PEFA : A Disaster Preparedness and First Aid Guide Mobile Application

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Abstract

The capstone project entitled **PEFA: A Disaster Preparedness and First Aid Guide Mobile application** was designed and developed to provide information on how to deal with different disasters and first aid guide for common types of injuries. The application provides information for users to be better prepared against disasters such as fire, flood, typhoon, terrorism, accident and earthquake. The device can also be turned into a flashlight and siren that can be used when the place is affected by disaster. There is also a First Aid feature that contains important information for different types of injury to those affected victims of any disaster. Also a First Aid checklist that can be set as your reminder for important things to bring as being prepared to any disaster. There is also a direct call to Philippine Red Cross in case an injury get worse. It can help to educate users about disaster preparedness. This application can be used by everyone who has an Android Smartphone. PEFA can be used as a reference material for future researchers who would also like to develop their own mobile application project using the same type of mobile application development.

1.0 INTRODUCTION

The country is naturally prone to disasters like typhoons, volcanic eruptions, landslides, floods,earthquakes, tsunamis, and others since it is located along the so-called Pacific Ring of Fire. Filipinos have already surpassed these kinds of disasters and have conditioned themselves for some more disasters to come each year. Since the Philippines is an archipelago, located in the midst of large bodies of water, it is very prone to the natural formation of storms and typhoons. In light of the horrifying disasters that struck the country, it seems that in terms of preparedness, mitigation and response efforts, there were still be gaps in which the government has to intervene also a roles to be played with, that is why they must be aware and at the same time be prepared, before, during, and after each and every disaster.

Calamities and disasters can happen anytime. With the use of science and advanced technologies, calamities and disasters can now be projected at a more or less realistic time or even at a realistic time. Seasons can also be a good indicator for a calamity or disaster to come, however, the challenge is still about what specific time and place this particular catastrophe has to surface. This condition puts all people and properties into uncertainty. It is always good and ideal to be certain in our thoughts, conditions, and decisions for the future, but

obviously it is difficult and sometimes impossible to attain certainty.

On the other hand, through the use of different gadgets like smartphones and tablets,life has been more productive and progressive. Even during emergency situations, peope may refer to a First-Aid Guide to make sure if the things are done in the proper way. Many people may deem it necessary to have a First-Aid guide specifically those who face serious injuries. Through this the patient would be provided with immediate assistance, and everyone would be more confident to help these patients especially if the First-Aid instructions are at hand. In addition, it makes perfect sense to create apps for life-saving tools like First-Aid instructions, which can be kept ready for emergencies.

First-Aid and emergency application is one of the most important things to prepare for wilderness trips and everyday life. First Aid during disaster is the immediate help extended to the affected victims of any disaster may avail. The proportion of the catastrophe can be of small scale or may be of catastrophic proportion. The disaster can be natura or man made. First aid during an emergency can save many lives as often the rescue operation initiated by the government and private agencies takes time, especially if the disaster happens in a geographically remote place.

Having basic knowledge on first aid during any disaster would not only lessen the amount of damages of facilities in a community, it will also lead to reduction of the number of fatalities.

In this study, therefore, the researchers proposed a mobile app. It features an easy to follow step-by-step instructions that can guide users to ensure safety from every disasters. There are also useful tools which can convert a smartphone into a siren and flashlight.

1.1 Objectives

The researchers proposed PEFA mobile application due of the following:

1.To give information about basic Emergency Tips awareness for common disasters that strike in the country using a mobile application.

2. To guide people on how to apply basic First Aid for common types of injuries

3.To give knowledge of First Aid and save lives of those in danger.

1.2 Scope and Limitations

SCOPE

The proposed mobile app covers basic information for Disaster Preparedness/Awareness that will help everyone on how to deal with the disasters before, during and after. Pre-loaded content means easy access to safety information at any time even without an Internet connection. Safety tips prior to typhoons, earthquakes,terrorism,accident and flashfloods are likewise provided. PEFA mobile app will also serve as a First Aid Guide kit in the user's pocket, and it is very useful to everyone especially to the people who lack knowledge on first aid appication. This mobile appication has a nationwide area coverage.

LIMITATION

The mobile app is for Android Phone Users only and no disaster warnings or advisories.

1.3 Purpose and Description of the Project

This study provides the guides that give key life-saving information for different

disasters and first aid guide for minor incidents.This mobile application is an effective tool for educating people about disaster preparedness.

To do this, the researchers used Android Studio and Java for creating the mobile application, the operating system that supports the chosen softwares and a computer that can run the selected software with adequate performance.

2. REVIEW OF RELATED LITERATURE

2.1 Foreign Literature

According to Gregory Anderson, et.al (2011) Unintentional injuries are the leading cause of death among persons 1-34 years of age in Canada and 1-44 years in the United States, resulting in approximately 2.6 million hospitalizations, 34.9 million emergency room visits and 87.6 million medical office visits per year for all workers in the U.S. Basic first aid training prepares bystanders to react and provide immediate and efficient treatment for a wide variety of incidents including alerting the emergency medical system (EMS), maintaining the airway, breathing and circulation, respiratory and cardiac arrest, and hemorrhage control. The response time in emergency situations is critical, but the first aid provided must be performed properly in order to prevent further complications and potentially save lives.

To improve the emergency response and outcome, first aid must be taught correctly to a broad spectrum of individuals within the community, workplace, and health care environment. However, with the need for effective initiation of intervention being known, healthcare professionals and laypersons often face criticism for inadequate basic lifesaving skills. Insufficient skills of basic lifesaving are caused by a lack of training and appropriate instruction, limited practice, lack of self-efficacy, and poor skill retention .

According to Bert Metz, et.al (n.d), there must be identification and assessment of mitigation technologies and measures that are required to deviate from “business-as-usual” in order to raise the level of resiliency – and not the tolerance – of nations and communities to all kinds of disaster. Therefore it is no longer unfamiliar to see on mass media people who refuse to evacuate their homes in the face of impending danger because they have misunderstood their sense of tolerance as a meaning of the security and resiliency.

M.K. Magunda (2010) explained that public awareness activities foster changes in behavior leading towards a culture of risk reduction. She aso stated that the objective of the communication strategy is to widely dissemiate information on disasters and risk reduction and its likely effect, to save lives.

2.2 Local Literature

Cardenas (2010), described that the relationships which now exist are called "culture of disasters." He stated that adding to the complex tangle of social systems, social values, simple management concepts and ecosystems. Most of the Filipinos are only beginning to know the rules of disaster risk reduction and management. People who live in urban areas are less sensitive to the ecosystems.

Rollon (2010), disaster preparedness is much more realistic. On the management side, prevention is always an important plan of every action. Incongruence between natural processes and the human use of physical resources have been demonstrated on many occasions. Especially for urban centers like Metro Manila, preventive measures such as relocation job generation, and no settlement of zones may be

expensive. For example, human settlements in coastal areas shoud be avoided unless some aggressive measures are in place with high and expensive dikes and retaining walls.

In addtion, Siringan (2010), explained that there are places that can be avoided, and some places where relocation might be necessary and places where mitigation for certain hazards may still be possible.

Likewise, Olympia (2010), shared the risk reduction measures that are community-specific. Philippines is naturally prone to different disasters because it is one of the countries with long coastlines.

Tabios (2010), summarized the role of the community plays in disaster management related to preparedness, adaptation and mitigation. He stated that there is a big role of what the community can do in disaster management. Every community should establish and organize planning and response teams during predisaster and post-disaster phases.

The main requirement is to develop emergency or evacuation plans such as routes, food provisions and protective shelters in times of disaster. Multi-hazard maps are very useful for this purpose.

For Martires, (2011), social system is “a complex and dynamic set of relationships among its actors interacting with one another.” In R.A. No. 10121 stated the need to “adopt a disaster risk reduction and management approach that is holistic, comprehensive, integrated and proactive in lessening the socio-economic and environmental impacts of disasters including climate change, and promote the involvement and participation of all sectors and all stakeholders concerned, at all levels, especially the local community.” Aside from being a multilevel system, Disaster preparedness becomes also multi-relational. In the social system of the community, there are still various subsystems interdependent with each other.

2.3 Foreign Study

This section contains information of different studies, and their similarities and differences from the proposed study.

The thesis entitled "ubAlert" is a global social network and can be used around the globe to give important information needed about disasters that happened accross the world. The app also serves to save lives by sharing the knowledge of the world. It differs from the proposed study because it requires an internet connection to be able to use it.

"Disaster Alerts" is a simple mobile app that provides latest feed/RSS about recent disasters around the world. It contains information about recent disasters including earthquakes, floods, and tropical cyclones. The information provided by Global Disaster Alert and Coordination System, is a cooperation framework between the United Nations, the European Commission and disaster managers worldwide to improve alerts, information exchange and coordination in the first phase after major sudden-onset disasters. GDACS also provides thae real time access to web-based disaster infromation systems and related coordination tools. It differs from this study because it also requires internet to be able to use it.

First Aid and CPR from American Heart Association is a mobile app design to guide and give information about first aid. The app conatins a total of 34 videos and 46 illustrative guides, so the user has no problem understanding exactly how to perform certain resuscitation procedures as well as grasping the concepts behind them. It can also store Medical information

2.4 Local Study

The mobile app named TUDO is a web and mobile application designed to be usable on different smart phones, tablets and PCs. The idea of Tudlo consists in solving an issue of every individual that has to deal with Traffic, Road Conditions, Emergencies, Disasters, Catastrophes and other unexpected events in human life. In these various events there is a big impact which has the capability to endanger life, disrupt operations, cause environmental damage and bring significant change to day-to-day living.

PINDOT is a mobie application created originally for the province of Albay, The name of the mobile app is short for Provincial Information Network on Disaster Occurrences and Threats. It is a pro-active, comprehensive webapplication. Its purpose is to lessend and mitigate the effects of every disaster such as natural and man-made calamities. APSEMO adopted for easier and faster information dissemination tool to mitigate the effects of the disasters through the help of new mobile technologies. The mobile app can be used to give government agencies, organizations and individuals, immediate access to disaster warnings, advisories, location data and disaster mappings.

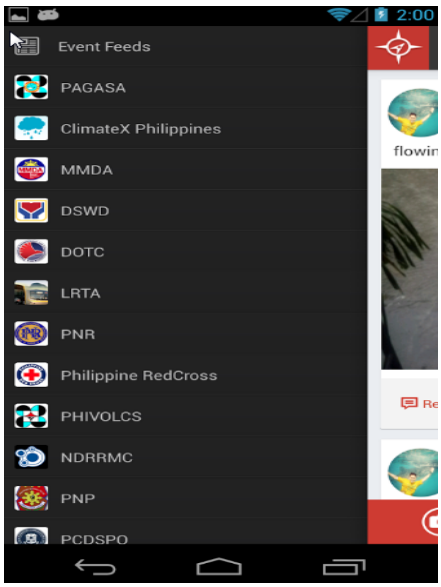


Figure 1. TUDLO APP User Interface

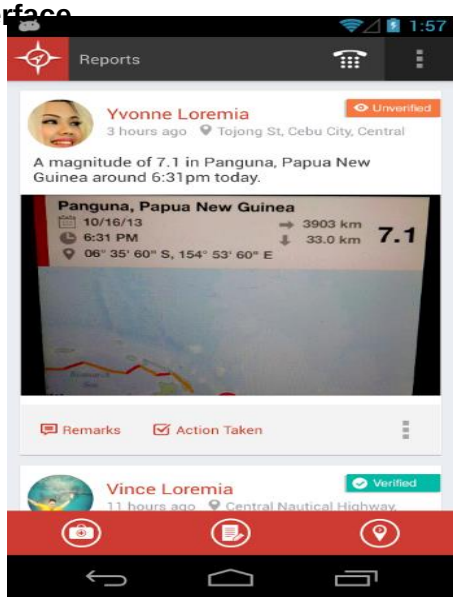


Figure 2. TUDLO APP User Interface

3.0 METHODOLOGY

With the use of MADLC (Mobile Application Development Lifecycle) project development model, the researchers were able to gather methods and procedures for the completion of the proposed mobile application. MADLC is needed for developing a mobile application. It will help the researchers to achieve the objectives of their proposed project. It is made up of different phases: Inception, Design Phase, Development, Stabilization and Deployment.

3.1 Inception

Inception stage is all about defining and refining the idea for an application. Al of the mobile devices comes up a whole new way to interact with computing, corporate infrastracture and also the web. Through this, the researchers collected different ideas that wil help to build to this mobile application.

3.2 Design Phase

This phase, is about defining the app's User Experience for what the general layout is and how it works and also turning that User Experience into a good User Interface design with the help of a graphic designer.

- **User Experience (UX) Design**

UX is generaly done via wireframes or mockups using tools such as Balsamiq, Mockingbird, Visio, or just plain pen and paper. The researchers decided to use Visio as a tool to design the the UX.

- **User Interface (UI) Design**

After designing User Experience, the next step is to create a User Interface design. In this phase desired graphics and colors are introduced and will be finalized. Focusing and giving more time on good UI design is more important.

3.3 Development

Development is the start of building the application and the most important phase .It is usually starts very early, and the application si coded. A working prototype will be developed once the idea and concepts are all finalized. The assumptions and functionalities will be validated and it will help the to understand the scope of the work.The researchers will start to work the whole mobile application and coded through the use of Java.usually starts very early, and the application.

3.4 Stabilization

This phase is usually the process of working out the bugs in a mobile app. Not just from a functional standpoint but also the Usability and Performance. It is best to start stabilization very early within the development process so that course corrections can occur before they become costly. Typically, applications go into Prototype, Alpha, Beta, and Release Candidate stages. Different people define these differently, but they follow the following pattern:

- **Prototype** – The app is still in the proof-of-concept phase, and only core functionality or specific parts of the application are working. There are major bugs that will be present.
- **Alpha** – Core functionality is code-complete (built, but not fully tested). Major bugs are still present, and outlying functionality may still not be present.
- **Beta** – Functionality of the mobile app is almost complete and a minor bugs to fix and at least light testing to be done. Major known problems may still be present.
- **Release Candidate** – The mobile app is now ready for release and no more major bugs. All the functionality is tested and complete.

3.5 Deployment

The final phase of Development process is Deployment. After the stabilization is through, the application is ready for distribution. It can be uploaded to the appropriate application store/market like Playstore for Android and AppStore for iOS.

To be able to use the mobile app, the phone should have at least Android 4.1 OS Version (Jellybean) . The mobile app was tested in differrent android smartphone like Samsung, Lenovo and Firefly mobile with different sizes of screen.

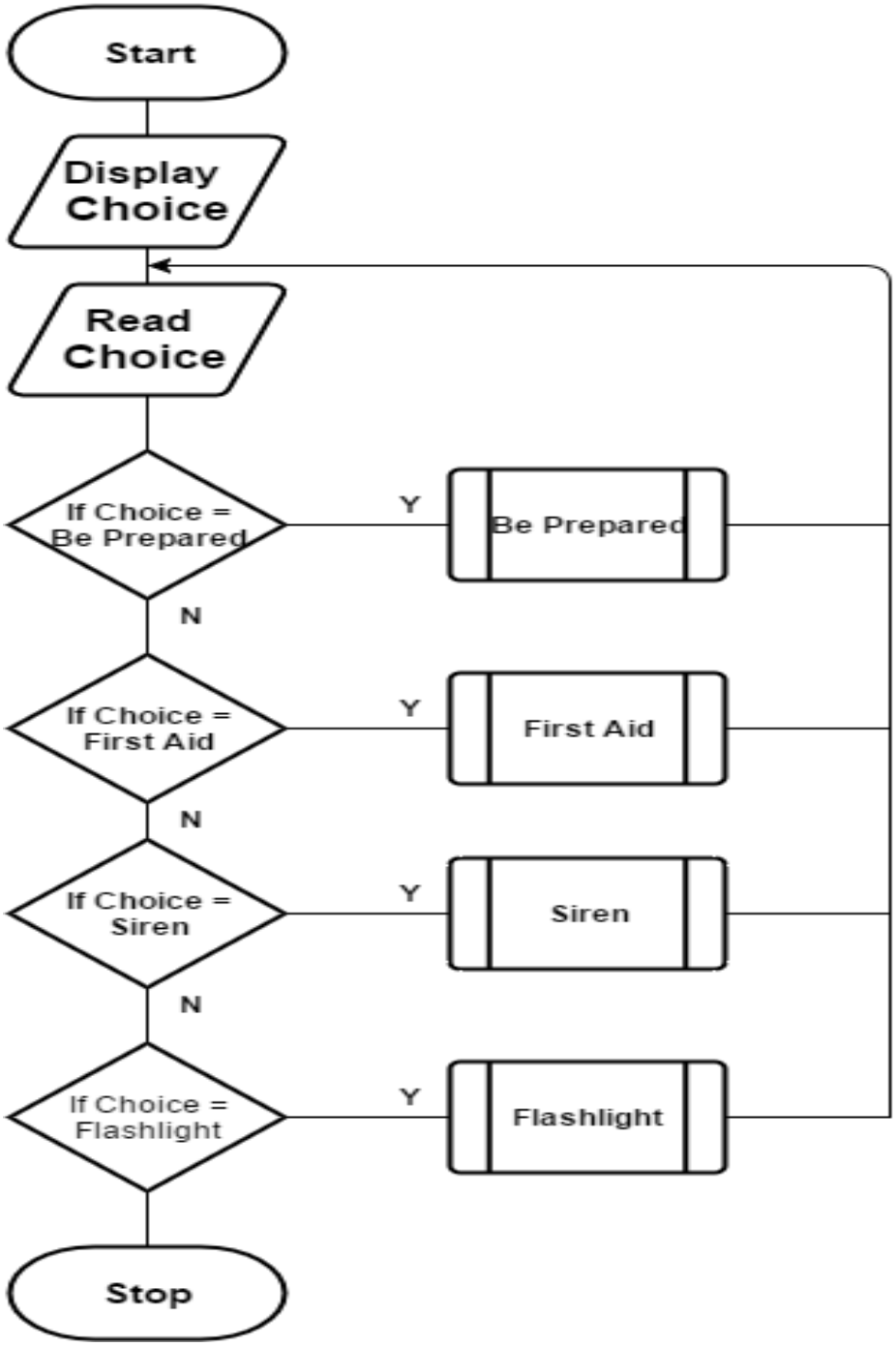


Figure 3. Main Menu

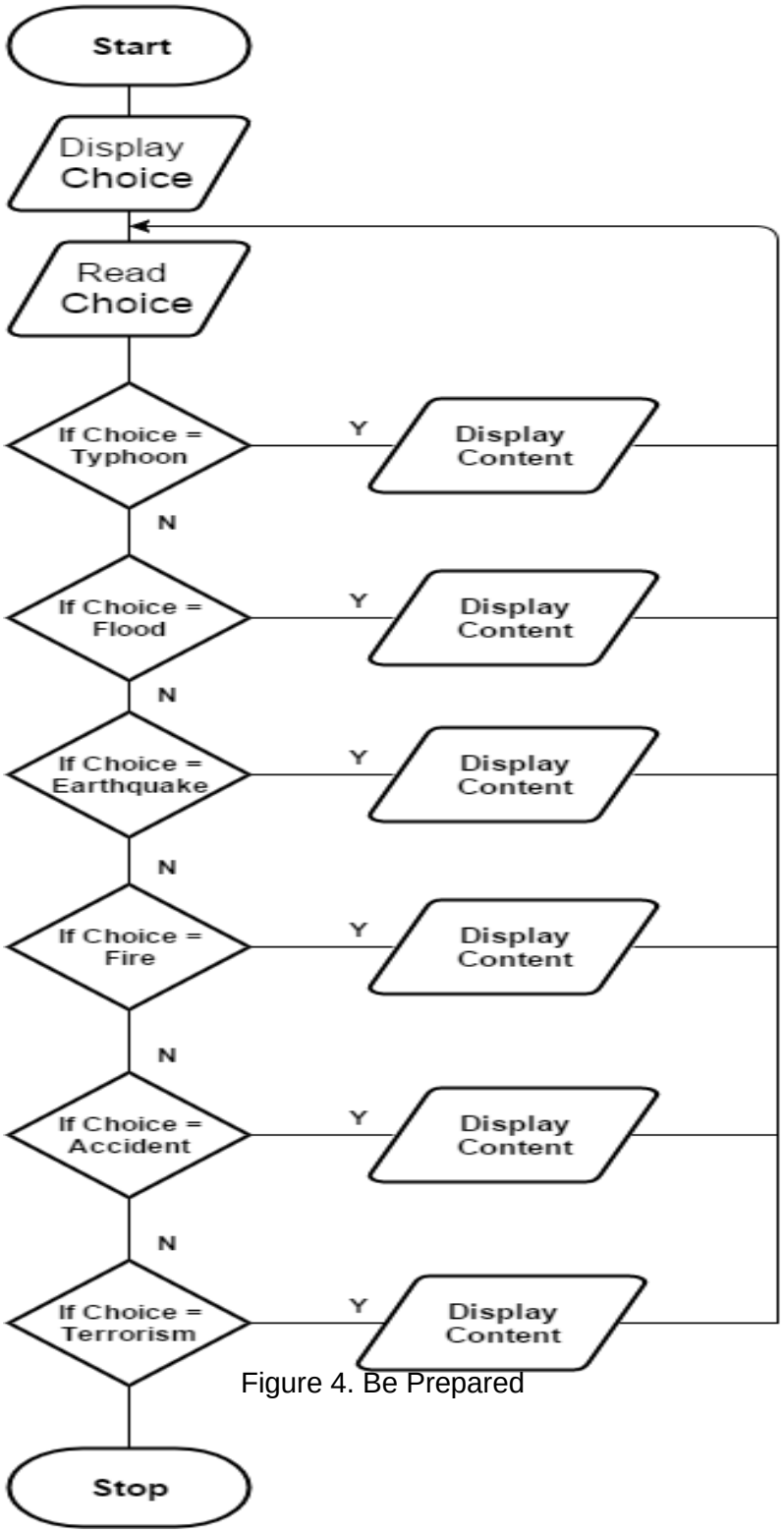


Figure 4. Be Prepared

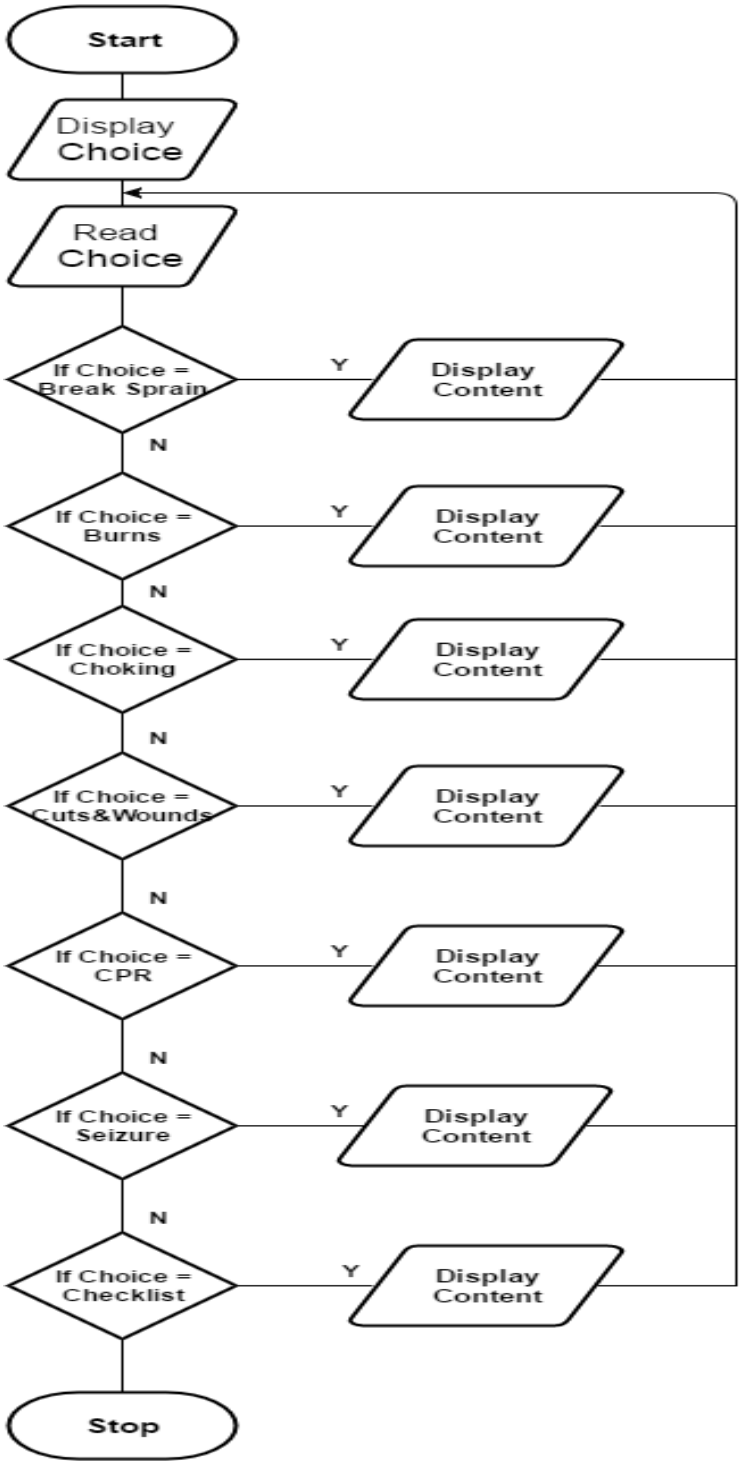


Figure 5. First Aid Menu

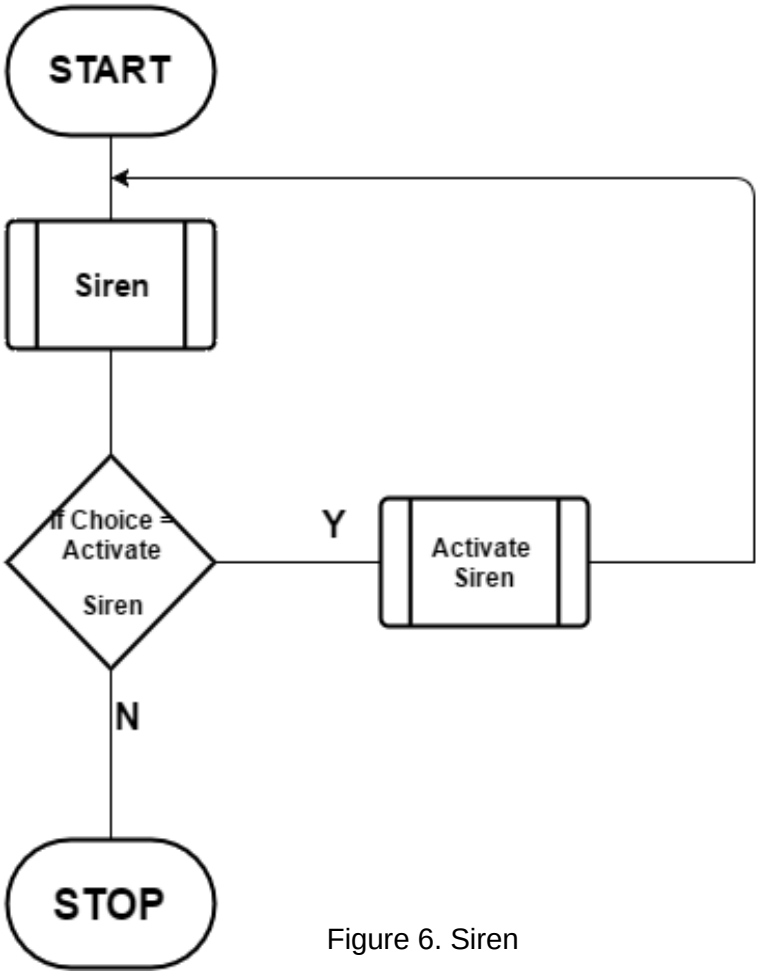


Figure 6. Siren

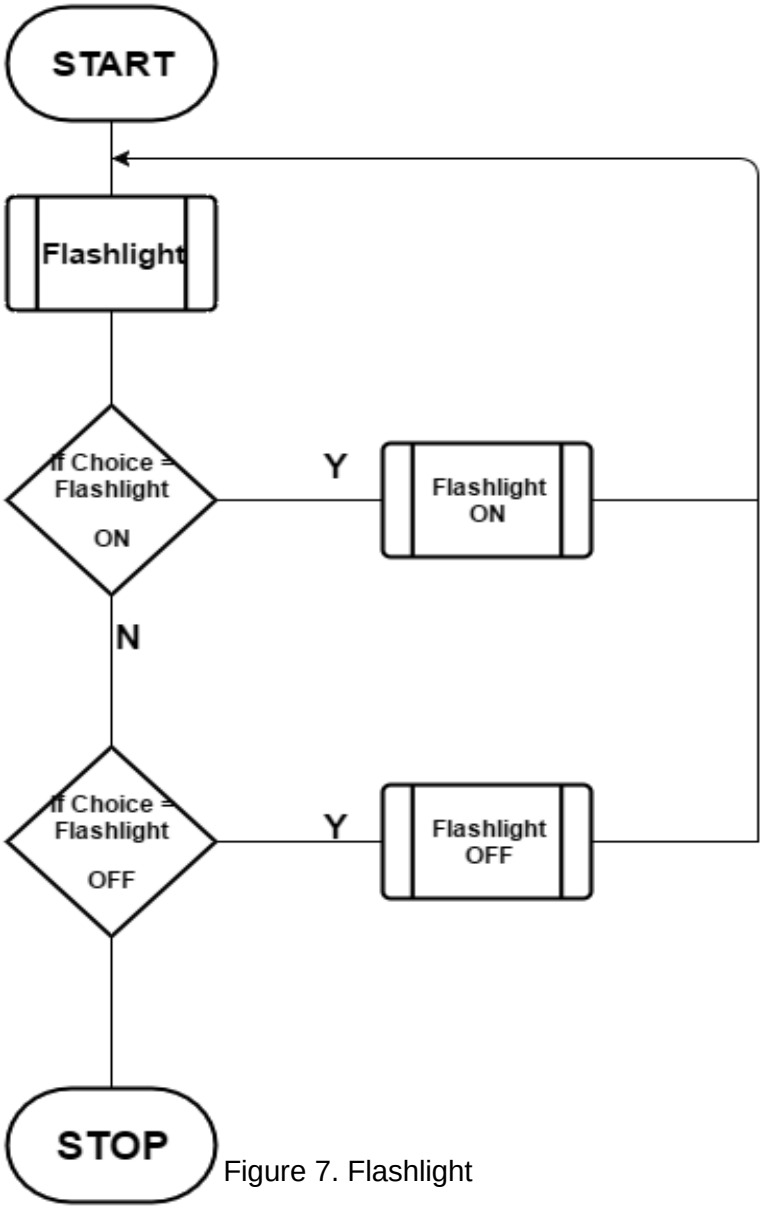


Figure 7. Flashlight

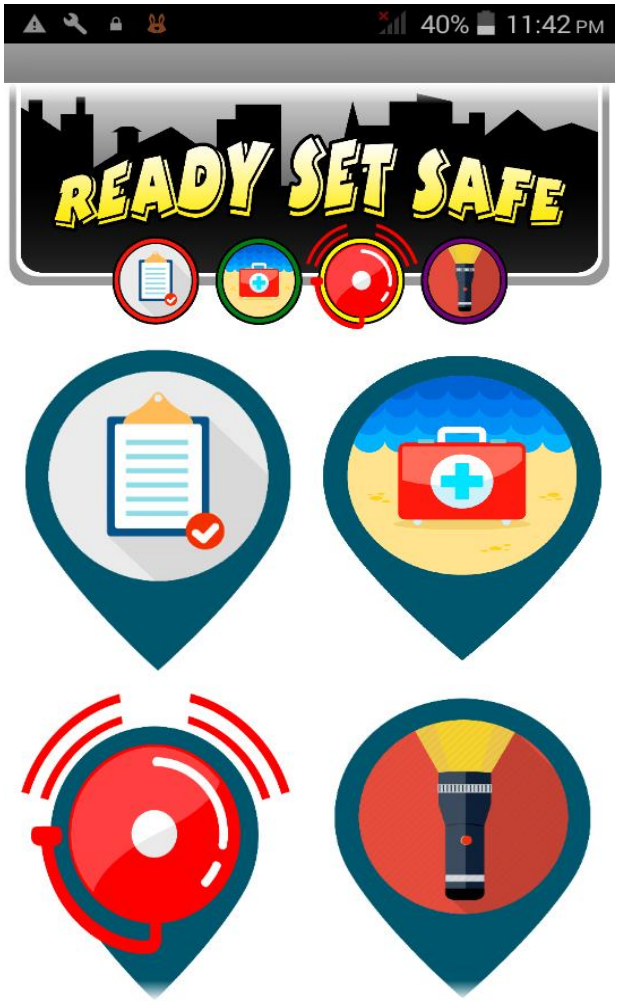
4.0 RESULTS AND DISCUSSIONS

To use PEFA application, the user will tap the PEFA icon in the phone's menu. Afterwards, the main menu layout will appear on screen. It contains four submenus which are Be Prepared, First Aid, Siren and Flashlight. When the user clicks Be Prepared, it will display the six common types of Disasters.

The First Aid has a feature to call for local help, 143 is a Philippine Red Cross number. Individuals can use this when the minor injuries get worse.

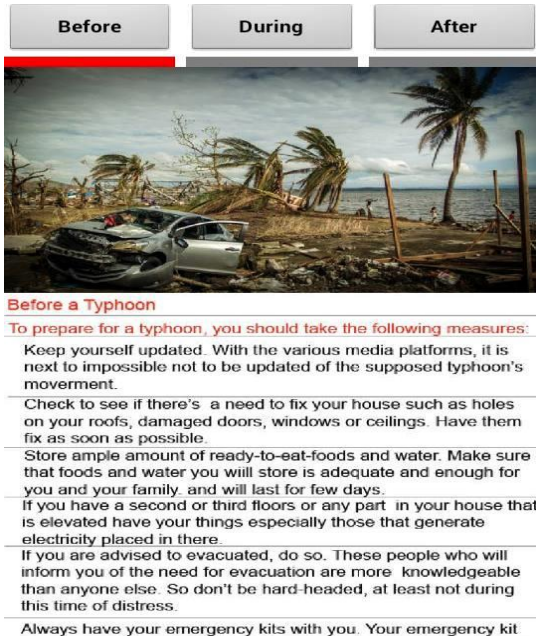
The loudness of the Siren feautre depends to the user's phone speaker. Also, the fashight wil be working for those who have their Camera Fash on user's phone.

Screenshots



This the Main Menu, there are 4 sub menus: Be Prepared, first Aid, Siren and Flashlight

Menu for Be Prepared, user will choose with different minor types of Disaster and read Safety Tips



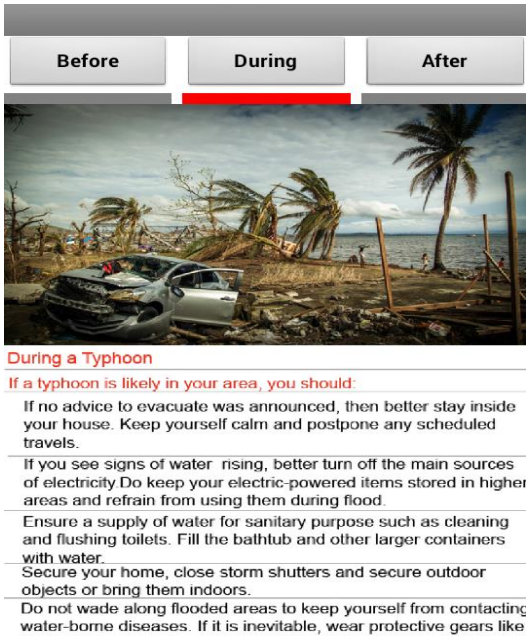
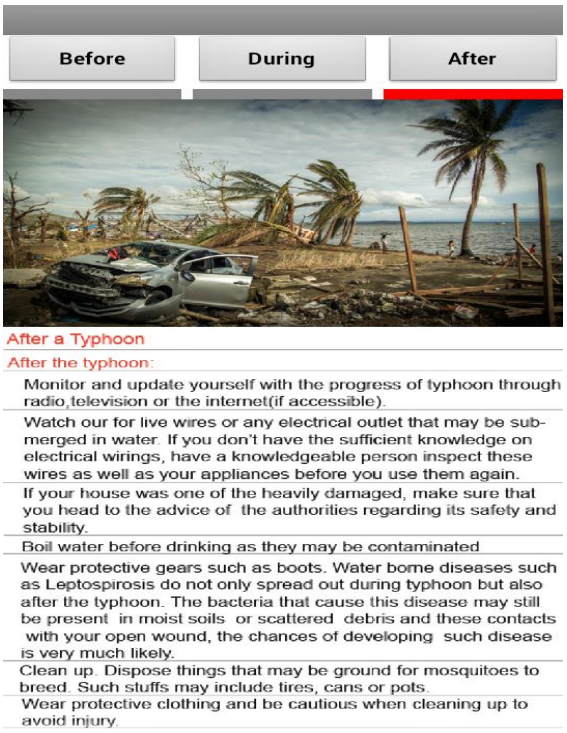


Figure 12. Before Typhoon

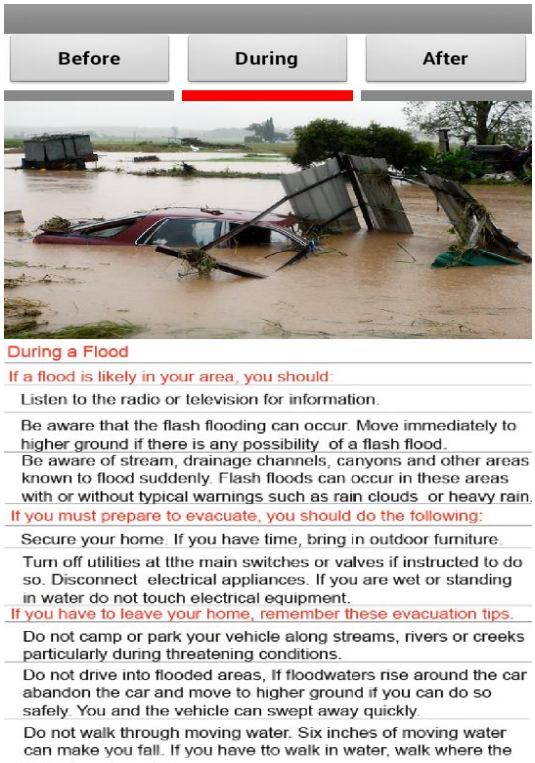
Included in this are the information on what to do Before Typhoon .



4. After Typhoon

Figure 13. During Typhoon

Included in this are the information on what to do During Typhoon .



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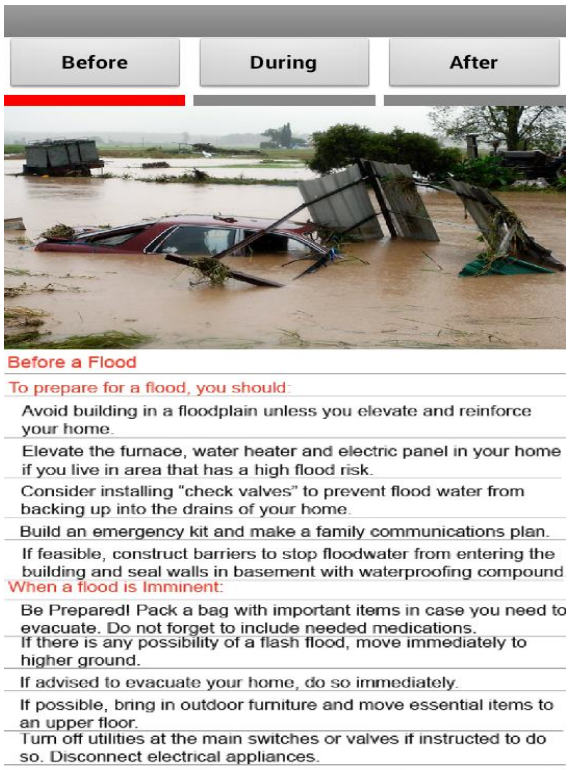

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Figure 16. During Flood

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Included in this are the information on what to do During Flood.

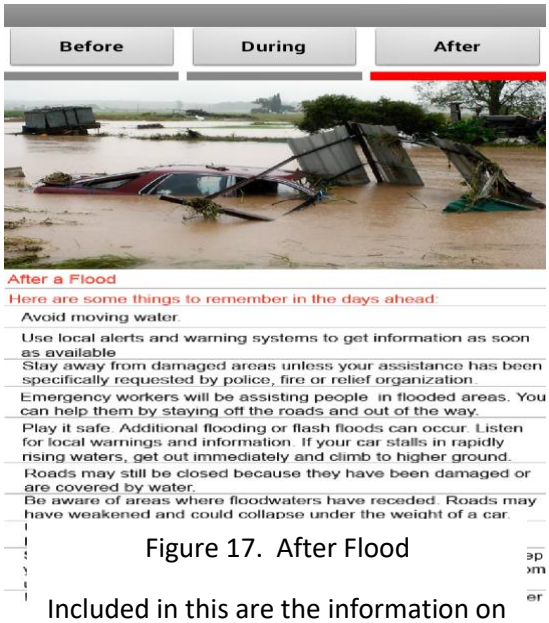

Figure 17. After Flood

Included in this are the information on what to do After Flood.

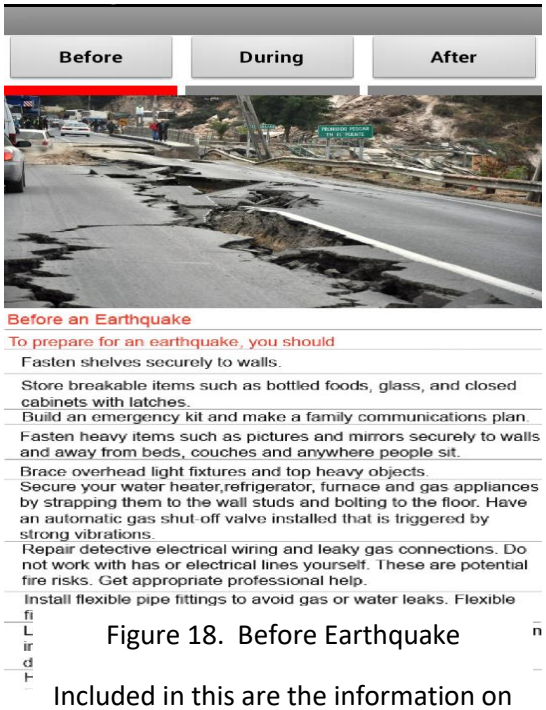

Figure 18. Before Earthquake

Included in this are the information on what to do Before Earthquake.

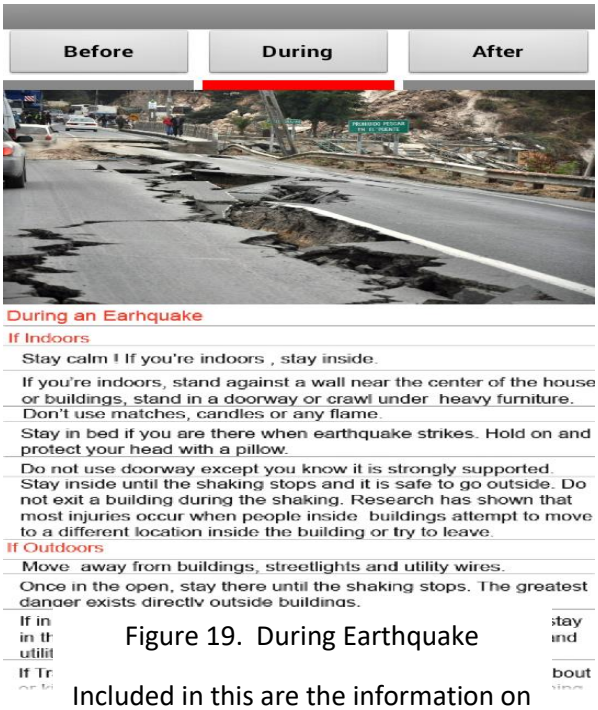

Figure 19. During Earthquake

Included in this are the information on what to do During Earthquake.

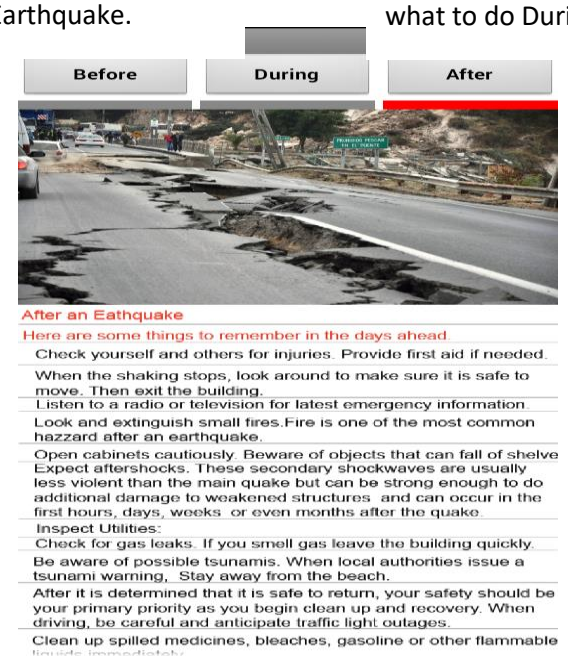

Figure 20. After Earthquake

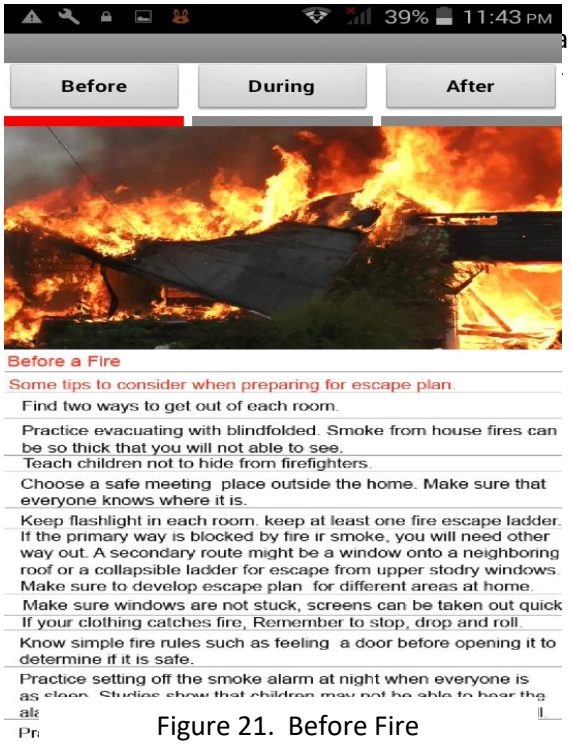

Figure 21. Before Fire

Included in this are the information on what to do Before Fire.

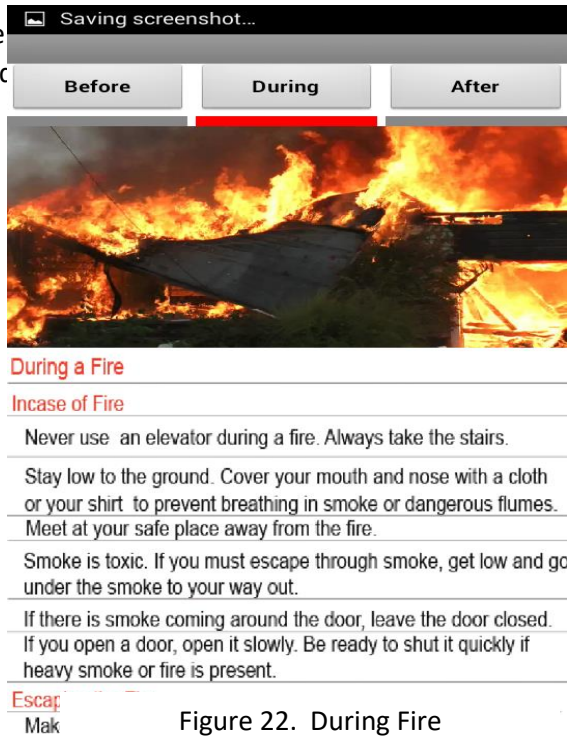

Figure 22. During Fire

Included in this are the information on what to do During Fire.

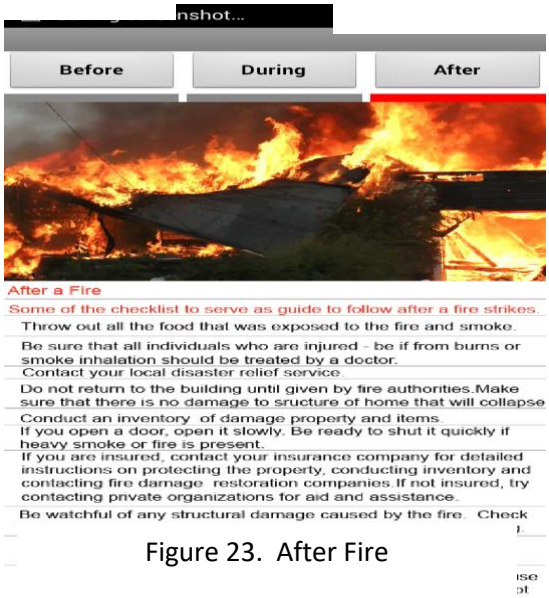

Figure 23. After Fire

Included in this are the information on what to do After Fire.

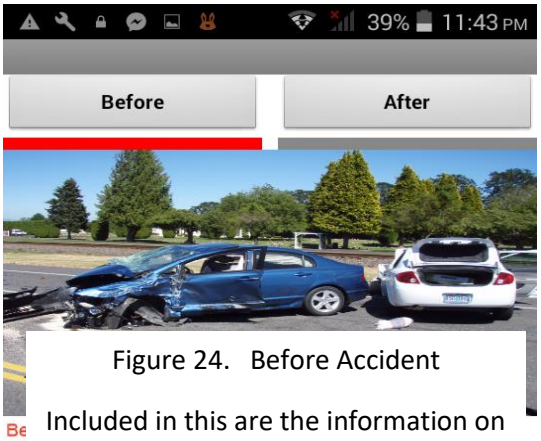

Figure 24. Before Accident

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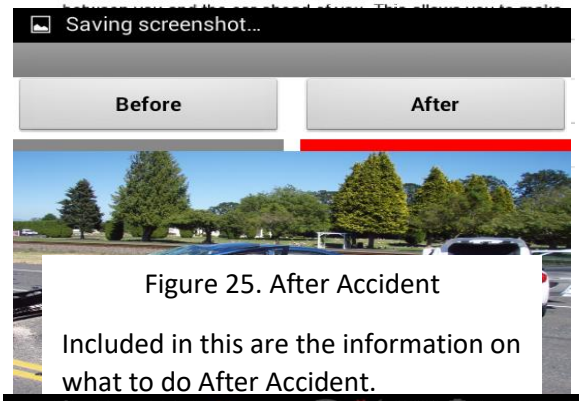
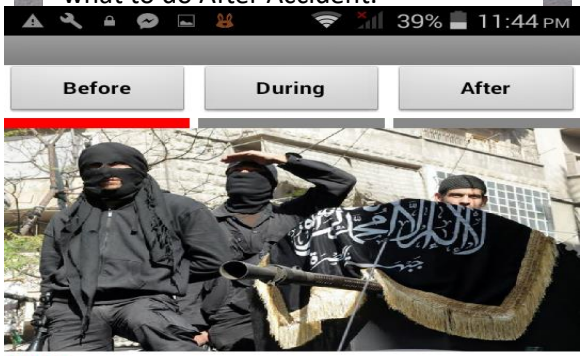


Figure 25. After Accident

Included in this are the information on what to do After Accident.



Before

Important things you can do to protect yourself in event of terrorism

Build an Emergency Supply Kit.Includes items like water,battery-powered,hand-crank radio,non-perishable foods.You may want to prepare a kit for your workplace.

Make a Family Emergency Plan. Your family may not be together when disaster strikes,so it is important to know how will you get back together and contact each other.Plan place where your family will meet. Know evacuation routes.

Find out from officials if any public buildings in your community have been designated as fallout shelters. If none have been designated, make your own list of potential shelters near your home,workplace and school.

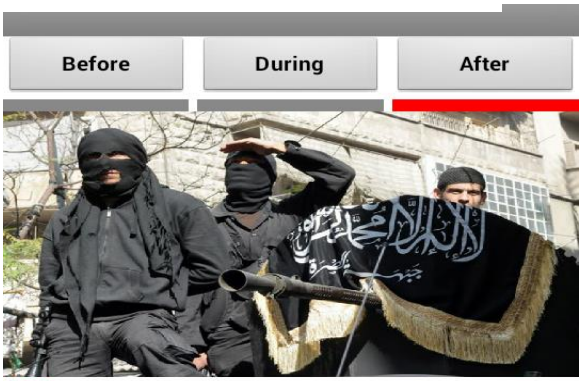
If you live in apartment building, talk to the manager about the safest building for sheltering and about providing for building occupants until it is safe to go out.

During periods of freightened threat increase your disaster supplies to be adequate for up to two weeks.

Taking shelter during a terrorist attack is absolutely necessary. There are two kinds of shelters: Blast Shelters are specifically constructed to offer some protection against blast pressure, heat and fire. Fallout Shelters do not need to be specially constructed for protecting against fallout. They can be any protected space

Figure 26. Before Terrorism

Included in this are the information on what to do Before Terrorism.



After

Here are some things to remembered in the days ahead:

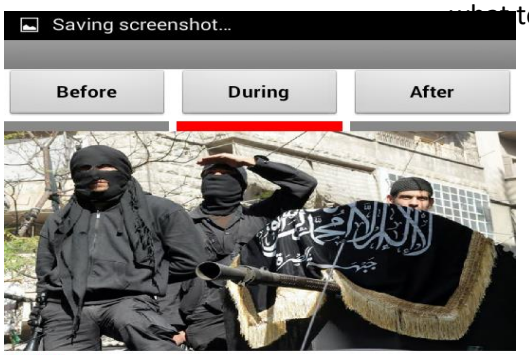
Decay rates of the radioactive fallout are the same for any size nuclear device. However,the amount of fallout will vary based on the size of the device and its proximity to the ground.Therefore, it might be necessary for those in the areas with the highest radiation levels to shelter for up to a month.

The heaviest fallout woul be limited to the area at or downwind from the explosion and 80 percent of the fallout would occur during the first 24 hours.

People in most of the areas that would b allowed to come out of shelter within a f evacuate to unaffected areas.

Figure 28. After Terr

Included in this are the info what to do After Terrorism



During

The following are guidelines for what to do in event of terrorism.

Listen for Official Information and follow the instructions provided by emergency response personnel. Based on what is known about the threat you may asked to take shelter and evacuate.

If an attack warning is issued, take cover as quickly as you can, below ground if possible, and stay there until instructed to do otherwise.

Find the nearest building, preferably built of brick or concrete and go inside to avoid any radioactive material outside.

If better shelter, such as multi-story building or basement can be reached within a few minutes go there immediately.

Go as far as below ground as possible or in the center of a tall building. The goal is to put as many walls and as much concrete, brick and soil between you and the radioactive material outside.

Radiation levels are extremely dangerous after a nuclear detonation but the levels reduce rapidly.

Expect to stay inside for at least 24 hours unless told otherwise by authorities.

People in the path of the radioactive material - downwind from detonation may also be asked to take protective measures.

what to do During Terrorism.

Figure 29. First Aid Menu

Menu for First Aid, user will read the guides on how to apply first aid for different minor injuries.

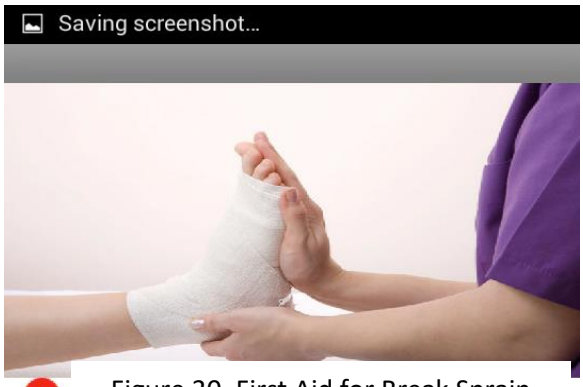


Figure 30. First Aid for Break Sprain

Included in here are the First Aid Guide for Break Sprain.

Figure 31. First Aid for Burns

Included in here are the First Aid Guide for Burns.

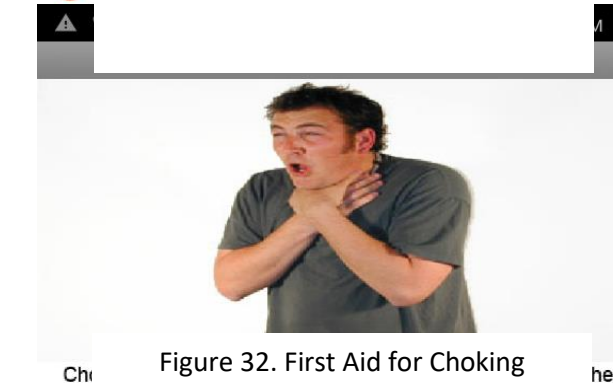
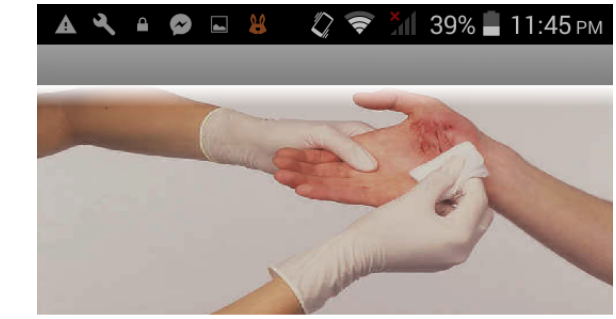
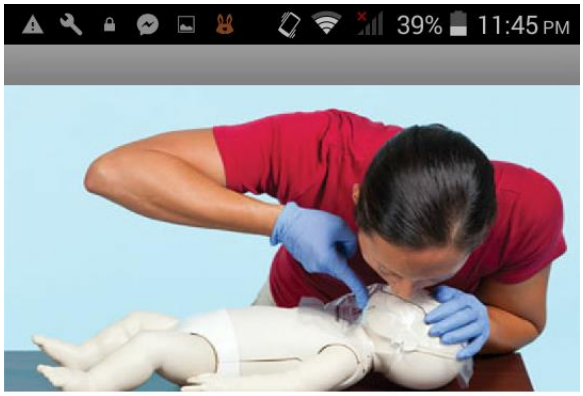


Figure 32. First Aid for Choking

Included in here are the First Aid Guide for Choking.





1 Check Response.

Can you hear me? Open your eyes. What's your name? Squeeze my hand.

2 Establish an Airway.

Support the jaw and tilt the head. if you see fluid or any objects, turn the person onto their side and clear.

3 Check for breathing.

Look at the chest. Listen for air escaping. Feel for air escaping and chest rising.

4 If no breathing.

Give two rescue breaths.

4 Call for help.

Figure 33. First Aid for Cuts and Wounds

Included in here are the First Aid Guide for Cuts and Wounds.

Figure 34. First Aid for CPR

Included in here are the First Aid

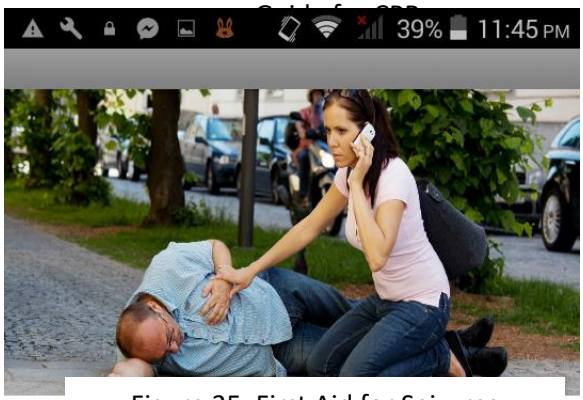


Figure 35. First Aid for Seizures

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Included in here are the First Aid Guide for Seizures.

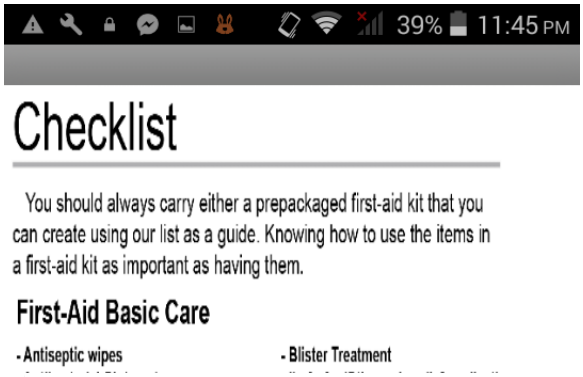

Figure 36. First Aid Checklist

Included in here are the First Aid Checklist, it is the list of materials that will use in different mind

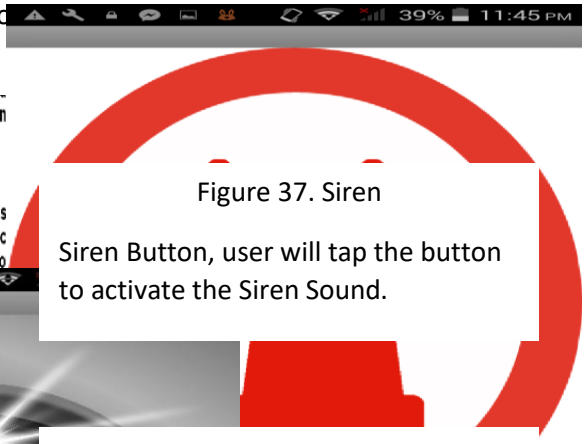

Figure 37. Siren

Siren Button, user will tap the button to activate the Siren Sound.

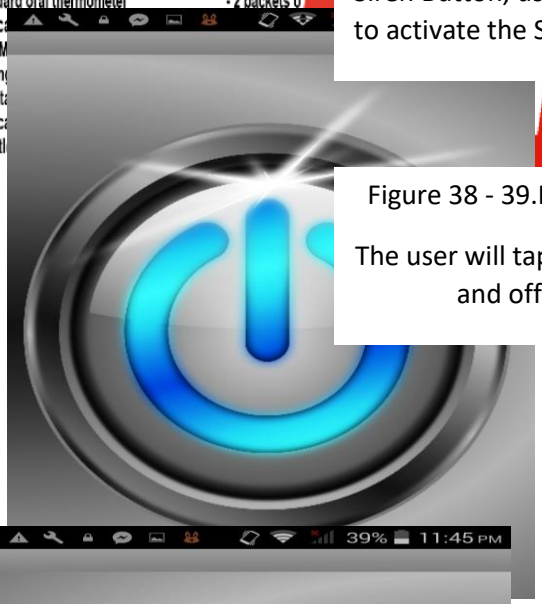

Figure 38 - 39.Flashlight ON and OFF

The user will tap the button to turn on and off the flashlight.

5.0 S
REC

5.1Summary

The capstone entitled “PEFA” is a mobile application that provide information on how to deal with different disasters and can be use as a First Aid guide for common types of injuries. This mobile application is only applicable for Android Phone users and doesn’t require Wi-Fi connection.

The mobile application also have a tool that can be use in times of disaster such as siren sounds and flashlight.

For the creation of this mobile application, the researchers used Android Studio and Java as the programming language.

5.2 Conclusions

This study entitled “PEFA” is a mobile application that provide information how to deal with the different disasters and can be use as a First Aid guide for common types of injuries. This mobile application is only applicable for those Android Phone users and doesn’t require Wi-Fi connection.

The mobile application also have a tool that can be use in times of disaster such as siren sounds and flashlight.

For the creation of this mobile application, the researchers used Android Studio and Java as the programming language.

5.3 Recommendations

This mobile application is recommended to all who are intersted to gain more knowledge about disaster preparedness and learn on how to apply basic First Aid for common types of injuries.

This application can also be a reference for other future researcher in developing their mobile application project. The application should also expand its compatibility. Furthermore it is also recommended to further enhance the design and functionality of the said mobile application.

APPENDICES

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