

# DiLight: an Ontology-based Information Access System for e-Learning Environments

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## Categories and Subject Descriptors

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## EXTENDED ABSTRACT

Educating students on Digital Library (DL) research and practices has become an important course taught in many universities. Due to the rapid development of DL field and students' diverse backgrounds and learning preferences, students face a steep learning curve when they try to grasp core concepts/topics and understand different DL views/approaches. DiLight is an interactive, integrated and active e-learning environment. One of the goals of DiLight is to organize course-related materials into an ontology [1] to support students to learn DL related topics and complete their learning tasks quickly and easily. DiLight is built on top of DSpace<sup>1</sup>, a leading open-source digital repository system, to take advantage of DSpace's powerful content management and search tools. Our demonstration will concentrate on DiLight's ontology-based information access functions.

DiLight's ontology organizes DL topics and related course materials in a hierarchy with 50 types of relationships (e.g., *belong to topic*, *illustrated by*, and *has problem*) (see Figure 1). To support students to access DL course materials, DiLight provides three ontology-based methods: content-based browsing, ontology-based search, and associated recommendation.

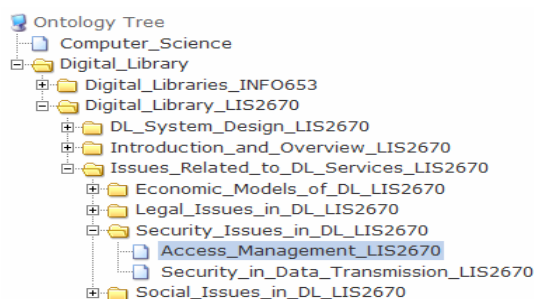
**Content-based browsing.** The ontology provides a visual presentation of the overall conceptual architecture about DL course topics. With 50 types of relationship provided in the ontology, students can navigate through the hierarchical structure, exploring or discovering internal semantic relationships among the course topics.

**Ontology-based search.** Our ontology-based search provides two functions: 1) it utilizes its built-in inference engine to locate documents that are truly semantic related to the query terms, thus achieves more accurate or comprehensive results. 2) It also

<sup>1</sup> <http://www.dspace.org>

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provides facilities to explicitly specify the scope of a search, which is useful when the user has some knowledge about areas/scopes in which the relevant information could be. A clear defined scope also helps to reduce ambiguities in query terms and thus increases search accuracy.



Current Issue: [Access\\_Management\\_LIS2670 \(2 >>> Expand >>>\)](#)  
belong\_to\_topic  
[Security\\_Issues\\_in\\_DL\\_LIS2670 \(3 >>>Expand>>>\)](#)  
illustrated\_by  
[Model\\_of\\_Access\\_Management \(1 >>>Expand>>>\)](#)  
has\_problem  
[Problem\\_with\\_Password \(2 >>>Expand>>>\)](#)

**Figure 1. DiLight's Ontology for DL Course Materials**

**Associated recommendation.** Content-based browsing enables access to materials via links between parent and child nodes, whereas ontology-based search provides a set of access points over the whole ontology. However, in a situation where internal connections between different topics are over a long distance (e.g. two related topics taught in different classes), some form of presentation of the link becomes important for students to build up a comprehensive understanding. With a clear understanding of internal connections among different topics, the teacher can utilize the relationship in the ontology to explicitly present the connections. This is what we mean associated recommendations. Documents in related topics are linked together across the whole system, thus enables information access over indirectly linked nodes.

## ACKNOWLEDGMENTS

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## REFERENCE

[1] Gruber, T. R. (1993). A Translation Approach to Portable Ontology Specifications. *Knowledge Acquisition*, 5(2), 199-220.