Group Knowledge Construction in Digital Library Communities

Project Summary

Now that digital libraries (DLs) are coming online, it is time to make them useful and usable by communities of learners. While collaborative use of DLs has always been identified as a goal, most support in DLs is oriented toward individual users. Collaborative use of DLs may include mechanisms for feeding back results of individual usage to help guide future use within a community; such feedback mechanisms are beginning to appear to support indirect anonymous collaboration in user communities. However, special support for use of DLs by small teams explicitly working together in DLs has not been adequately addressed to date.

Three major categories of DL usage can be distinguished:
(1) Research by people at work. Much work in today's information society is knowledge work by teams of employees; CSCW (computer-supported cooperative work) is concerned with the related issues.
(2) Study by students in school or college. Increasingly, schooling follows constructivist paradigms of pedagogical theory and organizes students into small groups to build knowledge collaboratively; CSCL (computer supported collaborative learning) is concerned with the issues here.
(3) Lifelong learning by citizens. Citizens often explore areas of interest with like-minded people; the Internet provides the potential to systematically bring people together at a distance and asynchronously, with HCI (human computer interaction) being concerned with designing effective interactions.

This project conducts targeted research:
(1) To understand how small groups can collaboratively make use of DLs. The user studies will study how small groups – both online and face-to-face – use digital library resources, addressing CSCW issues like privacy and social awareness.
(2) To design prototype software to support small groups to construct collaborative knowledge in DL communities. The prototype will be designed in keeping with CSCL theories and practice, and following HCI principles of user-centered, iterative design.
(3) To evaluate the prototype support with small groups of college students. Formative evaluation will take place throughout the iterative design, and will include both HCI inspection techniques and usability testing; summative evaluation of the completed prototype will be carried out via controlled experiment with small groups of students working on course team projects.

We propose to develop a prototype that provides support for small group collaboration in digital libraries. The software provides a shared online space where the group members can find, store, share, discuss, organize and annotate DL resources. Members will also have support for ranking resources and negotiating their rankings. Groups of three or four students in information science courses at Drexel University will use this software to explore digital libraries and to build collaborative knowledge on topics in HCI, CSCW or CSCL, resulting in term papers and group presentations.

Information from group knowledge construction using the software is fed back into a community repository associated with accessed DLs. Groups have a choice of making specific results of their collaboration visible to other DL users. This might consist, for example, of publishing the group's favorite resources, their most successful queries, or the most relevant journal titles for a given topic. Additionally, mining of usage data from the group efforts will result in a recommender system to help guide future users.

Intellectual Merit. This research will contribute to the understanding and practice of collaboration and of the role of small groups in building global communities. It will apply principles of CSCW, CSCL and HCI to the domain of collaboration in DLs and advance knowledge of small group needs in information-rich digital environments. It will develop innovative ways to support group needs in information-intensive tasks. A challenge for digital libraries is to make them more than mere repositories; providing group tools tailored to the needs of real users is an important way to make digital libraries "come alive."

Broader Impacts. The prototype is a proof-of-concept for much broader application of the design principles to schools, offices and homes. Focused on integrating DL resources into current collaborative trends in education, the project will provide a model for information-seeking groups in the workplace to adapt. Finally, small group support for information-seeking activities can benefit the larger society, including those most disadvantaged: several of the co-PIs are currently working on using digital information sources and technologies to help groups in a disadvantaged area of Philadelphia manage their chronic health problems.