning resources.

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