A Collaborative Linked Learning Space

Kai Michael Höver
Department of CS
TU Darmstadt
Germany
hoever@acm.org

Michael Hartle
Department of CS
TU Darmstadt
Germany
mhartle@tk.informatik.tu-darmstadt.de

Guido Rößling
Department of CS
TU Darmstadt
Germany
roessling@acm.org

ABSTRACT

Current learning systems typically do not allow students to combine learning materials with additional content, for example materials found on the web. We present a system that enables both educators and students to augment learning resources by creating meaningful links between them. In this way, both students and educators can benefit from the augmentations of others, and relate them to personal knowledge.

Categories and Subject Descriptors

K.3.1 [Computer Uses in Education]: Collaborative learning; K.3.2 [Computer and Information Science Education]: Computer science education

General Terms

Design, Experimentation

Keywords

CLLS, Linked Data, Web-based learning

1. COLLABORATIVE LINKED LEARNING SPACE

Students often use information resources either created by themselves or found on the Web in addition to provided learning material to bridge existing knowledge gaps or to get more suitable explanations. Many learning systems allow students and educators to add only text or digital ink annotations to learning material. Thus, it is hardly possible to augment provided learning materials with other learning resources.

Educators and students are rarely able to share learning resources they appreciate with other learners while preserving the semantic relations, e.g., a Web page that gives an example to the content of a slide. In this paper, we present a web-based system called Collaborative Linked Learning Space (CLLS) that provides access to learning materials, and enables learners to both create and share their personal knowledge graphs composed of different learning resources.

CLLS is a learning tool that supports learners in actively constructing knowledge graphs. It also provides a player for lecture recordings that can be used to bootstrap the construction. Figure 1 shows a lecture recording and the corresponding knowledge graph that is collaboratively created by the users. The lecture replay function provides a video of the lecturer (I), a slide overview (II), and the currently selected slide (III). The knowledge graph panel (IV) depicts a graphical representation of the knowledge graph. Nodes in the knowledge graph represent learning resources such as slides, PDF documents, and images. Edges represent the semantic relationship between the learning resources, e.g., “illustrates”, “contradicts”, or “exemplifies”.

To link a slide to a figure from a web page, for example, the user drops the figure on the slide in area III or on the corresponding node of the knowledge graph in area IV. In principle, all information resources with an Uniform Resource Identifier (URI) can be linked with each other. After the user has chosen the label for the relation, the knowledge graph updates automatically. The new information is also sent to the messaging server, which distributes it to both the central storage and the currently connected clients.

Learners can use the system in an exploratory way and in a constructive way. When using the system in an exploratory way, learners navigate through the public knowledge graph compiled by public elements of each personal knowledge graph led by their aims and interests. In constructive use, learners create a personal knowledge graph by interlinking and arranging different knowledge resources, either from the web or other learners’ knowledge graphs.

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Figure 1: Graphical User Interface of CLLS