

Leveraging A Wiki To Enhance Virtual Collaboration In The Emergency Domain

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*War, earthquake, winds, fire, famine, the plague,
year after year, it's been nothing but disasters.
Rashomon*

Abstract

In a crisis situation, critical success factors include good preparedness, the availability of trustworthy information and reliable people, and the responders' ability to improvise with the available, functioning tools. Wikis can be used as collaborative group support systems to support these activities, especially for communities of practice that must operate as high reliability organizations. The advantages of using a wiki are especially beneficial in volatile environments, such as those in the emergency domain, where critical real-time decision making is required. An international wiki - emergenciWiki.org - has been created and is being used by both practitioners and academics. The conclusions include that wiki features and functionality, which are important for safety-critical work, should add a minimum of bureaucratic overhead while helping to establish trust and a sense of purpose and community among the users, thus easing the evaluation of information reliability while strengthening ad hoc group interaction.

1. Introduction

A multi-organizational collaboration approach is both effective and efficient in disaster and emergency related work for preparedness, warning the affected populations, mitigating the effects, timely response and learning for the future. Disasters ignore man-made boundaries and require a global

collaborative effort to shift goals towards disaster prevention [1]. Therefore, the need is growing even more intensive for successful multinational, often multilingual collaboration within all crisis related fields, whether the scope of the incident is limited or local (emergency), regional and in some respect resource-overwhelming (disaster), or catastrophic to an unprecedented degree (mega-event).

In recent years, citizen awareness of the need to be attentive, trained, and to be prepared for and potentially act as responders in emergencies has been greatly raised by emergencies such as the terror attacks of 9-11, Hurricane Katrina, the Southeast Asia Tsunami and the recent fires in Greece. International efforts are required as disasters such as those affected in the path of a hurricane, can hit numerous islands with differing languages, customs and countries of origin before making landfall. For example, hurricanes frequently cross over numerous national boundaries along their paths of destruction such as in the case of Hurricane Felix. It is crucial to not underestimate the power behind the role the civilian plays in disaster management. The public is the largest group available to assess and report damage, to indicate new problems and to help disseminate critical information to neighboring communities.

Global climate change and political events are likely to lead to more and larger disasters in the future. In this paper we argue that wikis are an ideal platform to bring together and support the communication needs of those involved in

collaborative emergency response, such as communities of practice (COPs) and high reliability organizations (HROs).

The widespread availability of the World Wide Web (WWW), technological advances in wireless communication, and the Free and Open Software Systems (FOSS) movement have converged to make wiki software readily available to local and international entities concerned with emergency management.

The goal of this paper is to describe conceptually, the ways in which wikis can be an appropriate platform to support the communication needs of COP in the emergency preparedness and response domain. These COPs can link citizen-participants as well as organizations, which is important because the first major responders in disasters are usually community members and local volunteer organizations [11]. Disasters do not respect man-made boundaries of towns, counties, and states; thus, emergency response often involves groups that have never worked together before. An important requirement for any collaborative system support is the ability to network seamlessly across organizational and geographic boundaries, since who will be involved in any large-scale disaster is unpredictable [23].

Working well together in a time-constrained, safety-critical situation requires familiarity with the people, the context and the goals, and tasks and tools involved. Trust must be quickly developed between groups who have never worked together before due to the unforeseen situations encountered, unexpected events and new boundaries that may be formed [2, 10, 22] from these crisis. So that community ties can develop and comfort with system use promoted, there is a need to incorporate nonemergent activities such as planning, status reporting, and exchange of ideas to build a community and provide a history of lessons learned. Wikis are ideal for this because of their searchable pages. Different functions can be cognitively separated within the same system by use of pages.

The literature is replete with examples of proposals for structuring group communication with technology (e.g. computer mediated communication, groupware, group decision support systems). CMC systems for crisis preparedness and management are called by many acronyms, such as DEMS, DERMIS, ERIS, and ISCRAM. These systems have traditionally been developed as proprietary software, for a specific administrative or geopolitical context, to be used by professionals

for response, training, or both. Interoperability between different systems has often been a problem, and the demands have been intensifying for standardization, and for the openness and reusability of solutions [6, 7, 12].

Few organizations, counties, or nations can afford frequent physical meetings of the large number of professionals and volunteers needed for crisis preparedness and response. As an example, in one U.S. county with which we are familiar, there are two emergency management professionals, 70 other local government professionals, and 300 citizen volunteers who form the team to deal with emergencies. Alternatives to face-to-face communication and training have therefore been developed, and various computer mediated communication (CMC) systems are an established part of the disaster and emergency field not only in the U.S., but also in most developed countries as well as in a number of developing countries. The free and open source software (FOSS) movement is especially critical to developing countries who otherwise could not afford software of this nature. Particularly impressive has been the volunteer development of the FOSS Sahana, the world's first multi-functional disaster management software [3].

The use of wikis to support group collaboration is a new and growing application, Wikis are increasingly being used to support such collaboration in some domains, but the theoretical foundation for their use is still being laid. Wikis may be a solution to the need for collaborative electronic space that can support dynamically changing, real-time emergency response needs. FOSS wiki platforms are increasingly available, which makes them especially attractive for use by potentially large groups of emergency domain collaborators with changing membership. Such platforms provide a low or no cost approach to producing software that supports emergency domain collaborative needs. The research reported in this paper is important because it identifies the potential for wiki support of critical collaborative needs in the emergency domain. Wiki technology has functionality that can be uniquely advantageous for such collaboration but, at present, is missing from most CMC systems used in the domain.

In the remainder of this paper, after relating wikis conceptually to the present Group Support Systems literature, we describe how wikis are currently used for crisis related collaboration and cooperation noting that none truly tap into a wiki's greatest strength of immediate

accessibility to add, edit and thus disseminate real time information for fast, time critical decision making. We present how many of the original wiki systems' socio-technical weaknesses have been addressed so that wikis have become better suited for the requirements of safety-critical work. As an example of incorporating lessons learned from older general-purpose and disaster and emergency related wikis, we present the emergenciWiki.org project, a FOSS wiki for both practitioners and academics worldwide. We justify the design principles chosen for emergenciWiki.org based on the literature and describe how the user community and the activities and projects have developed thus far. We then describe the wiki being developed, emergenciWiki.org, which strives to explore the future and conceptually, the various information and communication needs of its members and readers in a dynamic, evolutionary manner.

2. Methodology

A nonexhaustive search was conducted of current emergency wiki sites. The focus was on describing the current use of wikis in the emergency domain. Foundational theory was used to ascertain the potential for wikis in the emergency domain. From that, a conceptualization of what an effective emergency domain wiki should be was developed. A wiki, emergencyWiki.org was created as a test-bed for the concepts we are developing.

3. Background

3.1. Group Decision Support Systems

Group decision support systems can be developed and understood using a framework based on the size of the group, the task type given to the group and the distribution of group members [4]. Research has also suggested that, in addition, different tasks require different tools to support the roles that will be needed [6].

Distributed groups can consist, for example, of a few dedicated people co-authoring, as in the case of this research effort, or medium size groups such as classes of 10-30 students, or large groups consisting of hundreds of people working together for a company or even more in a global relief effort. In such cases where thousands of experts are working on complex problems, these very large groups can have a combination of

small and medium size subgroups, all interacting simultaneously [21a]. This requires different support for each size group. Small groups coauthoring can function well in a non-structured environment, but as the group size increases, so too does the need for structure to effectively manage the information content produced and to minimize information overload. [18].

McGrath (1984) has identified four task types. The first task type concerns groups, which are interacting to generate creative ideas (i.e., brainstorming) or ideas for planning. The second task type concerns groups working together to solve problems or to reach a consensus on an item. The third task type concerns groups having to negotiate, sometimes through conflict resolution, in order for subgroups to agree to a set of terms in order to reach a common goal when they have conflicting needs/requirements (e.g., the need for a limited resource from a single pool where neither group can be totally satisfied). The fourth task type concerns groups implementing a solution. Traditionally, after a solution is implemented, a team either moves on to a new problem or is reconfigured so that interaction patterns either are disbanded or changed. Finding a single software solution that evolves with changing task types and/or evolving roles is difficult, costly and can be burdensome costing companies time and money.

3.2. Wiki Categories and Member Roles

Wikis come in all shapes and sizes. The wiki type dictates which users have visibility and editing privileges of the wiki pages. This influences the information and knowledge contained on the wiki. This is of utmost importance when decision making is concerned with time critical information used by emergency management groups.

In general, there are six types of wikis categorized by Leuf and Cunningham according to the security obtained through user access restrictions [8]; see Table 1.

Although it is useful to categorize wikis, this categorization is based only on two functional dimensions and ignores many important dimensions that reflect the task and user group size, especially when the task(s) involve time-critical analysis and fast decision-making. Using a framework that addresses the task and people, such as the one described in the section above, can improve understanding of the

differences and appropriateness of different wikis for a particular use. This aids in the

flexibility that may be required with membership roles as a systems need's evolve.

Table 1. Wiki Categorizations

Type	Access	User Restrictions
I	Fully Open	No restrictions
II	Lockable	All pages public, but editing restricted in various ways
III	Gate	Some pages public, others restricted to registered users.
IV	Members only	All users must be registered; may involve further group restrictions
V	Fire walled	All users must be on specific network
VI	Personal	Notebook usage on one system or private web site directory

The roles that people have in a virtual team determine the functionality required and the permissions that need to be provided. For example, [16] only certain roles may be able to:

1. Contribute discussion topics
2. Contribute replies to discussion topics
3. Create polls or votable items
4. Vote on contributed topics or replies
5. Write, edit, or read selected groups of items
6. Index items for consistency in retrieval
7. Edit or Delete items
8. Terminate items based upon age or conditions
9. Record actions or decisions taken as events
10. Record or trigger actions to be taken

Effective collaboration occurs when the participants share common ground, members are trusted, and the team has the same goal. Trust in virtual teams develops as swift trust [10] a type of quickly developing trust that relies on cues (e.g., roles) other than a history of working together. Communication is key to developing and maintaining swift trust [2] and it is most likely to develop at moderate levels of interdependence [10] Thus, the development of swift trust is more likely to develop during times of calm rather than times of crisis. A new team of trained emergency management professionals with the shared goal beyond representing their original organizations and trained to understand the operation of HRO's [17, 19] will have a "deference to expertise" that will make swift trust a starting assumption.

However, people need to use these systems before disasters occur to become comfortable with the technology [23]. There is a need for activities such as training games and more active community participation in planning efforts as well as interagency communication and support to build comfort with the technology and build trust among members of the community who are not active professionals in the field of emergency management. Developing FOSSs are, by nature and demand, catering to these as well as other needs.

3.3. Free and Open Source Software

Free and open source software (FOSS) has its roots in the late 1950's and early 1960's, when early general-purpose interactive computers became available to the first university students, who would freely exchange their programming ideas and source code. The modern open source movement was founded by Richard M. Stallman, who worked in the Massachusetts Institute of Technology's (MIT) Artificial Intelligence (AI) laboratory during the 1970's and early 1980's. [9] The first FOSS to become internationally well known in the mid-1990ies was the Linux operating system [15].

The key to the freedom and openness of most FOSS today is the GNU General Public License (GNU-GPL), envisioned and authored by Stallman in 1986-1989 [13], which allows anyone to do anything they please with a piece of software that is licensed with GNU-GPL. This includes selling it or new versions of the software, but only if the developer licenses all new versions of the software with the GNU-

GPL, too. This makes FOSS "virally" or "genetically" free-and-open, as software licensed with GNU-GPL can not legally be incorporated into proprietary software: even if a customer pays for the derivative, the source code must be released to the world [23]. Open source thus means that the source code is freely available, hopefully documented, and people are able to submit additions to the source to some sort of central depository for use by others and review by a team of dedicated developers.

Today, there are multiple types of FOSS available. For education, there's Moodle and vTutor; for Forums, there's phpBB, Simple Machine Forum (SMF), vBulletin; and for Information Management Software there's Mambo and Joomla. And for a nominal fee you can set up your own domain and eCommerce with full shopping capabilities using OsCommerce, ZenCart, Cube Cart or CS Cart. The large number of available wiki platforms includes several free and open source wikis, too.

The availability of FOSS wiki platforms helps less affluent entities, such as developing nations, to develop applications and software they might otherwise be unable to afford. In particular for this paper's focus, in times of crisis, this increases preparedness and recovery and response efforts assuming the digital divide isn't a confounding factor.

3.4. Free and Open Source Wikis

Free and open source (FOSS) wiki platforms differ from each other by functionality, look and feel, and target user groups. The diversity of FOSS wikis available makes it possible for an organization to find a wiki that is appropriate for its needs. Choosing a wiki should be guided by the needs of the user group. FOSS wiki platforms have been created to support various group sizes. Simplistic and familiar for large groups (MediaWiki), more functionality for medium size groups of wiki savvy users (TikiWiki), and collaborative functionality of authoring for small groups (DocuWiki). Other considerations for wiki platform choice include the technical expertise of the users as well as task requirements. An emergency wiki should use a platform that meets the specific user and task requirements for its target user group. Something that the users can use is better than something that is confusing, no matter how impressive the features are. Ease of use is critical, especially in communication during stressful times.

MediaWiki, TikiWiki, and DokuWiki

are noteworthy examples of open source wiki platforms because of their robustness and diverse functionality. MediaWiki provides the platform for Wikipedia, the most well-known and successful wiki to date. MediaWiki is suitable for a large, diverse user group because it is easy to use, has an intuitive user interface, and can support multiple user languages. Its functionality includes file uploading, searching, discussion forums, edit tracking and indexing of content items. Also, a transcript of communications remains. The organization can learn from it and, should the problem resurface, build on it to solve the new issues.

4. Leveraging a Wiki

There are numerous characteristics inherent in personnel who work in the crisis management domain be it academic, real world, or governmental related. Members of a COP or virtual team working together in preparedness and response, simulations, regulation or policy issues, can leverage a wiki's capabilities far beyond that of any single emergency domain group. There are numerous assumptions to be made which are not to be taken lightly. Groups that have the potential to leverage a wiki adhere to characteristics found in COP and HROs. Taking into account that the world can benefit greatly from a global effort creating a global intelligence, virtual organizations can further the aforementioned strengths, combining distributed groups for a global collective intelligence [5].

4.1. Communities of Practice

In online communities, conciseness and clear structuring of ideas and concepts in a form where replies can pin point what is specifically being discussed or addressed is extremely desirable for reducing information overload and facilitating a clear discussion[21b]. Members who are verbose and unfocused in their comments usually engender negative reactions in working groups with goals and tasks to accomplish [5].

Capturing the communications of a COP in electronic form provides an opportunity to analyze content of real life communications to gain a much better understanding of what is taking place for evaluation purposes. One can do this for basic research goals such as to understand fundamental human communication processes, or for applied research goals, such as

to improve the system and its ability to service a specific community. Defined by Wenger, et al [20],

“Communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis.”

It is not assumed that anybody or group fits this requirement simply by definition from being a participant in the domain. For example, just being the head of the emergency management group, doesn't necessarily mean that you are knowledgeable or even passionate about your work. It is critical that the group and all of those members within it, be knowledgeable. In cases where people are hired for other purposes such as political cronies or those hired based on 'who you know' and not 'what you know', more commonly referred to as a 'good ole boy' system, only collective stupidity will concur [14] and the effects can be detrimental to the public. That the members of a group are committed and knowledgeable is no small assumption, but a critical element to the overall leveraging and decision making that is entrusted to them as well as to the success of the outcome of the given crisis. For its these decisions that effect the people and our future.

4.2. High Reliability Organizations

Another philosophy which goes hand-in-hand with members of a COP, but is not inclusive and thus must not be assumed as true, is that the participants practice consciousness or be mindful of their environment and be critical about their own state [19]. This is a philosophy employed in a high reliability organization (HRO). Members of the group must be aware of their surroundings, question themselves and view mistakes as an opportunity for learning. Not all groups of emergency responders or emergency domain academicians form HROs. Mindfulness is a key variable to an HRO and is not to be assumed as it is common for people in all domains to be passively oblivious to their surroundings. To not only be in an environment, but to observe it, question states and have the need to satisfy any questions that could arise is a necessary condition for an HRO. For an HRO, errors or problems are never normalized, trivialized nor passed off as non-consequential.

For example, a single drop of water may not appear to be a big problem, but when it's a single drop of water where water is not supposed to be, then it could be perceived as a small indicator of a much larger problem. This is an assertive approach that seeks out various scenarios and how to best handle them.

4.2.1. Responsibility and Accountability

Another great difference in an HRO is how problems or mistakes are handled. In political organizations, it's been historically observed that there is a need to lay blame elsewhere. It can be against a single person known as 'The Fall Guy' or where organizations play the blame game as in the case of the disastrous response efforts to New Orleans from Hurricane Katrina. The mayor blamed the governor and the governor blamed the president and the president blamed FEMA and FEMA blamed the president and so on and so forth. Eventually, after a public outcry, an investigation was conducted and the truth could no longer be denied by the government. This is not a method conducive for fast turn around on problems and understanding. It's more a defensive approach to redirect responsibility when something goes wrong.

An HRO has an approach where one of its main goals is to rapidly recover from something unexpected and learn lessons from the experience. In order to accomplish this, mistakes are viewed as a great opportunity to explore a situation and events that occurred. No one is fired or admonished but, rather, an individual group is appreciated for discovering weaknesses of the system. The goal is to make sure to make the most of that failure and maximize the learning potential from the mishap. Therefore, the end result will be that there is a more robust machine that is accepted as not perfect, but that is now more resistant to the unexpected. In a nutshell, what doesn't kill an HRO only makes it stronger. A COP encompassing an HRO philosophy would strictly adhere to these expectations. The result is a group of willing knowledgeable, assertive and intelligent individuals which has an end result of a better group of people with which to interact with and to learn from. This combination of an emergency domain related group that interacts regularly striving for understanding and perfection is how a wiki can be best leveraged.

The fact that all communication is archived on a wiki makes reflection and action based upon an analysis of what happened easier. So, it gives

this type of group a better tool with which to maximize learning from lessons of the past and thus, help implement the HRO strategy with another feature unique to a wiki.

5. Emergency Wiki Sites

Wikis described in Table 2.0 are representative of the wikis we found that are used currently in the emergency domain. They do not make full use of the power of wikis although they do have the characteristic of COP. They are used more as static web pages and fail

to capitalize on the potential we describe that wikis have for use in dynamic real-time emergent situations.

The Ontolog wiki explicitly states that they are a virtual community of practice. The Eden group presents work: EDEN Becomes eXtension Pioneering Community of Practice where they offer “all EDEN delegates and other Extension faculty and staff from around the country -- and even other people with expertise in these topics -- will be invited to help create information on the Communities of Practice Wiki* Web site.”

Table 2.0 Present Emergency Wikis of June 2007

Site Name	Link and Description
CoLab Wiki	http://colab.cim3.net/cgi-bin/wiki.pl?WikiHomePage COLAB: An Open Collaborative Work Environment (CWE) to Support Networking Among Communities of Practice (http://www.gsa.gov/collaborate). Provides "incubator" space for open and member-only communities seeking to better understand web-based community collaboration approaches. At least one online COP (SICoP) works for "semantic interoperability" in the government sector, including disaster preparedness information and communication systems.
Emergency Wiki	http://wiki.oasis-open.org/emergency/ This wiki is provided by the OASIS standards consortium as a collaborative tool for members of the OASIS Emergency Management Technical Committee , who are permitted to post to these pages. OASIS (Organization for the Advancement of Structured Information Standards) is a not-for-profit, international consortium that drives the development, convergence, and adoption of e-business standards.
ESF Emergency Wiki	http://esf.uvm.edu/emwiki/index.php/Main_Page Building safety guidelines, including Indoor Air Quality Response Protocols and a Lab Spill Risk Assessment Tool
FluWiki	http://www.fluwikie.com/ The purpose of the Flu Wiki is to help local communities prepare for and perhaps cope with a possible influenza pandemic.
Ontolog Wiki	http://ontolog.cim3.net/cgi-bin/wiki.pl?WikiHomePage ONTOLOG (a.k.a. "Ontolog Forum") is an open, international, virtual community of practice devoted to advancing the field of ontology, ontological engineering and semantic technology, and advocating their adoption into mainstream applications and international standards. Some 10 members of this wiki held a meeting in the Netherlands in May 2007, to connect their efforts on ontologies for emergency management (one of the authors participated in the meeting).
Quake Help Wiki	http://quakehelp.asiaquake.org/qh/index.php/Main_Page QuakeHelp Wiki is a project of the World Wide Help Group.SM The wiki was begun just before Hurricane Katrina hit the gulf coast of the United States to help people cope with the hurricane and its aftermath.

5.1 Wikis As Knowledge Exchange Centers

Wikis have advantages that can benefit potential players from numerous perspectives, allowing for the collaboration and dissemination of information like never before. For example, the search functionality of a wiki can mitigate information overload. Utilizing a search centered strategy using key words to find the information is cognitively easier than coping with a hierarchical approach. There is a tremendous potential for wikis in Emergency Management. However, they cannot ultimately exist as independent operations. Since disasters do not know about local, state, and federal boundaries, wikis in this area have to support communities of practice that can handle disasters of any size. Therefore these wikis have to become Knowledge Exchange Centers (KEC) that form a network of application domains that can allow those that need information, knowledge, or volunteers with particular skills to be sought from a network of such centers in a manner that does not require the users to separately understand each independent node in the network.

In countries such as New Zealand, not only do citizens volunteer their talents in disasters, but companies and businesses volunteer useful equipment such as construction equipment, boats, communications equipment, medical supplies, etc. This requires systems which will allow those who want to volunteer such resources to be able to enter and update the material on their talents and the resources they command, which can be shared in a disaster situation [16].

One of the more recent successful solutions for local areas has been the civilian emergency response team (CERT) programs which bring training in Emergency Management to citizen volunteers. This has created a much larger manpower base to respond to emergencies than has been available in the past for many localities. However, this also requires web based systems for the coordination of the activities of this manpower and some continuous form of KEC to make sure current plans are updated and understood by all. What can result is an ability to have a network of resources and people that can respond to any disaster and provide coverage through the geographical spread of the disaster, and not be confined to artificial political boundaries in terms of overall response and cooperation.

6. The emergenciWiki.org Research Project

Our survey of current emergency domain wikis suggests that currently, no wiki exists that fulfills the potential for emergency wikis that we have suggested. A research project has been undertaken to develop a wiki as proof of concept that meets the needs of emergency communities and makes use of the great potential wikis have as described above. This research is nascent. Current activity has been focused on requirements definitions as described in this paper and the implementation of that functionality.

emergenciWiki uses MediaWiki, which was chosen due to the large dispersed group of experts who could be using it. The learning curve for using a wiki can be challenging. However, by using a platform many people are already familiar with, through their use of Wikipedia, the learning curve can be made less steep. EmergencyWiki is at the time of writing, open and unstructured. Some initial categories are given and basic information for emergencies is provided to seed the wiki. Membership is an option and users can register in the community portal, but initially registering isn't required.

At the same time, some active emergenciWiki members have detailed visions of what kind of a community and what functions the wiki may be supporting in a year or two. But codifying these expectations into, for example, emergenciWiki's layout, would not be wise. A mature look and feel for an immature virtual community could create false expectations and disappointments in new members and other interested people.

FOSS wikis are cheap, easy and quick to set-up and can be outsourced for a minimal fee. The start-up costs for emergenciWiki were very modest, under 100 dollars a year. This type of service is common and lessens the aggravating factors that are so time consuming when initially setting up a system. Compatibility issues, version correctness and the time it takes for the first time something is set up are issues that can be easily overcome by outsourcing. For example, outsourcing avoids the delays incurred when going through administrators, waiting for permissions to be set up, going through virtual private networks and avoiding security hazards. What should take 15 minutes can take weeks and be frustrating to all involved when attempting to

set up a wiki. So, we paid a group \$35 to set up MediaWiki, which took only 15 minutes. The cost of purchasing the domain was minimal as well.

6.1. The Launching of emergenciWiki.org

In our first 24 hour period, we had over 100 hits. After the acceptance of this paper 2 months later, we had over 600. At this time a cursory analysis of use suggests that it follows the 90-9-1 rule still where 90% of the hits are from curiosity seekers, 9% contribute a little and 1% contribute the rest. Although tempting, the authors restrain from contributing more as this is to be developed by collaborative efforts and not developed by a handful of contributors. The wiki had been announced in a paper presented to a conference on emergency management (ISCRAM.org). Prior to that conference, the announcement of emergenciWiki was made to a select group who worked collaboratively on other emergency response affiliated areas. This group was comprised primarily of professionals within the United States.

The purpose of this wiki is for a collaborative building effort by any knowledgeable individual or group affiliate who is concerned with natural or man made disasters, be they in academia and/or industry. It is believed that this group is, by nature, comprised of individuals and distributed teams create a virtual COP. Holding to this belief, it is hoped that knowledge will be built from any expert within a field, by any knowledgeable individual who can contribute to the content and hence, working together, we all benefit through a global collaborative intelligence. In this spirit, we will allow the wiki to evolve and reflect best the knowledge of the community. The more this is developed, the more powerful of a tool it will be.

We hope that information produced in emergenciWiki will become beneficial to the COP around emergency preparation and response.

There are many open issues surrounding this effort:

- What does the future hold for such a system as an emergenciWiki?
- Should restraints be used? Is this the right wiki software?
- Does a wiki define it's own purpose or is it simply evolving?

7. Summary and Conclusions

A snapshot of a wiki represents a moment in time where viewpoints are held in such a manner as to mirror a group's norms, beliefs or knowledge. Wikis have features which can be tailored to the user group by the use of the wiki. Some use the wiki as a way to distribute information, some use wikis interactively, building a strong reservoir of knowledge in a specific area such as FluWiki. Other wikis are used for group support, providing the necessary functionality to support multiple roles.

One doesn't have to leave the United States to cross cultures; sometimes it's simply a matter of crossing the street. In New York City, Chinatown and Little Italy are back to back. And as we all remember from the Twin Towers terrorist attacks, numerous nationalities can reside within the same building or company. The globalization of ideas and intelligence can be combined such that we collect and disseminate our strengths and start working together as a disaster struck environment utilizing outside experts with internal experts to fully leverage capabilities and create a global synergistic effect.

The emergenciWiki site will be available for professional groups in emergency management or volunteer citizen groups that want to try it for different purposes in a series of field studies. There may also be some student type experiments or exercises to test training usage.

8. Future Research

Future generations of emergency planning and response professionals and volunteers will be more likely to adopt and use the full potential of wikis because of their familiarity with them through such popular sites as wikipedia. Wikis as described in our conceptualization should, therefore, gain in acceptance in the near future. Now is the time to pursue the investigations that will yield the best practices and design principles for maximizing their effectiveness..

Our initial analysis of current emergency domain wikis suggests that they are not realizing the potential, as we have conceptualized, of wikis in the domain. Gap analysis should be performed with a rigorous analysis of the current wikis to ascertain what can be done to improve their applicability and effectiveness in the emergency domain.

The current project (emergencyWiki.org) will continue with introduction and

implementation of additional features, such as dynamic voting, to ascertain the feasibility of realizing our conceptualization with current wiki platforms and to solicit feedback from the emergency management domain [21b].

“As the new Web and the Net Gen collide with the forces of globalization we are entering what might be considered a perfect storm, where converging waves of change and innovation are toppling conventional economic wisdom [14].”

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