**Virtualshrine: An Interactive Museum Website For Casa Real Shrine**

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**ABSTRACT**

This study was developed in order to describe the daily operations and its encountered problems of NHCP Museo ng Kasaysayang pampulitika ng Pilipinas, Casa Real. These problems were addressed and analyzed in the developed Casa Real Shrine website and web-based admin information and content management system of cases. The project covers the creation of interactive website, managing of contents uploaded on the website, user management, and reports generation. This study also covered resolving common IT-related problems upon implementation of the web-based management information system. This study was evaluated using standard web evaluation criteria by its intended users and experts.

The proponents conducted observations, interviews, and surveys to acquire the objectives of this study. The research methodology utilized in this project was the quantitative approach. Quantitative approach was applicable to this study as it aims to collect and understand the behavior of Casa Real Shrine’s visitors and how the proponent will apply the results in the implementation of the VirtualShrine website. On developmental research, the proponents studied a process systematically, developed, and evaluated processes that met the set criteria for user’s acceptance to the developed system. The researcher used the Agile Software Development methodology to develop the web-based system. It was used to quickly produce the desired output while allowing the researcher to go back past phases without finishing the whole cycle.

For the acceptability of the developed Casa Real Shrine website, the researchers consulted with IT professionals from different fields, IT instructor from Bulacan State University, and the end-users or clients of the developed system such as the museum staff, students, local and foreign tourist. The evaluation form has the following criteria for software quality evaluation as follows: (1) functional suitability; (2) performance efficiency; (3) usability; (4) reliability; (5) security; and (6) portability. The researchers conclude that the developed website is usable and functional and also provides a user-friendly UI/UX design to end-users and also proves that the system is reliable and secured based on the data gathered. The researchers also believe that the system will be a catalyst in booking, storing and protecting the records of the Casa Real Museum. With this, the following recommendations were drawn that can be a basis for future researchers who would want to develop the same type of museum website. (1) An enhance VR control capabilities in virtual tours that could focus on improving the user experience and accessibility of VR technology; (2) A Museum maps that could focus on exploring the use of augmented reality (AR) technology to enhance the visitor experience; (3) QR codes for audio guides in museums could focus on studying the effectiveness of this technology as a tool for enhancing visitor engagement and understanding of museum exhibits; and (4) Calendar integration for museum closures could focus on studying the effectiveness of different notification systems and strategies for informing researchers and other stakeholders about unexpected closures.

**CCS Concepts**

• **Software and its engineering➝Software creation and management**

**Keywords**

Mobile Application; Android Application; Emergency and Disaster Preparedness; Mobile Learning Application

# INTRODUCTION

## Project Context

## The internet's global expansion over the years has impacted human activities through digital media, museums are evolving to adapt to the change and encourage young netizens to access and use museum materials Chen, T. L., Lai, W. C., & Yu, T. K. (2021). However, capturing and maintaining the attention of visitors is an absolute challenge in today's world, where information can be found online. Along with the digital revolution, visitor expectations have shifted somewhere along the way, and museums are striving to meet the difficulties posed by this new wave of digital expectations from their visitors Balanchine S., (2018).

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## In order to adapt with the changes in technology, museums need a visually appealing, informative, and entertaining website to attract visitors. According to Butler J. (2017), digital communications has created an opportunity for many museums around the world to create connections, communities, and relationships. It gives museums new avenues to share information about their exhibits and collections with a vast number of audiences and at the same time, allows them to understand visitor experience. To create a website that accurately depicts what makes a museum unique is to implement an engaging and interactive feature into the website Charr M., (2020). An interactive website is one that allows users to engage with and communicate with the website's content. It takes a unique and entertaining approach that is sure to catch the interest of its users.

## It is apparent that museum websites play a significant role in information dissemination. According to a growing body of literature: Increased online and off-line museum visits is an effective strategy to boost visitors' interest and satisfaction and encourages online website visitors to visit the actual museum Allen L. B, Crowley K. J (2014). According to Madriaga, Virto, & Blaso (2017), the websites of museums were originally intended to provide basic information such as hours of operation, location, and costs. But because of the evolution of digital media, websites now provide a variety of interactive capabilities, like virtual galleries as well as a variety of materials to help visitors navigate better.

## Most museums around the world offer the opportunity to purchase or book tickets online because of the threat of Covid-19 virus, museums and galleries are required to have a booking system to limit the visitors visiting the museum at the same time. This way, the spread of virus within the museum could be prevented. Billock J. (2020)

## The Casa Real Shrine is one of Malolos oldest structures that was built in 1580 and has witnessed most of the Philippines political history, which is why today, it functions as a museum of Philippine political history. The museum displays the exhibits, printing press of Malolos, display of 21 Women of Malolos memorabilia, Miniature dioramas, theatrical backdrops, interactive terminals, and original artifacts recreate these periods, from the earliest communities to the Spanish and American colonial periods through the Second World War until the present. It is recognized as one of the country’s most notable museums and is one of Bulacan’s pride. National Historical Commission of the Philippines (2022)

## The Casa Real Shrine plays an important role in the preservation of the local culture and history. Its existence also shapes knowledge by putting together visual cultural narratives that build views of the past and consequently of the present. Which is why it is important that they be able to clearly convey knowledge and information to their visitors all the while accommodating all visitors' needs during their visit. The Casa Real Shrine is popular amongst local and foreign visitors that want to learn about the Political History of the Philippines. The museum also caters educational tours for students and researchers.

## Over the years, the Casa Real shrine has used conventional techniques to spread information, generally through live exhibitions of artifacts where people must first visit the physical museum, but in this modern day and age, new trends have emerged, overshadowing the traditional way of attracting visitors. The proponents proposed the development of an Interactive website for casa real which is suitable for adapting digital advancement in the museum and be able to satisfy the needs of the visitors.

## The proponents believe that the implementation of the Casa Real Interactive Website will benefit both the Casa Real management and the visitors. Through the Casa Real interactive website, Visitors who want to visit the museum could inquire and book for admission online, the website could serve as the visitors’ digital itinerary and virtual tour guide as they venture into the museum making their visit hassle free. During the testing phase, feedback from end users will be gathered and used to identify recurring issues while also further improving the development of the website. Following the observation of these issues at Casa Real Shrine, the proponents would like to design and develop an Interactive Website for Casa Real Shrine.

## Purpose and Description of the Project

## The study aims to propose a web base system and bring the Casa Real Shrine to the virtual world as a virtual museum. The study also aims to utilize technology to freely walk and virtually visit the museum of Casa Real Shrine. Proposing a virtual museum is the main concern of the proponents to develop an interactive museum that is user friendly, interactive and provides additional information through the web for Casa Real Shrine is the main concern of this study.

## Objectives of the Study

The main purpose of this study is to design and develop a “VirtualShrine: An Interactive Museum Website for Casa Real Shrine” that will be utilized to virtualize Casa Real Shrine. The purpose is to deliver more knowledge to the online museum user by improving users' experience, interactivity, and comprehensive knowledge.

In order to develop the Interactive Website, specific objectives will be considered:

1. To develop a website that can perform functionalities such as:
   1. Online Booking reservation;
   2. Virtual Museum tour;
   3. Gallery Collections;
   4. User assisting features.
      1. Plan Your Visit
      2. Audio Guide
2. To design and develop a Management System that can perform functionalities such as:

2.1 Manage User Admins

2.2 Accept and Reject Visitor booking;

2.3 Upload Website Content

2.3.1 Collections

2.3.2 Exhibits

2.3.3 Blog

2.4 Generate and Print Admin Activity Report

2.5 Booking confirmation through email after reservation

1. To evaluate the level of acceptability of the proposed system using the software quality standard ISO 25010 instrument in terms of the following criterions:

3.1 Functionality Suitability;

3.2 Performance Efficiency;

3.3 Compatibility;

3.4 Usability;

3.5 Reliability;

3.6 Security;

3.7 Maintainability; and

3.8 Portability

## Scope and Limitation of the Study

The main concern of this study is to design and develop “VirtualShrine: An Interactive Museum Website for Casa Real Shrine”. This study will help to improve the current situation and will promote the benefits of using an Interactive Website to improve museum operations. The main advantage is its accessibility at any time since it is web-based.

 The proponents will consider several system functionalities which will be incorporated into the proposed system as follows: (a) Online Booking Admission; (b) Virtual Museum Tour; (c) Email confirmation after reservation; (d) Create Educational and Informative Contents; (e) User assisting features; and (f) Report Generation. In addition, the proposed system will offer features like a virtual gallery, number code to access the audio guide

As a part of the limitation of the study, the study will only address the improvement of Casa Real Shrine in integrating a web based interactive museum website. Other areas or matters affecting the structure and maintenance of the museum are not part of our research study.

The study will be utilized using a beta test to observe its purpose, potential changes, and any hazards towards the user. By this method the proponents will be able to come up with information that is vital to the research that could help improve the development of the system and will have great results once the final output is done.

# SOFTWARE DEVELOPMENT METHODOLOGY

The researchers used the Agile Development Model since the application is developed in both incremental and iterative approaches. Thus, it can lead to a more flexible workflow. This approach provides an opportunity for the researchers to make improvements and respond to changes constantly during production. By way of adopting its principles, it can help to deliver better software more effectively and efficiently.

Agile Alliance [7] defined Agile as “the ability to create and respond to change. It is a way of dealing with, and ultimately succeeding in, an uncertain and turbulent environment.” Agile principles emphasize collaboration, flexibility, and adaptability. It's based on the idea that the world is changing more often these days, which means software teams don't have years to bring new products to market [8]. Based on the VersionOne [9] report, 88% of the respondents ranked “ability to manage changing priorities“ as the number one benefit of adopting agile.

# RESULTS AND DISCUSSION

The developed mobile application was assessed in terms of functional suitability, performance efficiency, usability, reliability, and portability using the ISO/IEC 25010:2011 or the Square - System and Software Quality Models.

Table 1. Total Number of Respondents

|  |  |  |
| --- | --- | --- |
| Evaluators | Frequency | Percentage (%) |
| IT Professionals | 5 | 45.45 |
| CICT Faculty | 5 | 45.45 |
| Bulacan PDRRMO Former Division Chief of Research, Planning, and Evaluation | 1 | 9.09 |
| Total | **11** | **100** |

The respondents of this study are five (5) IT Professionals that have proven extensive knowledge or working in the field of Information Technology, five (5) Faculty Members from the College of Information and Communications Technology, and one (1) Bulacan PDRRMO Former Division Chief of Research, Planning, and Evaluation that familiar with the developed mobile application.

Table 2. 5-Score Likert Scale

|  |  |  |
| --- | --- | --- |
| Scale | Range | Descriptive Interpretation |
| 5.0 | 4.60 - 5.00 | Strongly Agree |
| 4.0 | 3.60 - 4.59 | Agree |
| 3.0 | 2.60 - 3.59 | Moderately Agree |
| 2.0 | 1.60 - 2.59 | Disagree |
| 1.0 | 0 - 1.59 | Strongly Disagree |

The evaluation procedure used a five-score scale which is 1 for Strongly Disagree, 2 for Disagree, 3 for Moderately Agree, 4 for Agree, and 5 for Strongly Agree. The five-score rating with its frequencies was collected from 11 respondents and the computed mean.

Table 3. Frequency Distribution and Descriptive Measures in the Evaluation of the Developed Mobile Application using the ISO/IEC 25010:2011 or the Square - System and Software Quality Models

|  |  |  |
| --- | --- | --- |
| ***Characteristic*** | ***Weighted Mean*** | ***Descriptive Interpretation*** |
| Functional Suitability | 4.73 | Strongly Agree |
| Performance Efficiency | 4.64 | Strongly Agree |
| Usability | 4.68 | Strongly Agree |
| Reliability | 4.87 | Strongly Agree |
| Portability | 4.76 | Strongly Agree |
| **Overall** | **4.73** | **Strongly Agree** |

**Functional Suitability**. The developed mobile application attains a high-positive value that can be interpreted as Strongly Agree. It means that the researchers accomplish the stated and implied functionalities in the application.

**Performance Efficiency**. The developed mobile application attains a high-positive value that can be interpreted as Strongly Agree. It means that the application can process and give accurate information in a short time and takes only a small proportion of resources.

**Usability**. The developed mobile application attains a high-positive value that can be interpreted as Strongly Agree. It means that the respondents agree that the functionalities serve their purpose and can be used by many in the future.

**Reliability**. The developed mobile application attains a high-positive value that can be interpreted as Strongly Agree. The application provides accurate information that is proved useful and available to use freely when the user needs its service.

**Portability**. The developed mobile application also attains a high-positive value that can be interpreted as Strongly Agree. The application can adapt to different OS versions and can still have the same valuable information.

Overall, with a weighted mean of 4.73, the developed mobile application met the software quality standards and concluded as Highly Acceptable.

# CONCLUSIONS

As a result of this study, the researchers developed a mobile application that accomplished all the stated and implied functionalities. The researchers proved that the developed application is useful and beneficial for the inhabitants of Bulacan in terms of emergency and disaster preparedness and has a high level of acceptability based on the results obtained from the respondents. Thus, it is expected to lessen the risk, spread awareness, and improve user preparedness in terms of disaster specifically in the Bulacan area where the study focused

# RECOMMENDATIONS

Considering the findings and conclusion of the study, the following recommendations were drawn and can serve as a basis for future researchers who would want to develop a similar application:

1*.* The College of Information and Communications Technology may consider the present capstone project as part of the research and extension program of the College to ensure that the developed system will be implemented, sustained, and maintained.

2. Make the developed mobile application available on devices running on the iOS operating system as well. Developing an Android application is low cost and flexible. Most individuals own smartphones, and most of these devices run on the Android operating system. Also, a great number of learning resources about Android development are available across the internet. For these reasons, the researchers developed the mobile application using Android programming.

3. Future researchers are encouraged to have the following functions and features: an administrator page for efficient handling of emergency hotlines, an announcement section with real-time updates and SMS notifications, free SMS sender for hotlines that are listed in the mobile application, and weather alerts.

# ACKNOWLEDGEMENTS

The researchers wish to express their sincerest gratitude and deep appreciation to the following individual who has extended their invaluable assistance and contributions for the success of this study:

Dr. Keno C. Piad, Dean of the College of Information and Communications Technology, for his never-ending guidance and support to all CICT students by inspiring them to study harder and unleash their potential.

Dr. Mayleen Dorcas B. Castro, capstone project adviser, for her assistance with immovable support to help the researchers enhance the content of the study as well as her encouragement, guidance, and motivation for completing this project throughout the whole semester.

Dr. Eunice B. Custodio, capstone project coordinator, for her support, encouragement, and motivation in completing this project as well as her guidance throughout the whole semester to further enhance the content of the study;

Mrs. Teresita S. Mangahas, Mrs. Lilibeth G. Antonio, and Mr. Chester Paul F. Valdez, the defense panel members, for their highly regarded comments and suggestions to further enhance the content of the study;

Dr. Nina D. Buenaventura, for her highly regarded comments and suggestions to further improve the reliability of the application developed by the researchers as well as providing reliable sources of information to be placed inside the app. For the sake of the enhancement and improvement of the developed application, Dr. Nina was able to share her knowledge and expertise;

To the families and guardians of the researchers, who provide monetary requirements and any sort of help all through the semester being an inspiration, and motivation doing this capstone project;

And above all, to our almighty God, who has always been there and come along through in giving the researchers sufficient knowledge and strength to pursue and to finish this study.

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