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Building an Ontology for Crisis, Tragedy, and Recovery

Crises and tragedies are, regrettably, part of life. While always difficult, recovery from tragic events may be increasingly facilitated and supported by technology. Yet, advanced intelligent information integration methods have not been applied to this domain, which we refer to as Crisis, Tragedy and Recovery (CTR). The impact of tragic events is felt over extended periods, requiring longitudinal studies of complex inter-dependencies. Consequently, with the Internet Archive and other partners, we will build CTRnet, an integrated distributed digital library network providing a comprehensive suite of CTR-related services.

A key task is development of a CTR ontology, for integrating information across tragic events. The ontology will aid information organization, exploration, visualization, and analysis (including temporal modeling of events as they unfold). We will employ ontologies for browsing and semantic query expansion. Ontology-based tagging will leverage the involvement of the community, and attach shared meanings to the elements of

the digital library.

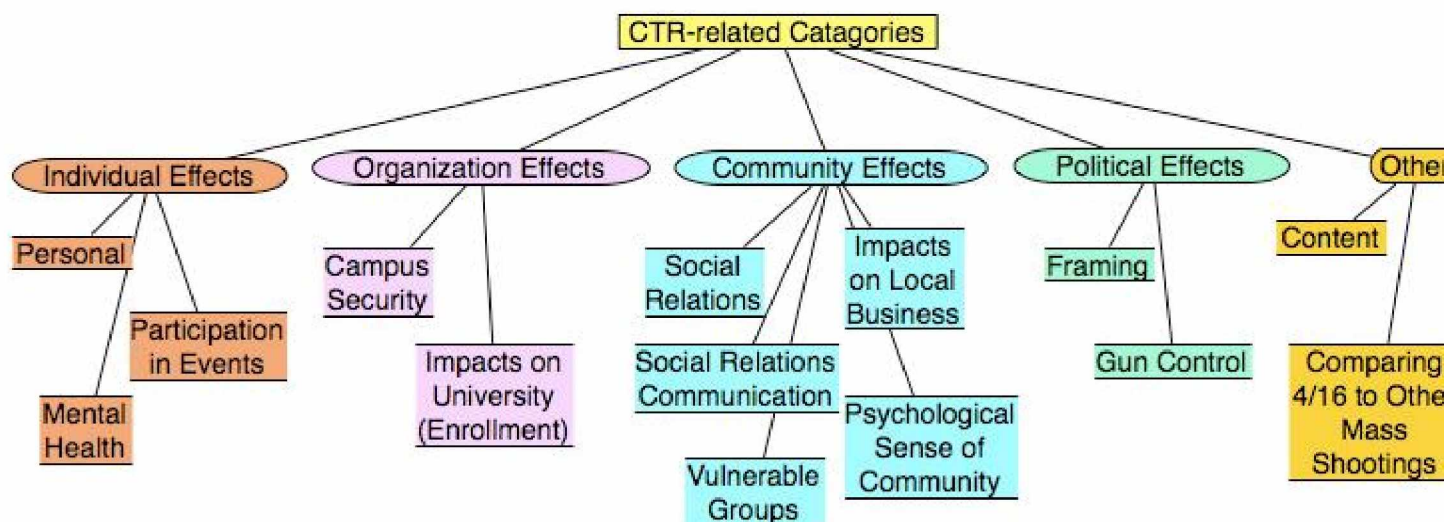
A comprehensive ontology will be connected into a knowledge base that relates to events, studies, findings, and results / lessons learned / best practices. It would include: variables to measure, activities and behaviors to monitor, effects to test, and connections with the theories and knowledge of a variety of social and behavioral science disciplines.

We will seed the ontology building process with data gathered from initial focus group analyses, as well as knowledge gained from literature in this domain and from Crisis Informatics. The User interactions and log data gathered from the CTR website and Facebook application will aid further refinement.

In a brief pilot exploration, we extracted top phrases from the abstracts and keywords from papers in the 2005 and 2007 ISCRAM¹ proceedings using the N-Gram Statistics Package²:

Selected distinctive word pairs identified from ISCRAM proceedings			
emergency response	Decision support	information systems	teams participants
decision making	data models	disaster monitoring	teams maps
command teams	disaster plan	Crisis management	sms text-message
flood alerts	information seeking	situational awareness	disaster registry
physical communication	human disaster	teams access	decision preference

We conducted focus group interviews following the April 16, 2007 tragedy at Virginia Tech. We employed the Group Cognitive Mapping System to generate ideas, issues, concepts, and important research questions that are relevant to the events of April 16th, resulting in the following categories:



We will evaluate the ontology in several ways. One connects with our information retrieval and digital library research; we will measure the breadth and specificity of the coverage of our content by the concepts in the ontology. Second, through focus groups and user studies we will measure the coherence, consistency, and other indicators of ontology quality. A third form of evaluation concerns the ease with which new CTR instances can be folded into the ontology.

At the NKOS workshop, we will solicit expert views, ideas, and suggestions for an optimal strategy for development and evaluation of a CTR ontology. We will learn about other related projects, useful software, and possible collaborations. Of particular relevance is our goal to work toward a global CTR ontology that is applicable in diverse cultures and in many languages.

1. International Conference on Information Systems for Crisis Response and Management
2. <http://www.d.umn.edu/~tpederse/nsp.html>