# Investigating the requirements of an online emergency response platform

## ABSTRACT

This paper highlights some of the difficulties experienced by volunteers and members of the general public when coordinating a response to an emergency in Pakistan, and discusses a participatory approach to investigating the requirements of an online emergency response platform that links volunteers with donors. The approach builds upon the use of a prototype platform in a simulated emergency situation with real users to test assumptions and learn about the design requirements for such a platform. The paper details the design process and the features of the prototype, and the feedback it received from users.

## CCS Concepts

Human-centered computing → Human computer interaction (HCI) → Interactive systems and tools

## Keywords

Emergency response; Online communication; Volunteers; ICTD; Social Media

## 1. INTRODUCTION

Pakistan is the victim of numerous catastrophic events that affect large numbers of people. Its geopolitical position makes it vulnerable to terrorist activity and its geographical location makes it prone to a variety of natural disasters including earthquakes, floods, droughts and heatwaves. Since 2011, there have been 3,760 terrorist attacks [1] and since 2015, five natural disasters have occurred in Pakistan [2].

Such events tend to affect people's' sources [3] and means of livelihood and in a very short time span result in a high number of victims requiring immediate medical attention. This puts considerable strain on public hospitals which are often unable to deal with a sudden increase in patients and the severe nature of their injuries. Once a hospital is drained of its resources, victims are obligated to make high out-of-pocket payments in order to support their own treatment, which they are often unable to afford. Victims often also require medium- to long-term rehabilitation

and assistance with other challenges resulting from damaged livelihoods through injury [4].

Many first responders to emergency situations are volunteers who are mostly but not necessarily associated with an NGO. These volunteers proactively seek opportunities to participate in and lead relief efforts, as was observed in the aftermath of the March 2016 attack on a park in Lahore. They request help from the general public through the use of direct contacts or social and the public is very willing to volunteer resources in such situations both in response to requests they become aware of as well as by their own initiative [5].

Facebook and WhatsApp are commonly used means of communication for making requests for support and managing them. Use of these channels is not unproblematic: Facebook does not offer a way to centrally track responses or feedback. If a public post is shared multiple times, it is impractical in a time-sensitive situation to determine the status of said request. Similarly, WhatsApp does not offer a tracking mechanism. Additionally, information is being received only by a relatively small audience which limits the reach of each request. As a result of using non-specialized communication platforms, there is often an oversupply of resources in the immediate aftermath of an emergency and difficulty in collecting donations for victims in the medium- to long-term after the emergency [6].

Several platforms exist that aim to solve similar problems (e.g. Ushahidi and Eden [7]), but none of them have seen uptake in Pakistan to coordinate emergency response. Regardless, there are limitations to the current options. For example, they do not provide a mechanism for collaboration and communication between relief organizations and as a result multiple parties respond to the same requests simultaneously [8].

In light of the absence of a communication platform that fits the needs of users in Pakistan, we developed a systematic participatory design process to learn more about the requirements such a platform would need. Additionally, we aimed to understand how potential users respond to the tool, (i) whether they would deem it useful, (ii) when and how they would use it and (iii) how it could be improved.

## 2. METHOD

### 2.1 The Prototype

The prototype "www.khidmatgaar.org" is a simple web platform that is specific for emergency response communication with the following main features: (1) requests are placed in a central location (home page) for public viewing, (2) requests can only be listed once, and (3) requests can be removed by the person who

made the request (a registered volunteer). Each request includes item type, amount, location of request and requester's phone number.

Khidmatgaar has two main user groups: volunteers who are either individuals or members of organisations who work on emergency response directly. These volunteers can issue requests on the platform. The second user group are potential donors, members of the public who are willing to help. They can view requests in chronological order on the website's home page and choose to respond. To utilise the networks of donors and the potential reach social media offers, each request is shareable over Facebook or Twitter, linking back to the original platform, which makes tracking of its status possible.

In early July 2017 we tested the prototype with members of both user groups. The goal of the trial was to investigate the design requirements of an online platform for emergency relief coordination and communication through various interactive sessions with participants.

## 2.2 Participants
A total of seven 'volunteers' and 22 'donors' participated in the event. Volunteers were selected based on their involvement in emergency relief efforts in Pakistan for at least 2 years; they were known to one of the organizers as fellow volunteers. Donors were students at different local universities. At the beginning of the event, informed consent was obtained from all participants.

## 2.3 Focus Group Discussions (FGDs)
We began with FGDs with volunteers and donors separately. The questions for both groups differed slightly. Volunteers were asked questions such as, "How do you learn about and decide what items are required?" and "How do you communicate with each other?" Questions for donors included, "How do you decide what to respond to?" and "Do you try to make sure the information you receive is accurate?" amongst others.

## 2.4 Demonstration and Ideation
The FGDs were followed by a 30-minute demonstration of the prototype and an ideation session to generate ideas for alternative solutions. Half of the donors and half of the volunteers attended the demonstration while the other half attended the ideation session. This was done to explore whether familiarity contributed to the use of the platform during the trial. The idea generation process was setup to test our assumptions about the design of the prototype and to generate alternative solutions to the same problem.

## 2.5 Simulation
In the simulation session, volunteers and donors were in separate rooms. They were asked to imagine a specific emergency situation in Lahore. Both were given the same initial prompt: "There has been an attack in your city and several people have been injured." Two minutes later, volunteers received additional information about the hospitals where victims were treated, and progressively learned more about specific items, such as blood, bedsheets, ambu bags, and water bottles, that were required. They were told that they can either use the platform to issue requests for items that were needed, or a closed Facebook group made specifically for this trial, representing all of Facebook, which all participants and researchers were asked to join. Donors received no further prompts, but were told that they should watch the website and the Facebook group to see if any assistance was required. To respond to a request, donors were instructed to write the items and

amounts they were donating on a small piece of paper and bring it to the volunteer simulation room.

The aims of this component of the trial were manifold: we wanted to learn how people would use the platform, how they would use it in combination with Facebook, and how they evaluate their experience afterwards.

## 2.6 Debrief
After the simulation the participants were asked to reflect on their experience using Khidmatgaar and the Facebook group. The discussion was guided by a set of open-ended questions.

## 3. Results
## 3.1 Focus group discussion
Volunteers said their initial response when they learn of an emergency situation is to do a needs analysis on the ground as soon as possible. Primarily, they learn about these requirements from the victims and their family members. The need for said requirements is communicated to the volunteers' network of friends and family through Facebook and WhatsApp. They felt that donors always respond very efficiently in the first 48-72 hours after an emergency, so collecting contributions for urgent and immediate needs (e.g. blood) is not challenging. A significant problem is the distribution and management of resources which is complicated by the lack of cooperation from public officials, unauthentic or excess requests for aid by victims/families and a lack of accurate data. On average of three days after the emergency begins, volunteers begin identifying the medium and long-term needs of victims and their families and make it their mandate to support them as much as possible. This is when volunteers need to proactively fundraise and find it most difficult to do so.

## 3.2 Ideation session
Feedback from participants on the requirements of a communication medium to facilitate relief efforts have been organized into two broad categories: trust and functionality.



Figure 1: Participants during the ideation session

### 3.2.1 Trust
Participants felt that a platform that is associated with a trustworthy face, that includes live updates on when donations are received by users, that offers contact information so donors can converse directly with recipients, and that includes imagery to support requests would help in increasing the trust donors have in it. They felt that social media posts are not 100% trustworthy and that a dedicated platform was necessary.

### 3.2.2 Functionality

In addition to trust, the other main genre of feedback that was received was related to functionality of a platform intended for communication about relief efforts. Participants felt that the development of a 'system that has details of all donors' with contact information was necessary, that users should be able to 'combine efforts and interact to fulfill victim needs', and that a social media group should be developed 'to spread awareness of needs at a national level'. Several participants indicated the need for a notification function while some had a preference for the notifications being region-specific. In addition, participants felt that status bars which show immediate needs and fulfilled needs, and ordering events in terms of priority would be useful coordination mechanisms. An additional feature participants felt was necessary was a news feed because it could 'alert the user about an opportunity to help [and] is really effective in the way Facebook [is]. Facebook is not ideal however, they said, because not everyone uses social media.

## 3.3 Demonstration

Almost immediately after making a request was demonstrated, volunteers asked for a feature that allows them to edit and update requests. Donors questioned why anyone would trust an unknown website such as Khidmatgaar when it was not associated with or endorsed by anyone they knew. They suggested partnering with an organization such as Edhi Foundation to lend credibility to the website.

## 3.4 Simulation

During the simulation we observed how volunteers reacted and organised themselves during an emergency situation, the kind of communication needs that arose, the experience of using Khidmatgaar versus the Facebook group, and how requests are treated.



Figure 2: participants (Donors) during the simulation

### 3.4.1 The volunteer's actions

Immediately after receiving news of an attack, the volunteers estimated the needs of patients even before any of the volunteers 'went' to a hospital, and started to reach out to their networks via Facebook to ask for support. The volunteers sent a representative to each of the hospitals to speak to victims and their families to identify their individual needs.

### 3.4.2 Using the website

Volunteers who were not in the demonstration session had difficulty understanding the website and its functionality when they were tasked with registering and making a request during the simulation.

### 3.4.3 The use of Facebook vs Khidmatgaar

From the beginning of the simulation it became apparent that there was a strong preference by the volunteers to use Facebook over Khidmatgaar. Requests for water, blood, and food for victims' families were made on Facebook. Within the first 10 minutes of the simulation, there was a demand (from the prompt) for bed sheets and this request was posted both on the Facebook group as well as the Khidmatgaar website. Within the first half of the activity, volunteers discussed if they should issue requests for certain items via Khidmatgaar but decided to use Facebook as the requests were deemed to be time-sensitive and a speedy response was crucial.

At a later stage, volunteers started to use Khidmatgaar for three specific kinds of requests: 1) items that were deemed non-crucial (e.g. bed sheets), 2) requests that were geared towards long-term problems (e.g. financial support for non-urgent but important surgeries, and 3) requests that were especially large in quantity or cost and were likely to take a longer time and larger amount of donors to accomplish. In total 29 posts were made in the Facebook group during the simulation and 11 on Khidmatgaar.

### 3.4.4 Arising Communication Needs

In addition to using the Facebook group to issue requests, volunteers used it for a wide variety of other communication: (1) volunteers updated the status of requests through comments on posts or through new posts, (2) donors tried to contact volunteers by commenting on a post and requesting more information or contact details, and (3) volunteers and donors discussed the nature of the required donation (e.g. whether volunteers were accepting cash donations or not). Participants had difficulty keeping track of updates as they occurred in various parts of the Facebook group and because several requests were active at the same time. This resulted in an oversupply of time-sensitive items. When volunteers used Khidmatgaar there was evident confusion as to how to track responses, as the platform does not allow any additional communication.

## 3.5 Debrief/feedback

Although during the simulation Khidmatgaar was used only rarely, participants' feedback was generally positive. They felt that the platform was a potentially very useful and helpfull tool but requiring a few additional features.

### 3.5.1 Communication

Volunteers had a number of suggestions for features that would make communication over Khidmatgaar more meaningful, and that would help serve their purpose more precisely. They felt that (1) they should be able to make updates to requests on the Khidmatgaar website in order to communicate the completion of a task and (2) a live chat or commenting feature on every feature for instant communication would be useful to add clarity to the communication between users.

Participants noticed that requests issued on Khidmatgaar only reach an audience that is already actively looking for opportunities to contribute, and were worried that this severely limits the reach of requests.

### 3.5.2 Ease of use

Participants felt that timeliness of the requests presented on the platform is crucial and that the landing page of the platform should automatically refresh, to ensure that the shown requests are in fact up-to-date and reflect current needs.

Volunteers said they are very occupied and have little time to use the website in a real life situation, and updating requests or marking them as completed costs time that they rarely have, especially when on site. However, updating and tracking requests on Facebook was also perceived as messy, with responses scattered and often requiring scrolling through a page to find the right posts. Volunteers voiced the wish for a clear and simple way to track progress on requests.

The current registration process is perceived as too time-consuming ad confusing without additional instructions. Making it possible to register via a Google or Facebook account would make registration shorter and easier. Donors asked for a feature that allows them to register as well so they may receive notifications whenever new requests are made on the platform.

### 3.5.3  Architecture of the platform

For donors to make informed decision on the priority of needs, they suggested that requests be listed on the platform in order of urgency or priority.

Not all donors have the same resources or interests nor can they all respond to all requests fully. Categorizing requests according to the kind of response or donation they require, and enabling filtering requests would help donors make faster decisions. Categories could include "Material Items", "Financial Support", "Blood Donations", etc.

### 3.5.4  Trust

Trust is a key component of Khidmatgaar's success: users want to trust the platform and the volunteers that issue the requests. In its current form, users feel they have little reason to trust the website and even less so the individuals making requests. To elicit trust and illustrate the use of the platform to new users, participants felt it could be valuable to display and archive of successfully made requests on the platform. An additional measure would be to achieve partnerships with already trusted institutions and services, e.g. existing relief organisations.

### 3.5.5  Khidmatgaar vs. Facebook

Volunteers confirmed our observation made during the simulation that Facebook is preferred for urgent requests and Khidmatgaar is perceived as a suitable tool for long-term requests or non-crucial items.

## 4.  DISCUSSION AND FUTURE WORK

We investigated the design requirements of an online platform for emergency relief communication through FGDs, ideation and demonstration of a communication tool, a simulation activity and a debrief session. We first asked volunteers and donors to identify problems they face in emergency situations, asked half of them to design a communication tool and demonstrated Khidmatgaar to the rest of the participants. Then we asked all participants to partake in an emergency simulation activity and act as either volunteers or donors in the situation.

We found that a coordination platform such as Khidmatgaar is perceived as a potentially valuable tool. However, the current prototype does not cater sufficiently to the needs of volunteers and donors during an emergency situation, which led volunteers to use Facebook over Khidmatgaar during the simulation. Several clear needs for additional features to increase the usefulness of the platform emerged. These perceived needs are likely to be influenced by familiarity with Facebook and resemble some of the features of that platform. The three most prominent requests were for additional communication tools, tracking of the status of requests and focus on long-term needs.

The communication needs of volunteers and donors are more complex than what is currently possible on the platform. Khidmatgaar needs to enable more communication between donors and volunteers through a chat or comment function. Tracking of the status of requests is necessary to avoid oversupply. Volunteers requested a simple and easy-to-use tracking function on the platform that is not time-costly and allows users to see the status of a request at one glance. The needs of victims often extend beyond the first three to four days after an emergency situation. Khidmatgaar was perceived to be especially useful to cater to these long term needs.

An additional request that emerged in the ideation session as well as in the debrief was the establishment of a network of donors that were connected to a platform and that they may be alerted by the platform of opportunities to help whenever they arise.

The platform should include these features in order to be perceived as a useful tool that adds value beyond the currently preferred Facebook. Furthermore, the registration process needs to be simpler, as users without initial instructions struggled to use the website. Sustainability models for Khidmatgaar need to be investigated.

Several problems were highlighted in the FGDs that Khidmatgaar does not address, but which were deemed crucial by the volunteers. Most of these are related to a lack of clear information during an emergency situation. It is difficult to obtain information about the needs of victims, or even the actual number of victims inside a hospital. Future work should also address these problems in order to increase the efficiency of volunteer-led emergency response.

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