

CILT '99 Seed Grant Proposal

Statement of Work

Project Title:

Interoperability among Knowledge-Building Environments

Abstract:

A number of software environments have been developed to support collaborative knowledge building, typically incorporating a persistent discussion forum. Despite striking similarities and interesting differences among these community learning tools, there has been little direct interchange of ideas, designs, experiences and data among the developers. A first step toward increasing collaboration in this research community is to define a mark-up language to represent, archive and translate the data captured in these systems. This will help us to understand the design space of such knowledge building environments, to share software tools and to archive data for analysis. This project brings together representatives of research groups building related tools and evaluating the learning supported by those tools.

Principle Investigators:

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Objectives and Significance:

The goal is to start a collaboration among research groups and individuals who are designing, implementing, testing and evaluating innovative learning technologies that support collaborative knowledge building. A number of similar software *knowledge-building environments* (KBES) have been created, generally including a discussion facility that renders student argumentation persistent. This project will define a common data mark-up format that these KBE systems can export their discussions to. This will allow interchange of data and the display of data in shared formats to facilitate comparison and research. For instance, it will facilitate the archiving of discussions from different systems in CILT's Knowledge Network.

Project and Partners:

This project will bring together researchers working within a genre of collaborative learning technology that is prominent in the larger field, but has not been identified or conceptualized as such. The effort to make the data in these KBE systems exchangeable will raise issues of software design that will lead to sharing of expertise and technical advances. This is similar to the Dexter conference that defined a software model of the major hypertext systems in 1988 and clarified directions for their future development [CACM, 37, 2]. We hope to start with KBE researchers at Toronto, Georgia Tech, Colorado, Swarthmore, Berkeley, Stanford, SRI and elsewhere. The time they contribute to this project is likely to total in excess of 400 hours during the year: drafting documents, corresponding and attending workshops. The partner groups include several people with XML experience who are willing to share knowledge of this important new technology within the KBE community. A number of groups are already working on XML representations specific to their systems, and others will soon begin to do so as a result of this project. The PI (Stahl) will be leading an interdisciplinary graduate seminar on KBES in the Fall, with students doing research directly supportive of the proposed project. As a direct consequence of the planning of this project at CILT '99, a parallel project has been launched for research groups in the cognate field of CSCA (computer supported collaborative argumentation / design rationale), with an initial draft XML DTD already (within a week of the CILT conference) posted to a KBE for discussion. All of these activities will be represented and coordinated in the proposed project.

Expected Outcomes:

KBES are considered important learning technologies, yet their widespread adoption remains problematic. This project will begin to bring together a community of people deeply involved in the KBE sub-field to share data, designs and experiences. Data interoperability will facilitate the development of shared tools for analyzing, visualizing and comparing student learning within various KBES. When data is stored in an XML file, it can be interchanged between different

KBE systems or different versions of the same system, archived for flexible future use and displayed on the Web with metadata search capabilities. The definition of an XML DTD for threaded discussion and related information in KBEs is explicitly viewed as just a first outcome. The KBE-ML will include a minimal model of KBE storage, a full-featured ideal model and extensions for specific systems. If accepted, workshops proposed for CSCL '99 and elsewhere will relate this work to the broader educational issues surrounding KBEs. This project will lead to a clearer understanding of future stages of collaboration for subsequent funded projects.

Deliverables:

A number of participating groups have already started to work with XML representations of their own systems, so development is likely to proceed through iterations punctuated by communication and consolidation, with "standards" being repeatedly revised to support new concerns. The following milestones are targets for reaching consensus and producing semi-stable documents:

- Requirements specification for an XML DTD based on several specific KBE systems. (Month 2)
- Draft of a full-featured KBE-ML Document Type Definition for KBEs and a minimal subset to define compatibility. (Month 4)
- Development of export/import procedures between XML data and specific KBE systems. (Month 6)
- Organization of a workshop at CSCL '99 (assuming acceptance) on issues related to this project and the learning goals of KBEs. (Month 7)
- Development of Web display style sheets for the KBE-ML formatted data. (Month 9)
- Development of simple data analysis tools for the KBE-ML formatted data. (Month 11)
- Submission of funding proposals for future work. (Month 12)
- Preparation of project status updates and summary report. (Month 12)

Organization:

A set of four co-PIs will share primary programmatic and financial responsibility. They will decide how funds should be allocated as needs arise. Funds will be administered through the University of Colorado, but will be used to cover expenses at any participating institutions, such as the hiring of students working specifically on this project or the travel expenses of a participant who needs a subsidy to collaborate or attend meetings or workshops specifically as part of this project. An Executive Committee consisting of representatives of primary KBE systems will ensure the involvement of the research groups involved with those software systems. A Project Membership list of individuals will be used for the circulation of all project documents in order to build broad consensus.

Period of Performance:

12 months starting June 1, 1999.

Budget

\$2,600	Salaries and Wages Research Associate: 40 hours @ \$40 per hour Students: 100 hours @ \$10 per hour
\$3,000	Travel Domestic air fare and per diem to workshops or site visits: 6 trips @ \$350 air fare and \$150 per diem average
\$3,150	Supplies XML software tools \$2,000 Other software \$650 Printing, supplies, miscellaneous \$500
\$ 878	Indirect costs Fringe Benefits \$175 Research Associate @ 9.12% Students @ 2.89% Indirect costs at university of Colorado \$700
<hr/> \$9,625	Total