***SOCIETY'S NEEDS:***

Through every natural disaster, there are two very basic needs that society has to meet in order to have a safe and effective recovery: communication, and access to resources. These needs can be broken down into much more specific categories, but overall, they are the two biggest challenges facing society in the aftermath.

Access to resources, for example, is hugely important. There are so many different people with so many specific, and equally important needs that it is hard to know where to begin. Ready.gov and CDC.gov are great resources for disaster preparedness. Ready.gov has a very organized and detailed page with information on every type of disaster imaginable, including terrorist hazards, such as biological threats and nuclear blasts (http://www.ready.gov/be-informed). The CDC has a similar page for disaster preparedness (http://emergency.cdc.gov/). They even have a page on how to prepare for a zombie apocalypse, though this is really just a marketing tactic to raise awareness on the importance of disaster preparedness (Keller). These websites break down needs into very specific categories and go into great detail. You have to consider the deaf and hard of hearing, those with physical limitations, single working parents, people with limited English proficiency, people with special dietary needs, infants and children, pets, pregnant women, seniors, and military families, just to name a few.

It is very important to be able to care for all these people with these specific needs. For example, seniors might have several special needs, such as wheelchair accessibility, medication that needs to be refrigerated, or oxygen tanks and catheters. Children, on the other hand, might also need medication, but the very young will need access to formula or baby food, and diapers. Then of course, there are the basic needs for the general population: food, water, and shelter, and in this new age of technology, power. There is a great need to maintain the supply chain for stores to keep food in stock. In Hurricane Sandy, for instance, Sysco, a food distribution company, was able to adjust and prepare ahead of time to send out shipments of water and non-perishable foods to keep on the shelves of supermarkets. They sent out trucks before the storm and had full trucks ready and waiting for roads to clear afterwards. They have studied past disasters and know what the specific demands will be ahead of time so that they can better manage them (Wohlsen).

It is clear that communication is a common thread in achieving access to specific resources. There needs to be communication ahead of time to prepare the public for the events to come and to inform them on how to prepare themselves. There is the need for communication during the disaster to make sure that everyone keeps themselves and their families safe. And finally, there is the need for communication afterwards to let people know where they can go to find help, and what kind of help is available. Families also need to stay in contact and make sure no one gets lost. On top of that, people must communicate with each other about what resources they have available so that everyone can help each other in the time of need.

The challenges that face government during natural disasters are generally the same. However, the various duties of government such as Federal Emergency Management Agency (FEMA) or the Department of the Army (DA) dictate the specifics on how natural disasters are handled. Thus this paper will focus on one aspect of the government which the Center of Disease Control (CDC) regarding the challenges it faced during hurricane Katrina.

As observed in the challenges for preparing for natural disasters across various sectors of the society, communication is the biggest. In the case of Hurricane Katrina, the prolonged nature of the hurricane and the failure of high quality communication channels were the major obstacle faced by the CDC (Vanderford et al).

Before the advent of a hurricane, CDC had to ensure that health messages were suited to various audiences, locations and circumstances (Vanderford et al). These health messages included drowning prevention, food and water safety, preventing carbon monoxide (CO) poisoning, mosquito-borne illness, and so on. Health messages have to be up to date. Additionally, Katrina involved people who not only spoke English but French Creole and Spanish. CDC had to make sure health protection guidelines were readable at many literacy levels; hence, documents were written at 6th and 8th grade level. Furthermore, messages had to be communicated to public information officers and local media. CDC had to create pre-composed messages and instant messages so they could be ready to be sent at the advent of natural disaster. These instant messages had to be concise and include all relevant information in a brief paragraph.

The CDC had to recognize other non-government partners that would help with communication such as meteorologists and weather casters. They also worked with home-improvement chains to create Public Service Announcements (PSA) that describes prevention hazards in homes. Although, CDC had pre-event challenges in creating information to be disseminated to various end-users, it experienced stumbling blocks that prevented these information from reaching the end users-as effective as they planned hoped.

The first obstacle was power outages. The CDC had difficulty in sending “ready to go” messages to officers. CDC dependence on electronic channels left few alternatives to spread information. Officers were able to connect to the internet to download existing information. The only alternative was overnight delivery, but overnight deliveries were not able to get to certain areas due to the bad condition of roads. Fax machines were bad. Even though the CDC had little success during Katrina, it was able to compensate for its flaws at the end of the hurricane.

In the aftermath, the CDC had to communicate with evacuees and returning residents on safety measures after the hurricane such as avoiding injuries during clean up, preventing human to pet infections, and many other safety measures. CDC took advantage of recovery centers, American Red cross tents and also door-to-door communication.

***NON-GOVERNMENT NEEDS:***

Non-profit organizations have several needs they can meet by use of a mobile app. Mobile apps can be used to help people prepare for disasters, gather donations, and get volunteers organized during a disaster.

Mobile apps are a good way to meet the need of informing people about disasters, both before and during the crisis. Because the user doesn't need to sit at their computer, they can have the information available when they need it. For instance, you could have a list of emergency supplies you need to get when you go shopping. The Red Cross has a whole set of mobile apps designed to help people prepare for different kinds of disasters, as well as the general problems of first aid and shelter. In addition, since they're made for mobile devices, users will be able to use them even during a power outage. Finally, mobile apps can help users communicate during a crisis, such as with the Red Cross's “Safe and Well” listings, which let people post a public message to tell their friends and family that they're safe. Helping people stay informed during disasters without relying on land lines and power lines is a valuable service that nonprofits can provide by using mobile apps.

Some nonprofits use mobile apps to encourage users to donate. Most often, this is done as an add-on to an existing app rather than the sole purpose of the app. For example, the Red Cross apps previously mentioned include a donate button, which will automatically create a text message you can send to make a donation. In another case, GNC and Domino's Pizza made their apps suggest a donation to St. Jude Children’s Research Hospital when users made a purchase (Flandez). Lastly, commercial businesses can sponsor charities to encourage people to use their apps (Rigby), which allows the charity to benefit without having to develop an app on their own. All these methods meet a need very effectively. All nonprofits need money to function, and it is often the best way for people outside the disaster zone to contribute. So, it's very advantageous if they can simplify the donation progress as much as possible. Since users carry their phones everywhere, they will get more opportunities to donate, and if it only takes a few clicks to donate, it's more likely that they will decide to do so. So, mobile apps are a good way to meet a nonprofit's need for donations.

The other major thing that a non-government organization needs is manpower. Programs that can encourage people to volunteer and direct them where they are needed will be able to operate more efficiently. One way mobile apps meet this need is by using a smartphone's location capabilities to find nearby opportunities. Another way they can help is by making it simpler and more convenient to sign up for an event. The niceSERVE app, for example, allows volunteers to sign up for an event with a simple form, share the event through their social networks, and get notifications of future events (Zak). This means that the app can make life easier for current volunteers, attract new ones, and make sure that they stick around. Another fully-featured example is the Cause.it app, which is designed to connect volunteers, nonprofits, and local business sponsors. A nonprofit posts a need, a local business sponsors it, and the volunteers can search for needs they can meet. It even provides statistics to let businesses and nonprofits know what needs are being met. So, this is an app which provides both volunteers and donations to a nonprofit. By using mobile apps, nonprofits can more easily meet their needs of informing people, gathering donations, and attracting volunteers.

***EXISTING MOBILE TOOLS:***

With a few outstanding exceptions, the current selection of available mobile apps is dismal. This is no surprise, as we've grown used to the majority of apps in the various marketplaces being junk. Almost 2 million apps are available between the three most popular mobile operating systems, and sifting through the lesser quality apps to find a great one is not always an easy task. That being said, hopefully a point is made that the app market is overcrowded.

It's all in the spirit of competition, though, and right now American Red Cross is cleaning up in almost every category. With comprehensive and polished applications spanning four natural disaster types and general first aid, this organization is the leader in disaster app downloads. They include simple tools such as sirens, flashlights, and a communication feature, and some more advanced resources like shelter maps and donation links. What these apps do well is consolidate many popular features of other disaster preparedness and survival apps in one clean-looking and smooth experience. The bottom line is that Red Cross’s apps *work* and they work for what you need them to do*.* In a crisis situation, it is pertinent that your tool, or your application, actually functions how it is supposed to.

Even the federal government fell short of the Red Cross level of quality. With their FEMA app, they attempt to include many of the same features as Red Cross; e.g. disaster mapping, survival tips, checklists, etc., but the user interface is clunky and certain features are severely lacking. It is *not* something you would want to depend on in an emergency situation.

Tracking services, or location-based social apps already exist. Current offerings from Apple and Google with Find My Friends and Latitude are already large and well-established. For the most part, apps such as Life 360, which allows families to create a network and locate each other, are redundant and unpopular. This is really a niche market, and to become popular, any idea (whatever it may be) needs to be very unique. Location sharing is not unique, and would best be left with the large and established corporations unless sideloaded as an additional feature within an app. For example: if the Red Cross app could display the location of users as an additional layer on its map, it would enhance the experience.

Information about disaster preparedness is all over the internet. Sometimes, however, it can be difficult to search for relevant tips and find the help for the exact emergency situation you face. That’s why a checklist is a great feature that is covered by many of these existing apps. Not only does this help consolidate information, which speeds up the search process, it offers greater access to help. There could likely be a situation where no data connection is available, and within these preparedness apps like Red Cross, Disaster Survival Guide, and Disaster Readiness, the content is stored locally. Some even can diagnose medical problems and dynamically filter out what you don’t need to see. It takes the guess work out of queries to Google and speeds up the process significantly.

Communication remains the number one goal in disaster situations. The current app selection seems more focused on information than simple communication. Facebook can do a better job connecting people than can almost any other app built for this purpose, so there is still room to improve in this app category. Communication between family members, between the government and the public, and between the government and non-profits – these are the most obvious needs left to fill.

***APP PROPOSAL:***

Based on the information we collected, we have decided to design an app for the general public’s use during any large scale emergency to find and communicate available resources. Basically, we would like to create a resource matching app that takes data from those with resources available and informs people who need those specific things. After some research, we found that Ushahidi’s crowd mapping technology fits our needs perfectly, so we will design a front end app that takes user data and inputs it directly into our crowd map and also displays the data collected from our crowd map. We will have different categories on the map assigned to specific resources, such as food, water, power, shelter (which we will define as a place to sleep overnight), pet-friendly setting, baby needs, and transportation assistance. People will then be able to post a listing with their name, address, and contact information and check off different categories with resources that they have to share. Someone else will then be able to look at the crowd map and find a place to go based on their needs. We would like to include a filter feature that that allows you to search for places with specific resources, for example, food, water, and power, but not necessarily baby needs or shelter, so they can find the best help available.

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