Gap Analysis of Educational Web Tools in Engineering

Abstract

A gap analysis of Web tools in Engineering was undertaken as one part of a larger grant entitled Digital Library Network for Engineering and Technology (DLNET) (funded by NSF DUE-00-85849). The DLNET project seeks to build a Web content portal and an online review process to archive quality knowledge objects in Engineering and Technology disciplines. The gap analysis purposefully preceded the development of this portal to identify Web tools used or desired by faculty and students to help process Engineering and Technology information in the portal.

The Need

The emergence of Web portals to educational content has helped transform traditional links between knowledge developers and users. Where knowledge developers once were required to publish and market their content through publishers, libraries, and bookstores, they may now submit knowledge objects directly to public portals for immediate access and use by peers. One primary gain from Web portals is efficiency of dissemination. Faculty and students can access more information more quickly than before. These gains are positive, but they are not complete. Often, the educational method remains top-down delivery of content to the user. Student processing of information is not necessarily changed, unless a knowledge object happens to be a high-quality interaction or simulation. To fully complement Web portals, it is critical to integrate or recommend educational Web tools that provide the means for students and faculty to process and effectively utilize the growing body of content.

Popular course management systems such as Blackboard provide mechanisms for delivery of content, quizzing, and some group communication and file sharing. Additional information processing tools have been developed by educational researchers, however, that are not rapidly disseminated to the general education community by commercial products. These tools include such features as: collecting and generating diagrammatic displays of Web searches, archiving group-gathered data via Web forms, organizing Web information or links into problem-related categories, integrating or annotating one's notes with different Web resources, and collaboratively editing a group concept map.

The Gap Analysis

An online Delphi survey was conducted to reveal existing and needed Web tools for Engineering education. We identified a national panel of 66 Engineering and Technology faculty using Web tools to teach distance or on-campus courses. Using Web forms, panelists were asked to submit recommendations for existing and hypothetical Web tools that would support both their teaching and their students' learning. The 51 recommended tools were sorted into six categories: tools to create Web content, tools to disseminate or retrieve Web content, tools to process Web content, tools to collaborate or work with others, tools for assessment, and tools for course management.

The master tool list was submitted to the Delphi panelists for a second survey round. By converting panelists' Likert rankings to numeric form, rank-ordered feature lists were derived,

describing highest rated tools overall, as well as highest rated tools in specific thematic tool categories. One list was generated for all Engineering and Technology faculty, as were several discipline specific lists (e.g., civil engineers, chemical engineers).

This proposed poster presentation will describe the gap analysis process and present the final rank-ordered lists, illustrating the tools most desired by Engineering and Technology faculty. We will discuss implications of the analysis with conference participants, noting in particular that the panelists placed more importance on tools that support traditional teaching practices than on tools that would enable student-centered techniques.

Future Steps

We have taken steps to create an interactive Web site where panelists and others may leave their comments and further recommendations. Each list is integrated with a Web annotation engine, allowing site visitors to embed notes within the body of the documents. We have asked site visitors to consider leaving three types of annotations: comments on the rankings and their correctness, links to specific software programs that match a generic tool description, and lesson ideas for applying a specific tool. In addition to these linkages, we plan to review pertinent knowledge objects deposited into the Engineering content portal and link from the tool lists to those content pieces. These linkages will suggest mechanisms by which students may process information more actively.

Presenter Bio

Dr. Kevin Oliver is an instructional design and evaluation specialist with the Educational Technologies group at Virginia Tech. He develops online training materials and provides teaching support for the award-winning Faculty Development Institute. He also works with faculty to prepare grants, conduct evaluations, and develop technology-based materials for on and off-campus courses. His current projects include the development of a national online faculty development program, and wireless, hand-held computing activities for large lecture courses.

Additional Information

For additional information, please visit the project Web site:
http://www.edtech.vt.edu/dlnet/

This presentation has been delivered at the Association for Educational Communications and Technology (AECT) national conference in November, 2001, and has been submitted for presentation at the American Educational Research Association (AERA) national conference in April 2002.