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## Mobile Application for Incident Reporting

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**Abstract**— In the Philippines, reporting an incident always depends on self-reporting to the nearest law enforcer's office or calling a channel using a mobile phone. 911 is the National Emergency hotline to get assistance when an emergency occurs. However, the emergency hotline operated by the Emergency Network Philippines (ENP), cannot retrieve the reporter's location details immediately. Only when the reporters describe the exact location clearly. Yet, many circumstances that the reporters do not know when they are, or sometimes they have imprecise position information. Then, the law enforcers team may not be able to come to the right place efficiently on time. The incident reporting application incorporates the three types of incidents, classified as public disturbance, ordinance violation, and crime incident. To report an incident the application will automatically get the latitude and longitude of the mobile user or an option to manually pinned the location on the google map include also the incident type, description, and photos will be sent to the nearest barangay responder officer. The barangay responder officer able to request a backup officer, the rescue emergency unit such as a hospital ambulance or firefighters, or transfer a report to the nearest police station. The system also manages web admin for responder locations and generates statistical reports including charts and graphs. The positive feedback of the participants during the evaluation stage signifies that the application was accepted as tested and verified by the evaluation results.

**Keywords**— Incident; crime incident; public disturbance; ordinance violation; reporting application; Android application.

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### I. INTRODUCTION

Crime incidents are a significant concern of public safety [1]. 911 and 8888 emergency number launched in the Philippines to respond to the disaster and emergency like a fire, typhoon, terrorist attack, civil disturbance, vehicular accidents, and the like. Reporting an incident will help people coordinate where an incident happened in society. It encourages a witness or a victim of the crime to bring the offender to justice and make sure that it would not happen to anyone else through reporting. The most basic form of public communication with the police is through calls for service [2]. Law enforcement officers are in charge of handling criminal reports. They collect evidence that would help strengthen the filed case. Seeking concrete evidence is a very tedious task. It entails being able to gather witnesses that would support the victim's claim.

With the increasing records of crime filed in police stations, law enforcement officers have difficulty finding the perpetrators. According to the Philippine Statistics Authority (PSA), as of 2019, there are 520,389 total reported crimes [3]. Still, behind these numbers are numerous unreported cases.

There are various causes why people hesitant to report a crime to the law enforcer. Reference [4] argues that non-reporting is the result of three factors acting singly or in concert: (a) victim fear, (b) feelings of helplessness and the perceived powerlessness of police, and (c) the threat of further victimization from authorities.

With the advancement of technology, these numbers would significantly decrease. Mobile phones and tablets, in the form of smart devices, are becoming increasingly common around the world, particularly in densely populated urban areas [5]. To promote cooperation, the use of smart apps in Crime Reporting appears to be a simple and efficient way to engage people [6]. Police enforcement officers are now conducting their investigation and acquiring evidence with the use of technology. They use different technology like mobile applications, Global Positioning System (GPS), web application, and the like.

To further assist the law enforcement officers, the developed reporting tool should be reliable, efficient, and transparent [7]. With the several incident reporting technologies that used GPS in mobile devices, this study focused on the system development application for incident community-based tools, and public safety awareness. It primarily aimed to provide a real-time reporting platform for

a citizen to submit reports with evidence. The Incident reporting features are submission of report details with photo and auto-detect user GPS location, allows multiple reporting, allows backup reports, and generates statistical reports.

#### A. Literature Review

Mobile phones, particularly in their current "smartphone" generation, have become a regular necessity for billions of users around the globe [8]. The millennial society today has produced a variety of gadgets, one of which is the quickly upgrading technology that makes life easy through smartphones and computers. The security audit deals with a smartphone application that enables people to report criminal or suspicious activities around them safely but quickly and easily by submitting a message and multimedia data to the authorities [9]. The widespread use of technology has produced an opportunity and broad innovations in creating different applications to serve the needs and desires of every netizen. Today's generation has opened the doors of opportunity in terms of technology to help society find a solution to the problem.

A crime is an evil action that is against the law of the State and has a corresponding punishment to the person who commits the illegal action. Reference [10] stated that from the Ancient Greeks there is a science of physiognomy that studies the facial features of the person to reveal one's character. Hence, the person who committed the crime has a certain distinct characteristic to assess if the person is more likely to commit crimes than others. Furthermore, crime is described differently in diverse society based on what the social norm is. So, the crime is also based on what the majority disapproved in the society [11].

Reference [12] stressed the classification of offense that has distinction among "male in se", "mala prohibia" and crime. To put it differently "male in se" is an act that was wrong by nature while the "mala prohibia" is based on an act that was wrong in state and lastly the crime describe a violation of the criminal law. A criminal law was prohibited by the government for the safety of the public. Some of the offenses of "male in se" are murder, robbery, rape, and arson; while in "mala prohibia" is an offense like counterfeiting [13].

Crime reporting is the collaboration of everyone, such as police, victims, witnesses, and the community. The police officer is the major in-charge in implementing the law, finding a crime, identifying the defendant, and gathering evidence on a particular case. The influence of poor recording methods and low reporting has on the state's failure to police 'race' hatred in that it cannot shape efficient, evidence-based policies that could lead to a substantive challenge to racism [14]. Police facing a challenging environment today even the small and possibly temporary variation in the investigation workload could be detrimental to clearance [15]. Furthermore, the victims, witnesses, and the people in the society can cooperate in reporting crime-related activities.

1) *Reporting a dispute or conflict with the Barangay:* The Barangay is the smallest unit of the political sector in the Philippines. It has two alternative community-based mechanisms to solve the conflict or dispute among members of the same community: *Katarungang Pambarangay* (KP) and Barangay Justice System (BJS). The KP and BJS serve as

the peacemaker of disputing parties. The process of complaint starts in filing the case to the Barangay officials and the Barangay Chairman assists the mediation process. Both parties will give time to explain their sentiments, if no settlement happens, conciliation is the next step to be done. The conciliation is composed of the three members of the barangay that are selected by the parties. Thus, conciliation listens to the sentiments of both parties and explores the potential amicable settlement. The amicable settlement implies the final judgment of a court. Moreover, arbitration is an agreement of both parties in writing to abide by the arbitration given by Barangay Officials [16].

According to reference [17], there are other rules that citizens should be aware of and observe in addition to the Philippine Constitution. The ordinance will be passed down from the local government to the *Sanguniang Panlalawigan*, *Sanguniang Bayan*, and *Sanguniang Barangay* levels. The law is divided into five categories: loyalty to the country; peace, and order; family stability and security; health and physical well-being; and cleanliness, environmental protection, and natural resource conservation.

- Loyalty to the country protects against abuse of power, rebellion against the government, tax evasion, corruption, such as the illegal use of government funds, and any other form of dishonesty by government officials.
- Peace and Order refers to the safeguarding of human life and property.
- Family stability and security is a defense against all types of violence, including physical, mental, emotional, and financial.
- Health and physical well-being serve as a deterrent to the use of illicit drugs and the spread of infectious diseases.
- Cleanliness, Environmental Protection, and Natural Resource Conservation are protections against contamination of natural resources such as illegal logging, mining, and fishing.

2) *Reporting a Crime to the Police:* The Philippine National Police (PNP) Crime Incident Recording System (CIRS) was established by the Directorate for Investigation and Detective Management (DIDM). The purpose of the system is to incorporate the standard procedure of recording crime incidents [18]. The system records victim information, suspects, and narrative details.

Policy aspects include the recognition of public police encounters as 'teachable moments' and possible sources of police morale and credibility enhancement [19]. It argued that this operation needs to be situated in the relation to other support providers in the federal, private and charitable industries, in particular the welfare state [20].

Fig. 1 presents the flow and procedure to report to PNP. First, the police officer will get a report from a victim or witness. Based on the criminal law, the police will determine if the reported information is a crime or not. Second, if the reported incident is a crime, the desk officer will endorse to duty investigator, and the complaint recorded to CIRS. Third, they review the correctness of information before printing the Incident Record Form (IRF). Fourth is the signing of the IRF of both the duty investigator and the complainant. And lastly,

the complainant must secure a copy of the IRF for future reference.



Fig. 1 A friendly advisory from the Philippine National Police

## II. MATERIALS AND METHOD

### A. System Development Model

The Incident reporting project was developed using the agile methodology. It is the best solution to software development in the public sector [21]. With continuous iteration, Agile facilitates fast responses towards changes through using continuous planning, requirement analysis, designing, building, and testing to produce a software solution.

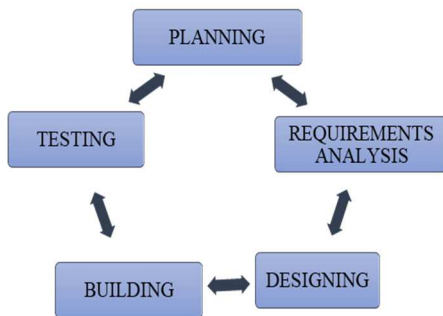


Fig. 2 Agile methodology

The diagram in Fig. 2, illustrates the sequence of the activities for the project development. The study used the Agile Model with five iterative stages namely planning, requirements analyzing, designing, building, and testing.

1) *Planning*: This stage determined the problem needed to be solved using an application as well as the simultaneous data gathering procedures. Meetings and interviews with the barangay and police officers or personnel, selected netizens, and other stakeholders were conducted. The objectives, expectations, and needs were identified for the project and the primary functionalities were presented to the stakeholders for suggestions and improvements.

2) *Requirements*: The detailed information from planning were divided into distinct issues and sub-problems for the possible requirements to be easily identified and understood. Gathered data from the barangay and police officials and personnel, especially policy rules were tabulated for analysis and then related to the study being conducted. Administrative functions, as well as the authentication being implemented and the desired state, were also conducted. Authorization levels were created which served as the pattern of notification. In addition, reporting processes were also asked that served as a guide for the reporting requirements of the system. This determined the feasibility of the project.

3) *Design*: After the planning and requirements analysis stages, each component of the system was designed. This includes the interface diagram and the use case diagram in the project design that were validated against the system requirement specifications. In addition, the database, software, and hardware specifications were all created based on the information that needed to be processed. The system architecture design adopted for the project used Google application and cloud architecture for the system.

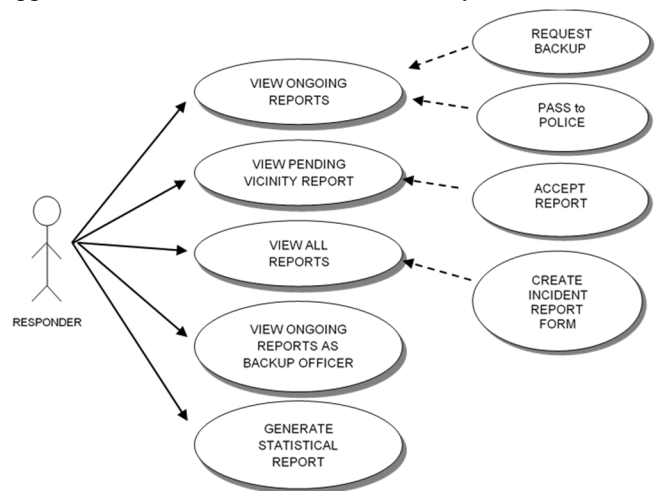


Fig. 3 Use case diagram of responder application

As shown in Fig. 3, full access to the modules of the application is accessed by the responder based on their user account level. The user accounts for the investigator-on-case, the police chief is allowed to access all modules; while the police personnel, police outpost, barangay captain, *barangay tanod*, have no access to view all reports, statistics report, and creating incident record form. However, the barangay captain and *barangay tanod* have an access to pass to the police. The user account for the hospital and fire station are allowed to view the pending vicinity report and view the ongoing report as a backup officer only. Entire respondents can request hospital and fire station as a backup.

The use case diagram for the reporter application is shown in Fig. 4. The reporter refers to those information providers in the application who have an account in the system and have reported crime incidents in the community. They can access the Reporting application with the following modules: my reports, submit a report, and navigation menu drawer. They are also allowed to display the reported incidents, submit incidents, and view the application setting in the menu drawer. The reporter report will be submitted to the nearest barangay station, and for incident assessment,

the barangay responder can be passed to the assigned police station.

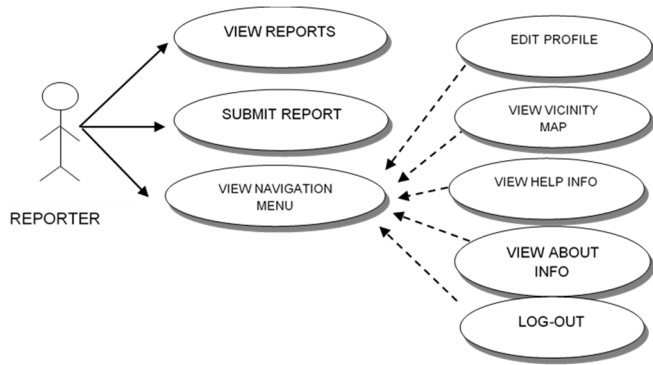


Fig. 4 Use case diagram of reporter application

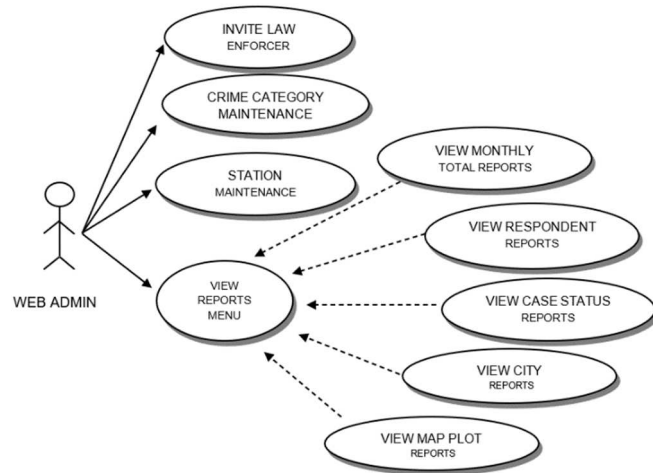


Fig. 5 Use case diagram of incident reporting website

The web administrator's use case diagram for maintaining privacy and confidentiality in incident documentation is shown in Fig. 5 [22]. This user is assigned to add a law enforcer, add crime a category, assign a station, and view statistical reports. The addition of a law enforcer needs a valid Google account to verify the email account. The user can add, edit, erase, and change incident types while maintaining the crime category. With a station maintenance setting, the admin can link the barangay station to the police station to set the boundaries of a specific police station. On the other hand, the admin can view all the reports and can filter and generate accordingly.

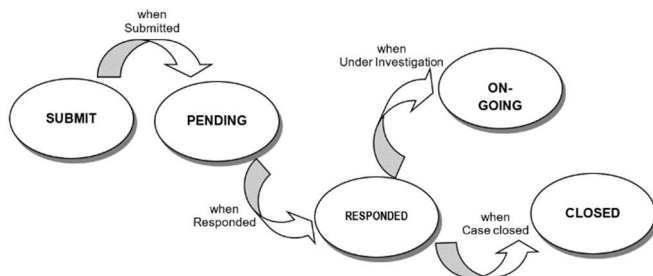


Fig. 6 Report status diagram

Fig. 6 displays the status diagram of the reports. This shows the different statuses assigned to the submitted reports. Below are the descriptions of the different status:

- Pending is the initial status of the submitted report. This means that the report is still pending and waiting for the response of the nearest law enforcer.
- Responded is the status of the report when it is responded by the law enforcer. This means that the information reported is in a process of validation and will undertake the necessary actions to resolve it.
- On-going is the status of the report when it is under the investigation of the law enforcer. This means that the information contained in the report is either incomplete in IRF.
- Closed is the status when the report is closed by the assigned law enforcer. This means that the reported incident is resolved based on the investigation result.

4) *Building*: This is also known as the coding phase. The system was developed using the Java programming language, Android Studio, Firebase, XML, and HTML. Java, XML, and HTML were used for the source code of the mobile application, Android Studio as the integrated development environment, and Google Maps for viewing the location. Modules of the system were developed through the programming of the functions of the system. Also, debugging and alpha testing were conducted to lessen the error encountered.

5) *Testing*: System testing was conducted after the development. All the components of the system were checked to look for possible errors and inconsistencies. The functionality, portability, and reliability of the information in the Android application and website were all tested. Delivery of the working product after these stages was done to assess the intended users' satisfaction and to get feedback. The process was then started again to address the suggestions of the respondents. Functional testing was conducted during this phase.

### B. Evaluation Procedure

The study adopted the ISO 25010 model as a software evaluation instrument. It was evaluated using the given evaluation instrument by the selected 30 respondents including 10 end users, seven IT instructors, three Android programmers, five barangay officials, and five police officers.

- Invited the participants.
- Conducted a project demonstration to the participants.
- Allowed respondents to explore and use the system.
- Distributed the copies of the evaluation instrument using the ISO 25010 model to the participants.
- Requested the participants to rate the application using the Likert Scale. The evaluation formation rate from 1 to 5, with 5 is the highest and 1 is the lowest.
- Totaled the points and calculated the mean of each criterion as well as the overall mean.
- Used the equivalent descriptive rating in Table 1 to interpret the data.

TABLE I  
DESCRIPTIVE INTERPRETATION OF THE MEAN

Numerical scale	Interpretation
4.51 – 5.00	Excellent
3.51 – 4.50	Very Good
2.51 – 3.50	Good
1.51 – 2.50	Fair
1.00 – 1.50	Poor

### III. RESULTS AND DISCUSSION

The Reporting application used the agile model for the development because it described the collaborative effort of the developer and the end-users. It's also concerned with adapting quickly to change and continuing to develop. It made it easier for the user to use the application and produced accurate data. During the planning phase, data was gathered and the problem was identified through interviews with concerned units such as barangay and police personnel, as well as residents or netizens, with a focus on the crime reporting and response process. The requirements analysis phase provided functional specifications of the application that helps the law enforcer to promote public safety, designing, and building phases employed user experience design that focuses on the information architecture and workflows of features, and testing phase focused on the investigation to be ready for implementation.

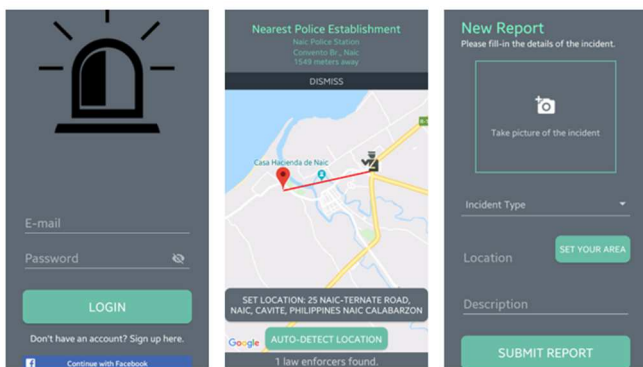


Fig. 7 Reporting application features

Fig. 7 shows the reporting process of the application. The application will automatically locate the nearest law enforcer station through the phone's GPS of the user or has an option to change the current area on the map.



Fig. 8 Responder application features

Fig. 8 shows the responding process of the application. The application will receive a notification from the reporter and respond immediately. It has features to request for the back-up responder (an officer within the station, the hospital for call ambulance, fire station, police station) can generate Incident Form Data, incident percentage, and incident map plot report.

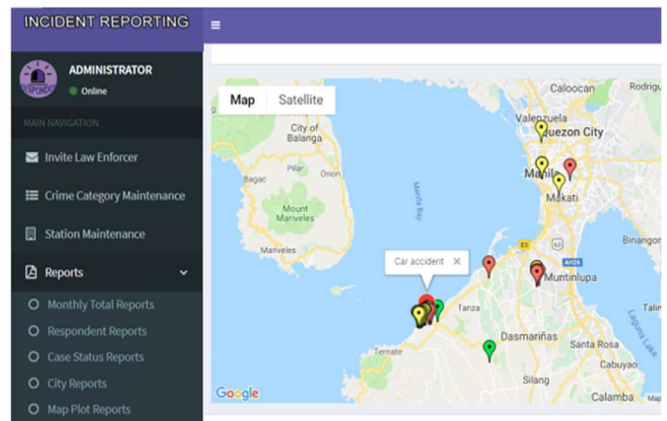


Fig. 9 Web-backend application features

Fig. 9 represents the application's website back-end features. Different types of statistical reports, such as monthly total reports, respondent reports, case status reports, city reports, map plot reports, and other data management settings, can be generated by the application.

#### A. Test case Results

The results of the developer's software functionality testing are shown in Table 2. It indicates that the application was tested in accordance with the provided functionality scenarios by the developer.

TABLE II  
TEST CASE RESULTS

No	Functionality	Test Case ID	Status	Details
<b>Reporting Application</b>				
1	Run the application	TC-001	Passed	User running the Application properly
2	Log-in to the application	TC-002	Passed	Log the registered account
3	Register to the application	TC-003	Passed	Accomplished the registration information
4	Send verification email	TC-004	Passed	Received the invited user verification message
5	Facebook registration	TC-005	Passed	Logged-in using Facebook account
6	Display Navigation drawer	TC-006	Passed	Displayed the navigation drawer and performed the action properly
7	Upload the report	TC-007	Passed	Send the report to the application
8	Check the status of the report	TC-008	Passed	Displayed the status of the report
<b>Responder Application</b>				
1	Login to the application	TC-009	Passed	Logged the account registered
2	Display the menu	TC-010	Passed	Displayed the main menu and the navigation drawer
3	Invite new responder	TC-011	Passed	Received the verification email
4	Click the verification link	TC-012	Passed	Verified the verification link from the application

#### IV. CONCLUSION

The following conclusions were made based on the study's objectives and findings: The following features was successfully designed into the application: real-time reporting platform to engage citizens or netizens to submit crime or incident reports with photos to be coordinated to the nearest responders through GPS; immediate response and updates from the responsible units, particularly the barangay and police personnel and officials as responders to the reported incident or crime; and generation of incident reports. The application was made with Android Studio for the overall development, Adobe Photoshop CS6 for the design, Google Firebase for the database, and Google Map for displaying and locating the nearest police station in the area. The application was carefully tested and proved that the functionality, portability, and reliability of the application software are working properly. Respondents rated the application software as excellent in five of the ISO 25010 evaluation criteria, including usability, reliability, performance, portability, and compatibility, as well as very good in terms of functionality.

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#### REFERENCES

- [1] J. Wu, and V. Frias-Martinez, "An analysis of the relationship between crime incidents and 911 calls," in *Proceedings of the Association for Information Science and Technology*, Vancouver, Canada, 2019, pp. 933-935.
- [2] P. J. Brantingham, and C. D. Uchida, "Public cooperation and the police: Do calls-for-service increase after homicides?," *Journal of Criminal Justice*, vol. 73, 101785, 2021, DOI: 10.1016/j.jcrimjus.2021.101785.
- [3] Philippine Statistics Authority, "2019 Philippines in Figures", Mar. 10, 2021. [Online]. Available: [https://psa.gov.ph/sites/default/files/PIF2019\\_revised.pdf](https://psa.gov.ph/sites/default/files/PIF2019_revised.pdf).
- [4] R. Kidd, and E. Chayet, "Why Do Victims Fail to Report? The Psychology of Criminal Victimization," *Journal of Social Issues*, vol. 40, pp. 39-50, April 2010. Accessed on: March, 10, 2021, DOI: 10.1111/j.1540-4560.1984.tb01081.x.
- [5] A. Qureshi, V. Garcia-Font, H. Rifà-Pous, and D. Megías, "Collaborative and efficient privacy-preserving critical incident management system," *Expert Systems with Applications*, vol. 163, 113727, January 2021. Accessed on: March, 10, 2021, DOI: 10.1016/j.eswa.2020.113727.
- [6] C. Charitou, D. G. Kogias, S. E. Polykalas, C. Z. Patrikakis, I. C. Cotoi, "Use of Apps for Crime Reporting and the EU General Data Protection Regulation In: Leventakis G., Haberfeld M. (eds)," *Societal Implications of Community-Oriented Policing and Technology. SpringerBriefs in Criminology*, Springer, Cham, pp. 55-61, April 2018. Accessed on: March, 10, 2021, DOI: 10.1007/978-3-319-89297-9\_7.
- [7] B. Yulianto, and Setiono, "Android-based parking violation reporting application," *The 5th International Conference on Industrial, Mechanical, Electrical, and Chemical Engineering 2019 (ICIMECE 2019)*, April 2020. Accessed on: March, 10, 2021, DOI:10.1063/5.0000626.
- [8] S. E. Polykalas, G. N. Prezerakos, F. D. Chrysidou and E. D. Pylarinou, "Mobile apps and data privacy: When the service is free, the product is your data," *2017 8th International Conference on Information, Intelligence, Systems & Applications (IISA)*, Larnaca,

5	Receive notification	TC-013	Passed	Received report within the jurisdiction of the law enforcer
6	View ongoing report	TC-014	Passed	Viewed the list of the ongoing reports
7	Request Back-up	TC-015	Passed	Requested to the backup report
8	Receive Back-up notification	TC-016	Passed	Received the Back-up notification
9	Display all reports	TC-017	Passed	Displayed the Report List
10	Generate Statistics report	TC-018	Passed	Generated Statistic reports
<b>Incident Responder Website</b>				
1	Browse the website	TC-019	Passed	Admin logged in the website
2	Invite the new responder	TC-020	Passed	Invited the email address of the responder
3	Create new station	TC-021	Passed	Created new station
4	Generate Monthly Report	TC-022	Passed	Generated Monthly reports
5	Generate Respondent Report	TC-023	Passed	Generated Respondent reports
6	Generate Case Status Report	TC-024	Passed	Generated Case Status reports
7	Generate City Report	TC-025	Passed	Generated City reports
8	Generate Plot Map Report	TC-026	Passed	Generated Plot Map Report

#### B. Evaluation Results

Moreover, the performance of the application was evaluated based on ISO 25010. Functionality, usability, reliability, efficiency, portability, and compatibility are all factors to consider. Ten end users, five police officers, five barangay officials, seven IT instructors, and three Android programmers were among the 30 people who tested the system.

TABLE III  
QUALITATIVE INTERPRETATION OF RESPONDENTS' RATING OF THE APPLICATION

Criteria	Mean	Qualitative Interpretation
1. Functionality	4.47	Very Good
2. Usability	4.54	Excellent
3. Reliability	4.61	Excellent
4. Efficiency	4.73	Excellent
5. Portability	4.67	Excellent
6. Compatibility	4.63	Excellent
<b>Overall Mean</b>	<b>4.61</b>	<b>Excellent</b>

\* Range of values: 4.51 – 5.00 = Excellent; 3.51 – 4.50 = Very Good; 2.51 – 3.50 = Good; 1.51 – 2.50 = Fair; 1.00 – 1.50 = Poor

Table 3 summarizes the results, displaying the mean for each criterion as well as the qualitative interpretation. The total mean obtained by averaging the means of the six parameters is also shown in the table.

- Cyprus, pp. 1-5, August 2017. Accessed on: March, 10, 2021, DOI: 10.1109/IISA.2017.8316392.
- [9] M. Dawson, P. Taveras, and C. Detel, "Assessment of National Crime Reporting System: Detailed Analysis of the Mobile Application. In: Latifi S. (eds)," *17th International Conference on Information Technology--New Generations (ITNG 2020). Advances in Intelligent Systems and Computing*, vol. 1134, pp. 65-71, May, 2020. Accessed on: March, 10, 2021, DOI: [https://doi.org/10.1007/978-3-030-43020-7\\_10](https://doi.org/10.1007/978-3-030-43020-7_10).
- [10] D. Kindersley, "The Crime Book: Big Ideas Simply Explained," New York, DK Publishing, 2017.
- [11] L. Grant, "What Is Crime?," GRIN Verlag, 2011.
- [12] M. J. Lynch, P. B. Stretesky, and M. A. Long, "Defining Crime: A Critique of the Concept and Its Implication," New York, Palgrave Macmillan, 2015.
- [13] E. C. Carter III, "Criminal Law and Procedure for the Paralegal-Second edition," New York, Wolters Kluwer, 2016.
- [14] J. Carr, "Recording and Reporting Racist Hate Crime: Police and Civil Society Responses," In: *Haynes A., Schweppe J., Taylor S. (eds) Critical Perspectives on Hate Crime*, Palgrave Hate Studies, Palgrave Macmillan, London, 2017, pp. 369-391. Accessed on: March, 10, 2021, DOI: [https://doi.org/10.1057/978-1-137-52667-0\\_20](https://doi.org/10.1057/978-1-137-52667-0_20).
- [15] A. Roberts, J.M. Roberts, "Crime Clearance and Temporal Variation in Police Investigative Workload," *Evidence from National Incident-Based Reporting System (NIBRS) Data*. *J Quant Criminol*, vol. 32, pp. 651-674, 2016. Accessed on: March, 10, 2021, DOI: <https://doi.org/10.1007/s10940-015-9270-9>.
- [16] M. Manuel, and M. Vigo, "Katarungang Pambarangay," A handbook, Manila Philippines, SALIGAN & LGSP, 2014.
- [17] H. O. Pontigon, S. T. Ching, and A. C. Sunga, "The Filipino Moving Onward 3' (2007 ed.)". Manila, Philippines, REX Printing Company Inc., 2007.
- [18] RPCRD (2014). *Reporting a Crime to the PNP*. available: <http://pro9.pnp.gov.ph/index.php/programs-and-policies/announcements/226-reporting-a-crime-to-pnp>.
- [19] T. Oliveira, J. Jackson, K. Murphy, and B. Bradford, "Are Trustworthiness and Legitimacy 'Hard to Win, Easy to Lose'? A Longitudinal Test of the Asymmetry Thesis of Police-Citizen Contact," *Journal of Quantitative Criminology*, 2020. Accessed on: March, 10, 2021, DOI: 10.1007/s10940-020-09478-2.
- [20] C. Crowther, "The Police Policy Process in Modern Society," In: *Campling J. (eds) Policing Urban Poverty*, Palgrave Macmillan, London, 2000. Accessed on: March, 10, 2021, DOI: [https://doi.org/10.1057/9780230509269\\_6](https://doi.org/10.1057/9780230509269_6).
- [21] A. Ribeiro, and L. Domingues, "Acceptance of an agile methodology in the public sector," *Procedia Computer Science*, vol. 138, pp. 621-629, 2018. Accessed on: March, 10, 2021, DOI: 10.1016/j.procs.2018.10.083.
- [22] C. Chatzigeorgiou, L. Toumanidis, D. Kogias, C. Patrikakis and E. Jacksch, "A communication gateway architecture for ensuring privacy and confidentiality in incident reporting," *2017 IEEE 15th International Conference on Software Engineering Research, Management and Applications (SERA)*, London, pp. 407-411, 2017. Accessed on: March, 10, 2021, DOI: 10.1109/SERA.2017.7965759.