

Online tools help students search for meaning

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(PhysOrg.com) -- With universities storing ever more teaching resources online, how do students and tutors find what they need? European researchers have devised novel ways to classify and locate teaching materials – and in eight different languages.

University students no longer learn from lectures and books alone. Thanks to the internet, they now have access to a huge range of supporting material, such as lecture notes, assignments, articles, and so on. To organise this material effectively, most universities have invested in a ‘learning management system’ (LMS) to archive and present documents online in a systematic way.

But as the volume of material grows, both students and tutors have the problem of locating the information they need.

“In general it can be hard to find what you are looking for,” says Dr Paola Monachesi of the Institute of Linguistics at Utrecht University. “The normal way to search the LMS is by a full text search. That’s what you do in Google, you just type a word and get a list of results.”

Unfortunately, such searches ignore the relevance and suitability of the ‘learning objects’ they identify. An EU-funded project called LT4eL (Language Technology for eLearning), involving universities in ten European countries, has devised new ways to search by meaning rather than by text.

Extracting keywords

One approach is to search by metadata – keywords and other labels that tell a potential user much more about a document – but metadata has to be entered manually by the author and the task is often neglected.

“We thought, can we develop a system where keywords are assigned automatically or semi-automatically?” says Monachesi, who coordinates LT4eL.

The project has created a ‘keyword extractor’ that analyses each document in the LMS archive and proposes a list of keywords that the author can accept, reject or modify. The prototype focuses on material in computer science and e-learning and has been designed to work with documents in Bulgarian, Czech, Dutch, English, German, Polish, Portuguese and Romanian.

Trials show that it works faster and more consistently than manual annotation. A related tool even extracts definitions from the material to build a glossary of key terms.

Although online dictionaries are already available, they do have some shortcomings. “Very often the words are ambiguous so you don’t really know the proper definition in the context of your learning object,” Monachesi explains. “Key’, for example, might mean the key of a keyboard or a key to open a door.” The LT4eL tool ensures that the offered definitions make sense in the context of the course material.

Multiple languages

A second, potentially very powerful approach, allows users to search for information by concept. The ‘semantic search’ tool organises keywords

and definitions in a hierarchy according to their meaning – an ontology – revealing the relationship between them. For example, a student searching for information about HTML, the language used to mark up web pages, would also be pointed to material about XML, as both are used for similar purposes.

But the real richness of the LT4eL system is that the resources can be cross-referenced between several different languages.

“Since we classify documents through topics we can also search in different languages at the same time,” Monachesi points out. “I had Polish students who could speak English, the course was in English, but they preferred to read documents in Polish. With such a system, I could search in English or Dutch but get Polish documents. So my students could get material in their own language even though I don’t know Polish.”

The system has obvious benefits for students on exchange programmes and those studying a field where much of the material is not available in their native tongue. Because of the choice of languages, the project should help develop ties between ICT research communities in the new Member States and the rest of the EU.

Although the project has been designed with higher education in mind, the tools have been tested with schools in Romania and should also be useful for industrial training.

Tagging the future?

LT4eL was supported by the EU’s Sixth Framework Programme for Research, and the Seventh Framework Programme is funding its successor, LTfLL (Language Technology for Lifelong Learning) which will be further developing the semantic search.

“We see a lot of potential in the semantic search but we noticed that students don’t use it in the way they could,” says Monachesi. “I think this is because it’s new and different from what they are used to on Google, for example.”

So, among other things, the new project will look at the ‘tagging’ system popular on social networking websites like Flickr and YouTube to see if it could be adapted to make the semantic search more user-friendly.

“Maybe we can find a semantic representation more lightweight than our very structured ontology that may be difficult for people to understand.”

For the purpose of the project the LT4eL tools have been integrated into the ILIAS learning management system but Monachesi stresses that the tools are open source and are freely available from the project website and SourceForge.

“This gives the widest possible distribution and dissemination – anybody could use them – but the licence would also allow for commercialisation.”

Link: www.lt4el.eu/

Provided by [ICT Results](#)

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