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Web-Based Report Management System with Incident Mapping: VAWC Cases

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Abstract: The Web-Based Report Management System with Incident Mapping: VAWC Cases was developed to assist organizations in managing and addressing Violence Against Women and Children (VAWC) cases effectively in Barangay Mandalagan. The Web-Based Report Management System with Incident Mapping: VAWC Cases simplifies the reporting process, secures case records, and provides real-time visual incident mapping to enhance response and decision-making. Key features include incident reporting, monitoring, and analysis with remarks; incident reporting using geo-mapping; descriptive and trend analysis; automated report generation; email notifications; and a maintenance logging system with detailed summaries. The agile Development Methodology was employed, encompassing the stages of planning, design, implementation, testing, maintenance, and deployment. Usability and reliability testing were conducted using the Post-Study System Usability Questionnaire (PSSUQ) for end -users and ISO 25010:2011 for IT experts. This involved stakeholders such as the VAWC Staff, the Barangay Captain, and the IT experts. The system's technical features achieved 100% pass rate, indicating successful validation. PSSUQ results demonstrated high usability, with an overall mean score of 1.97. The system was also evaluated using the ISO 25010:2011, with an overall mean score of 4.58, indicating very effective system functionality. The system contributes to a more efficient, accurate, and accessible approach to handling VAWC cases, promoting safety and advocacy for victims.

Keywords: Automated Classification, Case Documentation, Incident Mapping, Usability Testing, Violence Against Women and Children.

INTRODUCTION

Violence against women and children (VAWC) is a critical issue that affects countless individuals globally. This form of violence includes physical, emotional, and sexual abuse, and it has profound impacts on the victims and society at large. According to the World Health Organization (WHO), one in three women worldwide has experienced physical or sexual violence in their lifetime (WHO, 2021). This alarming statistic highlights the urgent need for an effective intervention to prevent and respond to VAWC. In the Philippines, VAWC remains a significant public health and social issue. Reports from the Philippine National Demographic and Health Survey (NDHS) indicate that a considerable number of women have suffered from violence. The Philippine Statistics

Authority (PSA) documented a 63% increase in reported VAWC cases from 2018 to 2021 (PSA, 2021). Furthermore, the Philippine Commission on Women (PCW) notes that many incidents go unreported due to fear, stigma, and lack of awareness (PCW, 2021). These findings suggest that the actual prevalence of VAWC may be higher than reported figures indicate. Despite the extensive research on VAWC at the national level, there is a noticeable gap in localized studies focusing on smaller communities, such as Barangay Mandalagan. Most existing literature provides a broad overview, which may not adequately address specific barangays' unique challenges and dynamics. This gap in research hinders the development of targeted interventions tailored to the needs of these communities.

The study aimed to assess the prevalence of VAWC in Barangay Mandalagan and evaluate the community's response to these incidents. By collecting and analyzing data on reported cases, the study seeks to provide a comprehensive overview of the extent of VAWC in the barangay. Additionally, it assessed the effectiveness of local interventions, support systems, and policies in place to combat VAWC

OBJECTIVES OF THE STUDY

The purpose of this study was to develop a Web-based Report Management System with Incident Mapping: VAWC Cases to address, monitor, and manage cases of violence against women and children.

Specifically, this study aims to:

1. Design and develop a Web-based Report Management System with Incident Mapping: VAWC Cases the following technical features:

a. incident reporting, monitoring, and analysis with remarks;
b. incident report using geo-mapping;
c. descriptive and trend analysis
d. automated report;
e. email notifications; and
f. maintenance logging system with detailed summaries.

2. Testing the functionality of the aforementioned features.

3. Evaluate the usability of the system in terms of:

a. system usefulness;
b. information quality;
c. interface quality; and
d. overall usability.

CONCEPTUAL FRAMEWORK

The conceptual framework of the study follows Input-Process-Output-Outcome (IPOO) model:

Input: Consists of essential data collected and entered by VAWC staff, including case details, victim information, perpetrator information, witness details, incident reports, referral data, and protection order information.

Process: The system performs data encoding, storage, validation, and organization, as well as case tracking and incident mapping to geographically visualize reported cases.

Output: Includes organized case records, generated reports, and mapped visualizations of incidents, which are accessible to authorized users such as VAWC staff and local authorities

Outcome: Improved efficiency in case management, enhanced accuracy and timeliness of reports, better monitoring and analysis of incidents, and more informed decision-making, ultimately contributing to more effective handling of VAWC cases.

METHODS

Research Design

The study utilizes a developmental research methodology to design, develop, and evaluate the Web-Based Report Management System with Incident Mapping: VAWC Cases for Barangay Mandalagan. This methodology is ideal for projects that aim to create a new product, system, or process that aligns perfectly with our goal of developing and implementing the Web-Based Report Management System for Community Incident Response: VAWC Cases.

The system was developed following the Agile Development Model, which includes the following phases:

1. Requirements Gathering Phase

The first phase of the developmental research involves gathering information and user requirements. This will be accomplished through in-depth interviews with key stakeholders, including Barangay Mandalagan VAWC Office representatives and other relevant departments. These interviews aim to provide valuable insights into user experiences and expectations for the Web-Based Report Management System with Incident Mapping for VAWC Cases.

2. Iterative Design and Development Phase

In this phase, the design and development cycle begins. Diagrams were created to envision the system's layout and to determine the processes.

3. Rapid Prototyping Phase

Initial prototypes of the VAWC system functionalities were created based on the gathered user requirements. These prototypes have undergone user testing by representatives from our target respondents.

4. Continuous Testing and Feedback Phase

Feedback from this testing guides iterative refinements to the system design, ensuring it aligns with user needs and provides an intuitive, user-friendly experience.

5. Deployment and Maintenance Phase

Combines functional and user acceptance testing. Functional testing ensures that the VAWC system performs its intended tasks accurately, while user acceptance testing assesses usability and user experience with end-users from the Barangay. The evaluation results will help identify any remaining issues and guide further system refinement before its final implementation in Barangay Mandalagan.

System Features

- User registration and login
- incident reporting, monitoring, and analysis with remarks;
- incident report using geo-mapping;
- descriptive and trend analysis
- Report generation

System development Life Cycle (SDLC)

The researcher used the Agile Development Model as the system development framework. This model focuses on working the project step-by-step, getting feedback often, and continuously improving the project.

Phase	Description
Requirements Gathering Phase	Gathering and analysing user and system requirements
Iterative Design and Development Phase	Designing and developing system through with ongoing revisions and updates
Rapid Prototyping Phase	Creating prototypes to demonstrate and gather feedback
Continuous Testing and Feedback Phase	Testing the system regularly and collecting feedback
Deployment and Maintenance Phase	Deploying the system and maintaining continuous maintenance

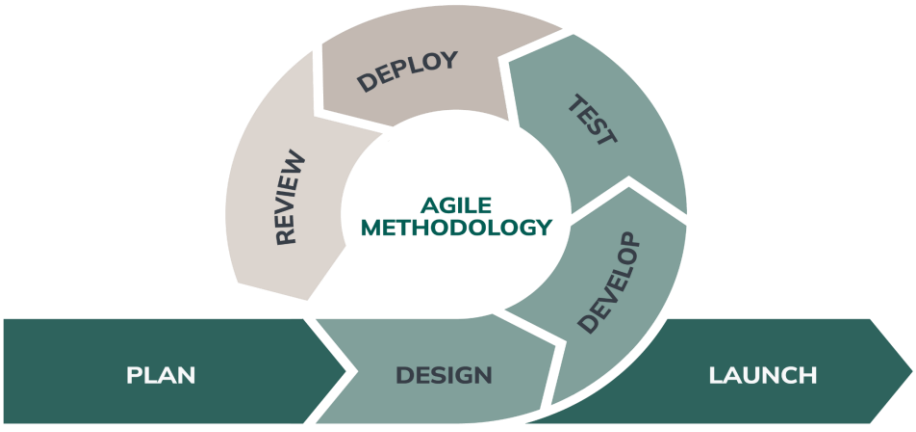

Figure 1. Agile Development Model

For Community Incident Response: VAWC Cases, creating a web-based report management system requires a development methodology focused on adaptability, continuous improvement, and community responsiveness. The Agile methodology exemplifies this approach, emphasizing collaborative project management and iterative development cycles to ensure ongoing enhancement and responsiveness to community needs. Unlike traditional, linear development approaches, Agile breaks the project into smaller, manageable stages called "sprints." Each sprint focuses on delivering specific features, allowing continuous feedback and improvement throughout development.

Phase 1. Requirements Gathering Phase

The researcher conducted interviews and workshops with stakeholders from the Barangay Mandalagan VAWC Office and potential users to understand their needs and pain points with the current process. From these sessions, develop a clear list of functional and non- functional requirements for the system, including features like case, victim, perpetrator, witness, and service forms.

Phase 2. Iterative Design and Development Phase

The development of the Web-Based Report Management System with Incident Mapping: VAWC Cases is divided into smaller, manageable phases, each focused on implementing specific functionalities. For each phase, prototypes demonstrating core features were developed using tools like wireframes and mockups to visually represent the system. User testing sessions with Barangay Mandalagan VAWC office representatives were conducted to gather feedback on these prototypes, allowing for design and functionality refinements before proceeding to the next development phase.

Phase 3. Rapid Prototyping Phase

Focus on rapid development using tools and technologies that facilitate quick turnaround times, such as pre-built components, scripting languages, or low-code development platforms. This approach allows for faster iteration and feedback cycles, ensuring the Web-Based Report Management System with Incident Mapping: VAWC Cases system is aligned with user needs.

Phase 4. Continuous Testing and Feedback Phase

Integrate testing throughout the development process by automated testing, manual testing, and user feedback mechanisms to identify and fix bugs early on. Encourage continuous user feedback through surveys, interviews, and focus groups to ensure the Web-Based Report Management System with Incident Mapping: VAWC Cases remains user-friendly and addresses evolving needs.

Phase 5. Deployment and Maintenance Phase

Develop a comprehensive deployment plan for the VAWC system, considering critical factors such as user training to ensure smooth adoption, data migration to seamlessly transition existing data, and robust system security to protect sensitive information. Additionally, establish a detailed maintenance plan for the system to handle future bug fixes, incorporate feature improvements based on user feedback, and implement system upgrades to keep the platform current with technological advancements.

System Design

The system architecture design consists of one component; a web-based interface for the VAWC Desk Staff to have full access on the system while the Barangay Captain may have access to the system but limited to Reports or of cases.

Respondents of the Study

The selection of the respondents used purposive sampling, focuses on individuals that have specific expertise and experience relevant to the study.

Instrument Used

Two evaluation tools were used:

1. Functionality Test Cases – to ensure that the system performs its intended operations correctly and meets specified requirements.
2. PSSUQ (Post-Study System Usability Questionnaire) – to evaluate the system's usability based on four criteria:

- System Usefulness
- Information Quality
- Interface Quality

- Overall Satisfaction
  A 7-point Likert scale was used in the questionnaire, with lower scores representing stronger agreement and better system performance.

Data Analysis

The gathered data were examined using the mean and Likert scale interpretation to know the system's overall usability and functionality measures.'

Data Gathering Procedure

1. Interviews were conducted with the beneficiaries to know what the system needs.
2. The researchers observed existing processes to identify inefficiencies.
3. Questionnaires were administered to collect feedback on usability and user experience.

Ethical Consideration

The researchers prepared a formal letter to request permission to conduct interviews and gather data from the Violence Against Women and Children (VAWC) desk in Barangay Mandalagan, Bacolod City. Prior to initiating the research, the researchers sought and obtained the consent of the VAWC desk officers and participants, who were informed about the purpose, scope, and significance of the study. Only those who voluntarily agreed to participate were included. The researchers will prioritize confidentiality and ensure the privacy of all data collected during the study. Personal and sensitive information shared by participants will be securely stored and used solely for the purposes of this research. Measures such as password-protected files and restricted access will be implemented to prevent unauthorized access. In compliance with the Data Privacy Act of 2012, participants' informed consent will be obtained, with a clear explanation of how their data will be collected, stored, used, and shared. The researchers will uphold the highest standards of integrity, ensuring data protection and safeguarding participants from any potential harm or distress. Regular audits and adherence to ethical standards will ensure that the research aligns with legal requirements and respects the rights of all participants. Furthermore, the researchers will remain sensitive to the context of the subject matter, ensuring that the study is conducted with respect and compassion for those involved

RESULTS AND DISCUSSION

This section presents the results of the functionality testing and usability evaluation of the Web-Based Report Management System with Incident Mapping: VAWC Cases. The findings address the study's objectives—specifically, to assess the system's functionality and determine its level of usability based on the Post-Study System Usability Questionnaire (PSSUQ) criteria: system usefulness, information quality, interface quality, and overall satisfaction.

System Functionality Testing

Table 2. Summary of System Functionality Test Results

Features	Results	Remarks
Incident Reporting, Monitoring, and Analysis with remarks.	100%	Passed
Incident Report using Geo-mapping	100%	Passed
Descriptive and Trend Analysis	100%	Passed
Automated Report	100%	Passed
Email Notification	100%	Passed
Maintenance Logging System with Detailed Summaries	100%	Passed

The results in Table 2 below indicated that users found the system easy to use and effective, with high satisfaction levels regarding its features and design.

Usability Evaluation

The **Post-Study System Usability Questionnaire** was used to determine the systems usability. The respondents rated there experience on a5-point Likert scale, where 1 represents strongly agree (best performance) and 5 represents strongly disagree (lowest performance

Table 3. Mean Score in the Level of Usability in System

Criteria	Mean	Interpretation
System Usefulness	1.77	Strongly Agree
Information Quality	2.36	Agree
Interface Quality	2.00	Agree
Overall Usability	1.97	Strongly Agree

The Overall Usability score of 1.97 suggests that users were satisfied with the system and it met their needs. These PSSUQ results demonstrate that the system is generally satisfied and acceptable to users.

System Usefulness

Table 4. Summary of Mean Scores in System Usefulness

Item	Statement	Results
1	Overall, I am satisfied with how easy it is to use this system	1.5
2	It was simple to use this system.	1
3	I was able to complete the task and scenarios quickly using this system.	2
4	It felt comfortable using this system.	1.5
5	It was easy to learn to use this system	1
6	I could become productive quickly using this system.	2

The overall mean is 1.5 indicates that the developed system meets the required industry standards, showing it has the capability to satisfy user's needs effectively.

Information Quality

Table 5. Summary of Mean Scores in Information Quality

Item	**Statement**	**Result**
7	The system gave error messages that clearly told me how to fix problem	2.50
8	Whatever I made a mistake using the system, I could recover easily and quickly	2.50
9	The information (such as online help, on-screen messages, and other documentation) provided with this system was clear.	2.50
10	It was easy to find the information I needed.	2.50
11	The information was effective in helping me complete the task and scenarios.	3.00
12	The organization of information on the system screens was clean	2.00
Information Quality (INFOQUAL)		**2.42**

The overall mean is 2.42 indicates that the developed system meets the required industry standards, demonstrating its ability to provide accurate and useful information to users. There are improvements that were suggested for organization and information hierarchy.

Interface Quality

Table 6. Summary of Mean Scores in Interface Quality

Item	Statement	Results
13	The interface of this system was pleasant.	2.00
14	I liked using the interface of this system	1.50
15	This system has all the functions and capabilities I expect it to have.	2.00
16	Overall, I am satisfied with this system	2.50

The overall mean is 2, this indicates that the developed system meets the user-friendly, capable of satisfying the needs of it's users

Overall Usability Results

The overall usability mean score of Web-Based Report Management System with Incident Mapping: VAWC Cases is 1.97, which is significantly better than the PSSUQ industry norm of 2.82. This indicates that the users found the system useful, users were able to clearly understand the information provided by the system. Users were satisfied with the system's interface easy to use. Overall, the users were satisfied with the system, and it met their needs.

Discussion Sumarry

The Web-based Report Management System with Incident Mapping for VAWC Cases was developed with the following technical features: incident reporting, monitoring, and analysis with remarks, incident reporting using geo- mapping, descriptive and trend analysis, automated report generation, email notifications, and a maintenance logging system with detailed summaries. The system was evaluated by a VAWC Desk Officer and a Barangay Captain in Barangay Mandalagan based on its ability to manage and monitor VAWC cases. The evaluation showed that the system met the users' needs, providing an easy-to- use platform for handling VAWC reports. The findings suggest that the system is beneficial and fulfills its purpose of improving the management of VAWC cases. The incident mapping feature helped visualize the locations of reported incidents, while the trend analysis function provided valuable insights into patterns over time. The email notification feature also ensured timely updates for VAWC officials, perpetrators, witnesses, and victims. A detailed User Manual was created to assist users, offering clear instructions on how to use the system effectively.

CONCLUSION AND RECOMMENDATION

Objective 1: To Design and develop a Web-based Report Management System with Incident Mapping: VAWC Cases the following technical features: incident reporting, monitoring, and analysis with remarks, incident reporting using geo- mapping, descriptive and trend analysis, automated report generation, email notifications, and a maintenance logging system with detailed summaries.

Conclusion: The Web-based Report Management System with Incident Mapping: VAWC Cases is an effective tool for managing VAWC cases in Barangay Mandalagan. The system helps VAWC officials track, report, and analyze incidents in a more organized and efficient way. By using features like geo-mapping, trend analysis, and automated reporting, the system improves the overall management and decision-making process, leading to better support for victims.

Recommendation: The researchers recommend improving the system by adding a feature for real-time data sharing with other barangays and local government units (LGUs). This would allow for better coordination between different authorities, ensuring a faster and more unified response to VAWC incidents. Additionally, implementing regular training for VAWC officials on maximizing the system's features will further improve its effectiveness.

Objective 2: To test the functionality of the aforementioned features of objective 1 in the system functionality features. It is a test to meet the expected outcome of the system.

Conclusion: After testing the system's features, it was confirmed that it functions as expected and meets the required standards. The features for incident reporting, monitoring, and analysis with remarks, incident reporting using geo-mapping, descriptive and trend analysis, automated report generation, email notifications, and a maintenance logging system with detailed summaries all worked as intended. The system is capable of handling VAWC reports efficiently and accurately.

Recommendation: Another recommendation is to integrate a mobile version of the system. This would allow VAWC officials to access and update case reports on the

Objective 3: To evaluate the usability of a Web-based Report Management System with Incident Mapping: VAWC Cases in terms of System Usefulness, Information Quality, Interface Quality, and overall usability.

Conclusion: The system was tested based on different features to assess its overall usability. After evaluating the responses using the PSSUQ Evaluation Instrument, the mean score was 1.97, which shows that the system is easy to use and meets the expected standards. This suggests that the system is effective for managing VAWC cases in Barangay Mandalagan.

Recommendation: Another improvement could be made in the system's error message feature. Currently, while the system provides error messages, they could be made clearer and more specific, helping users understand exactly what went wrong and how to fix it. By improving the clarity of these error messages, users could recover from issues more quickly and with less confusion, ultimately improving the overall user experience.

Objective 4: Develop a user's manual

Conclusion: A user manual would be useful for the VAWC Desk official/Admin to better understand and navigate the system. It would provide clear guidance on how to use the system's features effectively.

Recommendation: The researchers recommend that the user manual be developed in a simple, easy-to-understand format, with visuals such as screenshots or diagrams to guide users through each feature. The manual should also include a section for frequently asked questions (FAQs) and troubleshooting tips to help users resolve common issues. Ensure the manual remains relevant and should be regularly updated as the system evolves. Additionally, the manual could be made available in digital and print formats for easier access by all users.

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