

NSF Research Project Annual Report: 0705772

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**Organization:** U of Massachusetts Amherst

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**Title:** III-CXT: Process Families and Their Application to Online Dispute Resolution

### **Organizational Partners: National Mediation Board**

NMB is an enthusiastic partner in this project. NMB makes generous amounts of the time of key senior staff members available, and proudly tells the members of its community that it is pleased to be a partner with NSF in supporting this project.

Most significantly, NMB has been using the prototype systems that this project has been producing. NMB has found the prototypes to be of considerable value. Their use of these systems has added significantly to our understanding of the underlying research issues, and provided important new direction for the research.

### **Research and Education Activities:**

The project has focused to date on the development, and plans for the evaluation of, systems for supporting the conduct of Online Dispute Resolution (ODR). A prototype, STORM, was developed with the support of a previous NSF grant. That prototype clearly indicated that a family of systems, rather than a single system, was needed in order to support the diverse needs of different ODR situations, mediators, and participants. Accordingly this present grant is focusing on how to create such a family of ODR support systems.

The project is presently engaged in developing STORM 2, a framework within which a family of STORM-like systems can be developed. STORM 2 employs an architectural approach in which the coordination, resource, and artifact specifications are all adaptable, and specified at a meta-level. By modification of each of these three concern areas, and then integrating them, a new ODR support system can be created. This work is proceeding, and we are just now able to create specific instances of ODR support systems.

Concurrently we are proceeding with plans for evaluating this approach. Current evaluation plans center on demonstrating the ability to generate a collection of ODR support systems that differ from each other in their ability to assure anonymity. Our NMB partners have advised us that different levels of anonymity, assured to

different parties at different times during an ODR session, are needed. The STORM 2 system seems able to accept specifications of needed anonymity and use them to rapidly generate an ODR support system that guarantees these levels of anonymity. During this summer we expect to be able to demonstrate this capability.

Evaluation of the capability will also entail using the generated ODR support systems to determine the extent to which the generated systems succeed in meeting needs. A small case study is to be carried out in the Fall to assess the suitability of the generated systems. This case study is also expected to indicate the need for revised and/or additional ODR support systems. Our ability to need those needs quickly and correctly will be an additional dimension of evaluation of our STORM 2 system.

The project has also been working on the early planning for a workshop that would attempt to identify key research areas in Online Dispute Resolution. These plans will be elaborated in the coming year.

### **Findings:**

- The separation of three areas of concern identified above seems suitable as the basis for the generation of a family of ODR support systems, but this is yet to be verified experimentally.
- Keeping these three areas of concern separated is proving to be harder than expected, as some issues seem potentially addressable by more than one concern. More study is needed in order to determine whether we have the right concerns identified, and whether the separation we have proposed is indeed workable.
- Anonymity is a more complicated issue than had originally been expected. Anonymity has many different dimensions and shadings. Support for the needed variation and flexibility is likely to be challenging, thus providing an excellent evaluation challenge for STORM 2, and for the general area of process families.

### **Training and Development:**

The project is proving to be an excellent vehicle for teaching social science research methods and modalities to our CS graduate students. CS graduate students more typically use quantitative methods to measure the results of their research, often using executing programs to generate the needed numbers. This project requires other methods in order to support evaluation. Our social science partners point out that success in supporting ODR will require assessing such factors as the

satisfaction levels of participants and their feeling of empowerment and trust. Approaches such as surveying and interviewing will be required to make such assessments. Social science project personnel are teaching our CS graduate students how to carry out such research, and make such assessments.

The participants are also using the project as a vehicle for gaining still more experience with the difficulties of understanding requirements. In this project requirements in such areas as anonymity, security, and privacy seem particularly important. We will be increasingly using our Propel property specification system to attempt to specify these requirements. In doing so, we will be gaining a stronger understanding of the need for specification in these areas, and the need for additional Propel system capabilities.

### **Outreach Activities:**

In working with the National Mediation Board, we projected to the labor-management mediation community a sense that the rigor of science can help in that particular domain.

As we continued to develop our ODR technologies, the technologies increasingly came into broader contact with organized labor, and representatives of the railroad and airline industries. In addition we look forward to working with other agencies as ODR becomes a more integral part of models of e-Government.

The most satisfying outreach has been with the Wounded Warrior Program of the US Army. We have been advising them and, through them, the US Army Ombudsman Office on the design of ODR systems which we hope will be implemented. Major international presentations were made to the Canadian Institute for the Administration of Justice, China International Economic and Trade Arbitration Commission and the 6th United Nations Forum on Online Dispute Resolution. Nationally, an op-ed piece appeared in the Boston Globe. Presentations and tutorials were given at Interagency Alternative Dispute Resolution Working Group, the Association for Conflict Resolution Annual Meeting and at Cyberweek, the Online Conference of the Center for Information Technology and Dispute Resolution. Talks have been given at the University of Montreal, Bentley College and the College of William and Mary. Our partner, NMB, continues to be approached by a number of other government agencies on the possibilities of adoption of ODR.

### **Journal Publications, Books or Other One-time Publications**

Simidchieva, B. I., Marzilli, M. S., Clarke, L. A., Osterweil, L. J., "Specifying and Verifying Requirements for Election Processes, Simidchieva", (2008). Proceeding, Published Collection: 9th Annual International Conference on Digital Government Research (dg.o2008) Bibliography: Montreal, Canada, pp. 63-72.

## **Software (or netware) Product Description:**

**Storm 2:** This is a prototype system that is designed to present example user interfaces to potential participants in an interactive process. Our project will support ODR with processes that define the specific approach to be taken in an ODR session. The Storm 2 prototype presents participants with a view of how that process-driven ODR session will look and feel by mapping directly from the ODR process models. The goal of this is to determine which user interfaces are most likely to be accepted by the participants, and how process definitions might have to be adapted to gain user acceptance and support.

## **Sharing Information:**

We expect to make our user interface prototype generally available. After evaluation of different versions of process-driven interface systems, we will make at least one of the most successful versions available through online distribution or some other such channel.

## **Contributions within Discipline:**

The project is indicating the importance of thinking of families of processes, rather than single processes, as the desired outcome of process development. There is growing interest in the use of executable processes as vehicles for assuring the development of superior products in diverse areas, such as software development, manufacturing, and engineering. Closer examination of the needs in these domains suggests that families or processes are needed to meet those needs. This project is confirming this understanding, and is also contributing a clearer understanding of the value of our specific approach in meeting the indicated needs.

## **Contributions to Other Disciplines:**

The project is indicating that technology has a very important role to play in supporting mediation and negotiation. ODR systems such as those that we are developing and demonstrating make heavy use of computing and communications technologies, and these are enabling the development of innovative negotiation systems that would not be possible without these technologies.

Further, our research in demonstrating that process definition and analysis technologies area also quite important to the support of such novel and innovative

negotiation approaches. Processes seem quite important in such human-centered activities as negotiation. Our work is demonstrating that it is possible to define such processes precisely. Moreover, this work is suggesting that the act of doing so might add significantly to the understanding of the processes by the participants, and to their trust and confidence in the resulting processes.

### **Contributions to Human Resource Development:**

The project is helping CS researchers to understand the nature of social science research and its modalities. Conversely it is also helping social science researchers understand the nature of CS research and its modalities.

### **Contributions to Resources for Research and Education:**

Ultimately, it is expected that the definitions of ODR processes that we will develop using the STORM 2 framework will be excellent examples that could serve as the basis for education and training in the area of dispute resolution.

### **Contributions Beyond Science and Engineering:**

The project expects that the ODR processes produced will be used in supporting actual labor-management negotiations carried out under the auspices of the National Mediation Board. If these processes are as effective as we expect, then we believe that they will lead to more effective labor-management negotiations. The consequences of this could be better, faster, and more successful negotiations and greater amiability in the US transportation industry.