Applying Feedback Analysis on Citizen's Participation System of CSFLU Barangays on Disaster Preparedness

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Abstract. Various initiatives through the use of ICT paved the way to better improve the services of the government during disaster situations. It helped in the preparation and mitigation process during disaster situations through different mediums such as Social Networking Sites and SMS to disseminate information. However, data that are gathered from this medium are not sufficient to address the problem experienced by the citizens, thus the concept of Citizen's participation system was developed. The objective of the study is to provide a mechanism or tool for barangay officials and the city government to strategically plan preventive measures during times of disasters based on the citizen's perspective, data analytics gathered from sentiments, suggestions, and feedback of the citizens was analysed using of Feedback Analysis in order to provide accuracy of data which is needed by the disaster response team that will be generated through data analytics.

1. Introduction

The Philippines is a democratic country thus active participation from its stakeholders is important. At present, promoting effective governance must involve the government unit, non-government organizations (NGO's), citizens, and private sectors to engage in collaborative activities and increase participation. (Guzman et.al, 2014). Citizen involvement plays a vital role in good governance, as the end recipient of law, policies, governance, and services; they are essential contributors to the decision-making, policy-making and service implementation given by the government. The advent of technology paved the way in bridging the gap between the government and its citizens.

Disaster situations are the most resilient times where the need for citizen involvement is required. Times of earthquake, typhoons, flooding, storm surge and other natural phenomenon are the instances where citizens are strongly affected and the need to be informed ahead of time is one of the goals of the government. Activities on disaster preparedness were implemented to local government units are one of the advocacy the government constantly plead to its citizens. However, the involvement of the community is limited because the view of the people to this advocacy is a mere implementation of the law which often leads to a reactive response to situations that results in a broader scale type of problems such as toll on death, loss of assets and greater liabilities.

According to state weather bureau Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), the Philippines alone is visited by at least 20 tropical cyclones every year.

Add to that the number, landslides, flood, the threat of storm surge or tsunamis and earthquakes also devastate the whole country. The chance for prevention to these disasters is very thin or worst, very remote. But the effects of these natural phenomena can be greatly reduced by educating and involving the citizenry for mitigation and adaptation.

The key to addressing such problems is Citizen Participation, thus, through the initiative of the government, the concept of E Participation or Citizen's Participation Systems was coined. In the website of E-Participation.eu (2016), the term E-Participation refers to the means of ICT-supported participation in processes concerning administration, policy making, decision making, service delivery, information provision, consultation, deliberation, etc. Through continuous ICT developments, citizens are finding new ways to participate in issues concerning them. ICT, e-government, and open government initiative paved way for e-Participation. (Tambouris et al., 2007).

Citizen's Participation System addressed 3 areas of governance during times of disaster, a.) Informative public participation which involves information dissemination on Warning signals, Class suspensions, flood status, etc.; b.) Consultative public participation which allows citizens in evaluating and assessing the performance of the barangay during times of disaster and c.) Cooperative public participation which allows the citizen to voice out their suggestions in improving the performance of the barangay (Guiao, 2016).

This study implemented Citizen's Participation system to the barangay/villages of the City of San Fernando La Union (CSFLU). It is one of the third class cities in Region 1 which is strategically located between the upland and coastal areas. It comprises of fifty-nine (59) barangays. The city always experience devastation from natural disasters, approximately thrice a year the city was visited by natural disasters such as typhoon, flooding, threat on storm surge and landslide. This study is a tool for barangay officials and the city government under the City Disaster Risk Reduction Management Council to strategically plan and implement preventive measures before and during times of disasters. The collected from citizen's feedback after analyzed provides a visual data through data analytics based from sentiments, suggestions, and feedback of the citizens. The citizen, on the other hand, will have a communications means to be informed, to collaboratively suggest and to participate in the improvement of their barangay in terms of disaster preparedness.

2. Methodology

The source of data are the citizen's and barangay profile extracted from the current Barangay Information System and the disaster preparedness policies and procedures which is based on the provisions of City Ordinance No.2011-6, Ordinance Institutionalizing the Disaster and Resiliency System in the City of San Fernando, disaster reports that the barangay submits to the City Government, and Citizen's feedback and suggestions coming from the city's official social networking site (Facebook page). Those data were gathered through series of interview to stakeholders, Survey was conducted to random citizens residing from the different barangays of the city, and Document analysis was also conducted to pattern the needed contents for report generation. This study utilized the concept of Feedback Analysis which aids analyzing the collected feedback from citizens which was generated through data analytics report. The system provides a concentrated information dissemination tool (web/ mobile accessibility) on upcoming disaster situation, Feedback tools (poll, a suggestion box or sentiment reaction box), Citizens feedback, sentiments and reactions during times of disaster (graphically represented) which aids in planning and improve the disaster preparedness and response mechanism as shown in Figure 1 below.
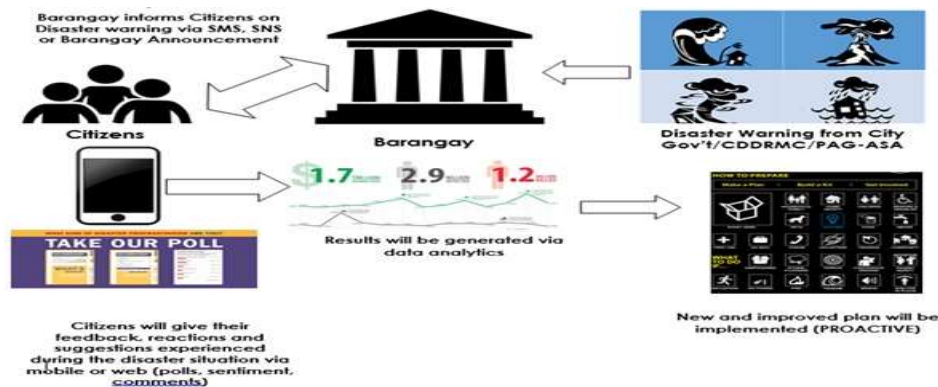
Figure 1. Conceptual Framework of Citizen's Participation System

3. Software Methodology

The development of the study was guided using Scrum Methodology, it has the capability to allow the proponents test the viability of the project through early delivery of prototypes. The incremental phases and daily team reflection allow the proponents improve the study on a daily basis. The activities are broken down into several phases, **Initiate Phase** data gathering from stakeholders was conducted, allocation of project responsibility was delegated based on prioritized product backlogs and finalization of Project timeframe was accomplished; **Plan and Estimate Phase** the project plan was drawn and gathered data were processed through feedback analysis, estimated project features were drawn and prioritized, **Implementation Phase** project development and early delivery of the prototype were done, daily meeting was conducted on the status of development; results were incremental and iterative delivery for project feedback. **Review and Retrospect Phase** project demonstration and validation were conducted for final revision. The last phase is the **Release Phase** the final delivery is done.

4. Results and Discussions

Based on interviews conducted by the proponents of this study, the city government actively participates in terms of informative public participation using Social Networking Sites specifically Facebook. Announcements on disaster-related events and situations were being posted on their city's official webpage and website. However, not all citizens are connected to this medium of communication but they still rely on TV and radio or via word of mouth on announcements especially those in the upland areas. Thus, this leads to problems on the part of the citizen such as: lack of preparation, unawareness on incoming disaster and delayed disaster response to their needs. On the part of the government: lack of information from the citizen & no knowledge on the current situation of the citizen during times of disaster leads to unimproved services during times of disaster which often results more casualties, delayed response to citizen needs and lack of trust from the citizens.

The proponents conducted interview to different citizens from Pias (upland), Poro (coastal) and Santiago (urban) the three most common disaster infested barangays. Based on the findings it was found out that these barangays are active in addressing citizens' needs during disaster situations, however, in terms of citizen participation; the citizens can only voice out their suggestions, concern or feedback during barangay/village assembly where not all the citizens attend such meetings. Also, disaster preparedness posters placed on the barangay hall is not sufficient to provide informative data on disaster preparation and mitigation because citizen's just pass through the barangay hall.

With the problems and findings stated above, the proponents applied Feedback Analysis on Citizen's Participation System in Barangays of CSFLU on Disaster Preparedness. The system allows the citizens to participate before, during and after disaster situations. It is a mechanism that aids the barangay and its officials improve their services based on the perspective, suggestions, and feedback of the citizens. This system includes polls, comment and post for the citizen's side and sentiment or reaction mechanism that can be accessed using their mobile phones. The collected data was analyzed and resulted applying

the concept of feedback analysis which would help the barangay/ village officials plan actions and strategies in improving their disaster related services specifically preparations that needs to be done before, during and after a disaster. At the same time, timely training and informing the citizens on how to prepare before an onset of a disaster affects their village could be done. Also graphical report was generated (data analytics).

4.1. Feedback Analysis Process

Feedback analysis requires the development of deep understanding of the strengths and weaknesses of an organization. This offers knowledge on how to do decision-making that would contribute to the improvement of the organization which produces results (Drucker, 2014). This form of analysis was adopted in this study to accurately assess the strengths and weaknesses of services the barangay offer before and during disaster situations. The proponents adopted the Feedback loop (see Figure 2 below) concept from the article of Imp-act (2003) which comprises of eight phases. By applying the phases of this concept on the analysis of data coming from the citizens, the barangay/ village officials, the City Disaster Risk Management Council and the city government was able to consider all the issues involved coming from the citizen's perspective and apply it to their decision making process, improvement of planning strategies and implementation of services. Thus, this results to a more responsive citizen's involvement and timely and proactive barangay official's response mechanism.
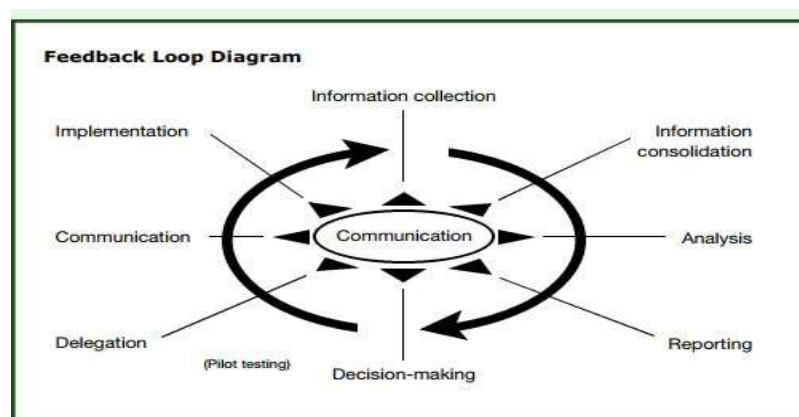

Figure 2. Feedback Loop Process

4.1.1. The result of the Feedback analysis.

The following figures below shows once the feedback analysis concept was applied to the collected data gathered from the responses of citizens.
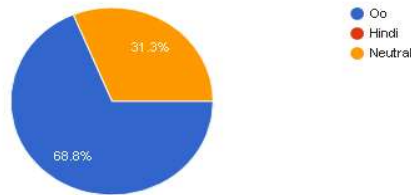

(What type of preparations do you make before an onset of a disaster?)

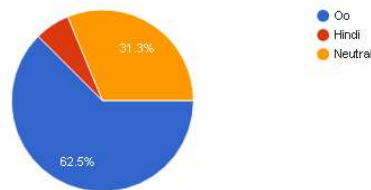**Figure 3.** Citizen responses

(Does your barangay or village officials help you prepare?)

Figure 4. Result of responses (citizen response)

Figure 3. shows sample responses of citizens before and onset of a disaster. Majority of them answered that they store goods, water, charged cellular phones and power banks and prepare 1st aid kits. Figure 4. Shows the result on the response mechanism the barangay conducts during disaster preparation and majority attested that their barangay assisted them during disaster preparation.
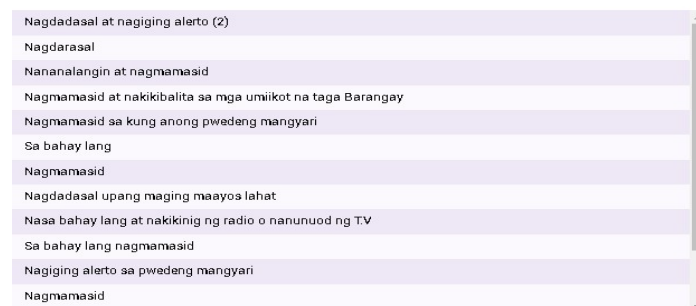

(*Is your barangay/ village active during times of disaster?*)

Figure 5. Result barangay response

(*What actions do you make during times of typhoon?*)

Figure 6. Citizen responses during time of typhoon

Figure 5 shows the responses of the citizens' in terms of the village officials involvement during times of disaster and majority attested that the village officials are active in addressing their problem and needs. While Figure 6 shows the citizens' response on actions they make during times of typhoon and majority said that they are in alert state, some are praying while others are in a standby mode waiting for officials to respond to them.

4.2. Design and Features of the Citizen's Participation System
In order to address the problem the following features were incorporated the Citizen's Participation are divided into 3 areas: the Citizen's module, Barangay module, and City Government module.

4.2.1. Citizen's Module.
Though the use of the Citizen's Participation System the citizen can a.) Receive announcement and warning, b.) Post Feedback, suggestion, rate and react, c.) Collaborate with other citizens in the barangay. See figure 7– 8 for sample screenshot of the citizen's module.
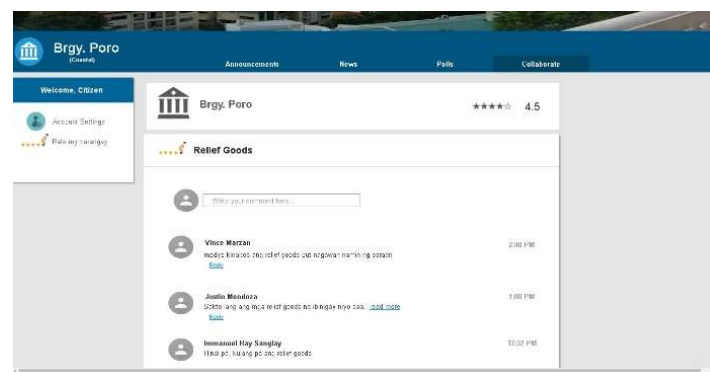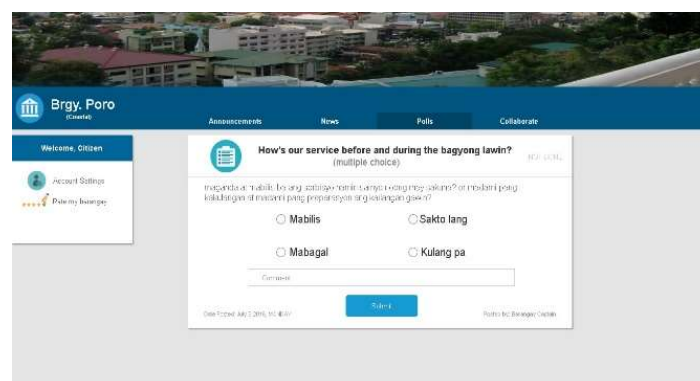

Figure 7. Citizen's Receive Message Form

Figure 8. Citizen's Poll Module

4.2.2. Barangay Module.
Though the use of the Citizen's Participation System the barangay officials can a.) Disseminate announcement and warning, b.) Respond to citizen's concern in terms of disaster, c.) Collaborate with the citizens for improvement of services in terms of disaster preparedness, d.) Generate reports through Feedback analysed data with a data analytics output. See Figure 9 and 10.
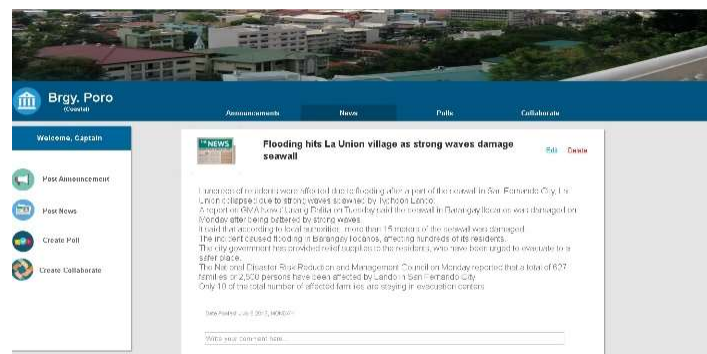
Figure 9. Barangay Information module

Figure 10. Barangay Dashboard module

4.2.3. City Government Module.
Though the use of the Citizen's Participation System the barangay officials can a.) Disseminate announcement and warning, b.) Respond to citizen's concern in terms of disaster, c.) View reports based on data analytics, d.) Monitor and supervise the barangay in terms of disaster preparation and mitigation.

5. Conclusion
The utilization of the Citizen's Participation System of CSFLU Barangays on Disaster Preparedness increased the citizen's participation in disaster preparedness, mitigation, and adaptation. Citizens are involved in the policy and decision-making through their feedbacks, reactions, and suggestions experienced during the disaster situation via mobile app and web portal. It is expected that a strong partnership will be forged between the City Government and the Barangay folks towards a zero casualty or reduced disaster risk or effect.

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