**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) Functionality Suitability; (2) Performance Efficiency; (3) Compatibility; (4) Usability; 5) Reliability; (6) Security; (7) Maintainability; and (8) 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**

Museum; Website; Booking System; Virtual Tours; Content Management System

# 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 [1] 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 [2] 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) [3], 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 [4] 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 [5] Allen L. B, Crowley K. J (2014). According to Madriaga, Virto, & Blaso (2017) [6], 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. [7] 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.

## 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 quantitative technique was used in the study to collect data from visitors of the Casa Real Shrine of Malolos. The proponents gathered statistics on visitor satisfaction comparing the present museum operations without the website and the museum operations after the website is implemented.

# The research and development element of the design involves (1) analyzing the existing museum operations, (2) innovating and developing a system based on the findings, and (3) testing the efficacy of the innovation. The approach includes a quantitative examination of the program/system, its components, as well as implementation and outcome data. Essentially, the procedure includes conducting comprehensive documentation analysis.

# The study was used an agile method for research, it is based on based on iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams. can help develop the features of the Casa Real Virtual Museum.

# According to Altameem E. (2015) [8], Agile is an important tool in software development because this methodology addresses the common project drawbacks including schedule predictability, scope creep and costs. The team members are also able to work effectively and accomplish the project tasks and increase motivation to the team that cause to increase in creativity and innovativeness thus delivering a high-quality software.

# RESULTS AND DISCUSSION

The developed interactive museum website 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 | 11 |
| CICT Faculty | 5 | 11 |
| Casa Real Shrine Museum Staff | 3 | 7 |
| Student | 12 | 27 |
| Local Tourist | 10 | 22 |
| Foreign Tourist | 10 | 22 |
| Total | **45** | **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, twelve (12) students, ten (10) Local Tourist, ten (10) Foreign Tourist and three (3) Casa Real Shrine Museum Staff.

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 Interactive Museum Website using the ISO/IEC 25010:2011 or the Square - System and Software Quality Models

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **Weighted Mean** | **Descriptive Interpretation** |
| Functional Suitability | 4.64 | Strongly Agree |
| Performance Efficiency | 4.65 | Strongly Agree |
| Compatibility | 4.69 | Strongly Agree |
| Usability | 4.71 | Strongly Agree |
| Reliability | 4.68 | Strongly Agree |
| Security | 4.78 | Strongly Agree |
| Maintainability | 4.79 | Strongly Agree |
| Portability | 4.84 | Strongly Agree |
| **Overall** | **4.72** | **Strongly Agree** |

**Functional Suitability**. The developed interactive museum website 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 interactive museum website 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.

**Compatibility.** The developed interactive museum website attains a high-positive value that can be interpreted as Strongly Agree. This shows that the website Virtual Shrine is having complete features when it comes to compatibility.

**Usability**. The developed interactive museum website 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 interactive museum website 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.

**Security.**  The developed interactive museum website attains a high-positive value that can be interpreted as Strongly Agree. The system makes sure the data are secure, prohibits unauthorized users from accessing and changing the data, and saves auditable logs that demonstrate each activity was made.

**Maintainability**. The developed interactive museum website also attains a high-positive value that can be interpreted as Strongly Agree. It demonstrates the system's adaptability to various hardware, software, and other operational or usage scenarios. Mobile devices like smartphones, tablets, and PCs can all access the designed system online.

**Portability**. The developed interactive museum website 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 4.72, the developed interactive museum website met the software quality standards and concluded as Highly Acceptable.

# CONCLUSIONS

As a result of this study led to the creation of a website which fulfilled all the stated and intended features. The website proved to be advantageous to all users, who can use it to discover the history of Philippine politics. It is expected that more individuals will be interested and intrigued by the history of the Casa Real Shrine as a result of the websit.

# 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. An enhance VR control capabilities in virtual tours that could focus on improving the user experience and accessibility of VR technology. This could involve exploring new ways to interact with virtual environments, such as using voice commands or gesture recognition, as well as studying how to make VR technology more accessible to people with disabilities.

2. A Museum maps that could focus on exploring the use of augmented reality (AR) technology to enhance the visitor experience. This could involve developing AR museum maps that can be accessed through a smartphone or other device, allowing visitors to see virtual annotations and information about exhibits as they explore the museum.

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. This could involve conducting user studies to evaluate the usefulness and ease of use of QR code-based audio guides, as well as examining how different design elements and features impact visitor behavior and engagement.

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. This could involve conducting user studies to evaluate the effectiveness of different notification methods, such as email, text message, or push notification, as well as examining the impact of different timing and frequency of notifications on researcher behavior and satisfaction.

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