"*Collaboration Services for the Math Forum Digital Library*"
Peer Reviews from NSF

PROPOSAL NUMBER.: 0333493

INSTITUTION: Drexel University

NSF PROGRAM: NATIONAL SMETE DIGITAL LIBRARY

PRINCIPAL INVESTIGATOR: Stahl, Gerry

PROPOSAL TITLE: Collaboration Services for the Math Forum Digital Library

PANEL SUMMARY:

The consensus of the group was that this was a superior proposal, as evidence the ratings. The Math Forum Digital Library is acknowledged to be one of the most prominent early success stories arising from the networks and infrastructure program. With over one million users, it represents an ideal testbed for the collaborative learning platform outlined.

This project effectively builds upon prior research initiatives, taking it to the next logical progression.

The research team is well-qualified, combing the mixed expertise of the PIs and co-PIs. The team has made a significant effort at collaborating with other teams and universities, both domestically and internationally. Drawing expertise from the schools of education, culture and communications,

the team endeavored to design a true multi-disciplinary initiative. The project plan, schedule of activities, deliverables and measurement criteria were clearly articulated and the project was felt to be highly sustainable.

The research design is well-conceived. By employing multiple research instruments, the team will draw upon both subjective perceptions as well as objective behavioral measures. Framing the research at three levels in order to measure the users, creators and designers as three distinct constituencies is a solid design that assures collection of reliable, meaningful data.

The team applauds the proposal's focus on the education market for several reasons. While generally acknowledged to be a potentially rich user base, the fundamental obstacles to teacher engagement remain – the problem of how to alleviate a teacher's time constraints continues to defy a technological solution.

Key suggestions for improvement include:

a) Describe how the research will address underrepresented groups

b) Clarify resources. How will 10 faculty members and 40 graduate students be utilized?

c) What roles will the international researchers play in the project?

d) Examine other research proposals in related disciplines to determine whether further collaboration is possible with peer research teams

e) Beware of extrapolating beyond the education test pool to other environments/audiences

f) Add K-12 schools and teachers as part of the testbed and overall design

In summary, this proposal describes an innovative effort by a multidisciplinary team to integrate collaborative technologies into the Math Forum Digital Library.

Review #1

RATING: Excellent

What is the intellectual merit of the proposed activity?

This NSDL Services proposal builds on the past extensive effort put into the Math Forum set of DL collections and services. The focus of the effort will be on collaboration to build and assess tools that contribute to greater interaction between users of the DL resources.

The strengths of this proposal are:

- a well-defined need to be addressed
- clear articulation of project goals
- a robust user community already in existence
- the use of teams of users, creators and designers to collaboratively create new materials, uses of materials.
- excellent understanding of, building on prior research and prior success of Math Forum.
- strong team of PI's - collaboration with key people
- leveraging products from previous NSF proposals
- strong project plan, evaluation, dissemination
- strong international cooperation

Weaknesses:

- more specific details about how different team members will be used.
- more specifics on how diversity issues will be addressed.

What are the broader impacts of the proposed activity?

This proposal has the potential to have a significant impact on the DL effort both in the USA and internationally.

Summary Statement

This is an outstanding proposal with all of the right ingredients for success - the right cast of PI's, building on a solid base.

Review #2

RATING: Excellent

What is the intellectual merit of the proposed activity?

Building upon previous research in online learning and use of digital libraries, the proposed research extends into a new and essential field of inquiry.   By focusing on group collaboration, the project team's prototype appears to provide the first comprehensive software environment to support cooperative learning online within distributed small groups. User testing of the prototype will yield tremendously valuable data on how users form groups and how effectively the prototype collaborative software environment supports group collaboration. This knowledge may in turn provide insights into how groups of users employ DLs and what features and functions should be incorporated into future DL's.

What are the broader impacts of the proposed activity?

The vision of true online group collaboration has been embraced by virtually every industry with widespread acceptance of the internet. The promise of a software environment that enables users to realize that vision is exciting. One can easily envision doctors in Beijing collaborating with doctors in the Atlanta CDC through such a medium.

The prospect of a tool that provides systematic support to group collaboration activities becomes particularly exciting in an educational context. As we come to understand the importance of social interaction in the learning process, the internet offers a new avenue for social interaction and new approaches to learning for students of all ages.

Availability of such a "drop in" platform suggests that teachers would now be able to collaborate with peers anywhere in the world, sharing resources on topics ranging from curriculum development to professional development. Students who might otherwise be isolated either by physical, social or economic constraints can now form social networks online to collaborate on educational ventures.

In short, delivery of the research and software platform outlined in the proposal should provide an innovative prototype to support group collaboration as well as valuable feedback on group preferences to direct future product development.

Summary Statement

Professor Stahl has written an outstanding proposal outlining in great detail the legacy of research that formed the foundation for the studies he proposes. His team appears to be working closely with several other teams of researchers at Drexel and other universities, both domestic and international. His vision and the intended outcomes of the research are well-defined and clearly articulated, as is the program schedule and plan to disseminate the results of the study.

Two key questions occurred to me as I read the proposal. I wondered first what the net effect benefit was of the collaboration with colleagues in Europe. At a time when most industries have severely restricted international travel for both budgetary and safety reasons, it's surprising to see extensive international travel budgets.

I wondered also whether there may be opportunities for the team to collaborate with companies providing additional related technology products beyond the educational product arena. The areas of functionality referenced seem to overlap, for example, with developments in e-learning, web conferencing online project management, web-based directory management and instant messaging products that are gaining market traction.

It's very exciting to see the progression of this collective body of research and I look forward to seeing the results of this and related studies. I very enthusiastically support this proposal.

Review #3

RATING: Excellent

What is the intellectual merit of the proposed activity?

The Math Digital Forum Library will be used as a model for the adaptation of groupware components to develop a collaborative learning environment.

Strengths: The project sets forth a clear statement of goals and objectives. The proposal is well written and clearly presented. A strong project team has been assembled to carry out the project activities.

What are the broader impacts of the proposed activity?

The project works with a large well-established digital library that provides a real world test for creation of virtual learning communities. The project outlines an achievable timeline with relevant quantifiable measures that add to the potential value and success of this project. The project"s broad base of participants will enhance efforts to disseminate project outcomes. Proposal is weak on participation of underrepresented groups.

Summary Statement

An innovative effort by a multidisciplinary, multinational team to integrate collaborative technologies into the Math Forum Digital Library.

Review #4

RATING: Excellent

What is the intellectual merit of the proposed activity?

Project proposes to build a collaborative tool for the Math Forum's Problem of the Week.

Strengths

This is a solid piece of work that can add enormous value to an already well-established and well utilized library by the K-12 community. The Math Forum's work has been highly valuable to teachers, students and parents and continues to be first on the list of references for non-mathematicians (and always the first hit on a 'math' Google search).

The way in which the problem is framed at three levels (User teams, creator teams and design teams) is a solid

design. Using the Problem of the Week portion of the Math Forum would allow for experimentation in one heavily utilized area and will allow the propagation of the collaborative tool to other sections of the Forum.

The mixed expertise of the PIs and co-PIs is a plus as is the international team they will be collaborating with.

The mixed methods evaluation should be informative. Although capturing 'perceptions' of how team members worked with one another may be more reliable than capturing 'feelings.'

The Math Forum Collaborative Learning Environment could be an essential extension of the work achieved by the Math Forum.

Concerns

It would have been interesting to have more information about how MFCLE will get at the issue of diversity. Because it is such a popular site it has the advantage of getting a wide range of users that will may not have access to other digital libraries. It would be worthwhile to collaborate with schools in the building of MFCLE. It would allow PI's to understand the constraints educators face when trying to use these kinds of tools in a typical school day.

Review #5

RATING: Very Good

What is the intellectual merit of the proposed activity?

Establish a collaborative learning environment for mathematics building on existing expertise.

What are the broader impacts of the proposed activity?

The microanalysis of the "Problem of the Week" as it is done by individuals versus more collaborative-based efforts.

Summary Statement

The proposal has high potential to do meaningful work. Not clear how the project will involve the claimed 10 faculty and 40 graduate students. Are the international researchers and their graduate students necessary and are their roles appropriate to the funding asked for them?

Review #6

RATING: Very Good

What is the intellectual merit of the proposed activity?

This proposal is grounded in current and past learning theory and seeks to develop that theory into practice. Proposer is well-qualified to pursue this research. The activity is well conceived and creatively organizes theory, current practice, sustainability, and software tool development. Results of the evaluative component of the research will inform current dialogue on collaborative develop of material for dissemination and Internet publication.

What are the broader impacts of the proposed activity?

Development of research and tools around collaborative use/generation/solution of mathematical problems may significantly enhance the utility of the Math Forum. Proper development of the collaboration tool may lead to wide adoption for/by disciplines outside of mathematics. Research results pertinent to collaborative online development structures will be of broad use to the community/society.

Summary Statement

This project presents a convincing argument for the need to develop/publish/evaluate online collaboration tools useful for mathematics discovery and problem-solving. It will extend the Math Forum's usefulness into new areas, and provide a significant contribution to digital libraries if the tool proves useable and the research demonstrates promise in the area of collaborative tool development. Plan and personnel are more than appropriate for the project, and the project ties in well with existing NSDL efforts.