ISSN (e): 2250 – 3005 || Volume, 14 || Issue, 4|| Jul. - Aug. – 2024 ||
International Journal of Computational Engineering Research (IJCER)

Cooperative Event Venue and Hostel Management System with Sales Forecasting

Dr. Ryan J. Dela Gente[1] Dr. Oliver D. Pavillar[2]
[1]*Assistant Professor,*
College of Computer Studies,
Alijis Campus, 6100 Bacolod City, Negros Occidental, Philippines.
[2]*Assistant Professor,*
College of Computer Studies,
Alijis Campus, 6100 Bacolod City, Negros Occidental, Philippines.

ABSTRACT
Digitization of business processes is gaining traction and has become a trend in large and small companies, with hotel industries adopting these trends. Forecasting is now becoming a valuable factor in business decisions, which is challenging. This study developed an Event Venue and Hostel Management System with Sales Forecasting integrated with the Cooperative Stakeholders Management System, Cooperative Loan Servicing System and Multi-store E-commerce for Escalante Multipurpose Cooperative (EPSTEMPCO) – Visayas. The system automated the booking of venues and rooms for clients online. The system featured a sales forecasting method. The study was evaluated using the adopted Computer System Usability Questionnaire (CSUQ). The participants were identified using purposive sampling from the employees and members of the cooperative. A developmental type of research was utilized for this study, and the Software Development Life Cycle – Rapid Application Development was the basis for the development of the system. The results of the evaluation of the system got an Overall Satisfaction of "3.38", System Quality of 3.33, Information Quality of "3.41", and Interface Quality of "3.41" which were all interpreted as "Strongly Agree". The system was fully functional, and all the objectives were met. The study results suggest that further research may enhance the features and create a new forecasting method.
KEYWORDS: *hostel, hostel management system, sales forecasting method.*

Date of Submission: 05-07-2024 Date of acceptance: 18-07-2024

I. INTRODUCTION

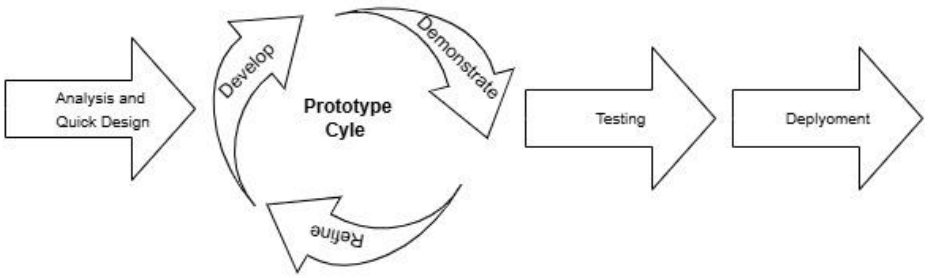
In these times where technological innovations are in high demand, early adopters gamble to have that advantage over their competitors. Recent developments in information and communication technologies are enabling businesses worldwide to face increasingly complex difficulties. This has resulted in a spike in the use of digital solutions among businesses of all sizes. Digitization of business processes is gaining traction and has become a trend in large and small companies. Hotel industries are adopting these trends for reasons like improving productivity, addressing the changing landscape of the competition, and the ever-changing customer needs and preferences (Lam & Law, 2019). Lin & Tsai (2016) created a deep learning-based customer forecasting tool to increase the quality of management decision-making. The accuracy of sales forecasts provides an objective measure of the performance of the forecasting system. This provides quantitative statistics that allow hotel management to assess the consistency of their sales forecasts over time. By tracking accuracy, we can improve future forecasts and make better decisions. The system was designed and developed as a module easily integrated into other modules. It is an advantage to the management since it lowers initial costs yet is capable of future upscaling. The system had multiple modules integrated, with specific functions and capabilities that communicate internally to other modules. The Escalante Multipurpose Cooperative (EPSTEMPCO) – Visayas will gain a competitive edge over other regional cooperatives.

Objectives of the Study

To develop an event venue and hostel management system that can automate booking venues and rooms for clients; enforce account security measures to avoid unauthorized access; electronically retrieve records and

data for fast reference activities; and allow online transactions. Design a sales forecasting method using a moving average model. Evaluate the system's usability using the adopted survey instrument of the Computer System Usability Questionnaire (CSUQ) regarding System Usefulness, Information Quality, Interface Quality, and Overall Satisfaction.

II. Materials and Methods



Software Designing and Development

The system's development was anchored to the software development life cycle (SDLC) to meet industry standards. The model of choice was rapid application development. According to Hirschberg (1998), rapid application development, or Rapid Prototyping, is a software development methodology that combines prototype and iterative models. Nugroho et al. (2016) stated that the model emphasizes the short and fast development cycle. The system process is divided into modules assigned to teams and usually takes about 60 to 90 days. It has produced a better output that caters to the requirements and needs of the stakeholders. What makes the model unique is that a prototype was developed during the development that showcased the features required by the stakeholders. Through this, the stakeholders had a better overview of the system. They could suggest features that needed clarification and were not part of the prototype and processes that will be added to the system. Lastly, the model's approach was vital as it gave the researchers a clear overview of the system and delivered a better development approach overall.

Analysis and Quick Design Phase

This phase determined the current needs of the study and the best approach to be made during the development of the Events Venue and Hostel Management System with Sales Forecasting. The results of this phase helped the researcher select the best tools for the development and a concrete solution to the process needed for the system as a whole.

Hardware and Software Requirements

The web-based system required a network infrastructure to manage its contents and give clients a user-friendly interface. Furthermore, the client-server model will be the system's setup, meaning there will be a specific configuration for both the client's unit and the server. Thus, to ensure optimal performance and compatibility, the following hardware and software requirements are required:

Client Computer Requirements

Hardware	Specification
CPU	Dual-Core or higher
RAM	2GB or higher
Hard Disk	1GB free space
GPU	Any
Screen Size	1366x768 or higher
Operating System	Windows 7 or equivalent
Browser	Google Chrome or equivalent

Client Mobile Phone Requirements

Hardware	Specification
CPU	Dual Core
RAM	1GB
ROM	50Mb free
GPU	Any

Screen Size	HD+ or higher
Operating System	Android 6.0 (Marshmallow)/iOS or newer
Browser	Chrome/Safari or equivalent

Server Requirements

Hardware	**Version**
Apache HTTP Server	2.4*
PHP	7.3*
MySql	5.0*

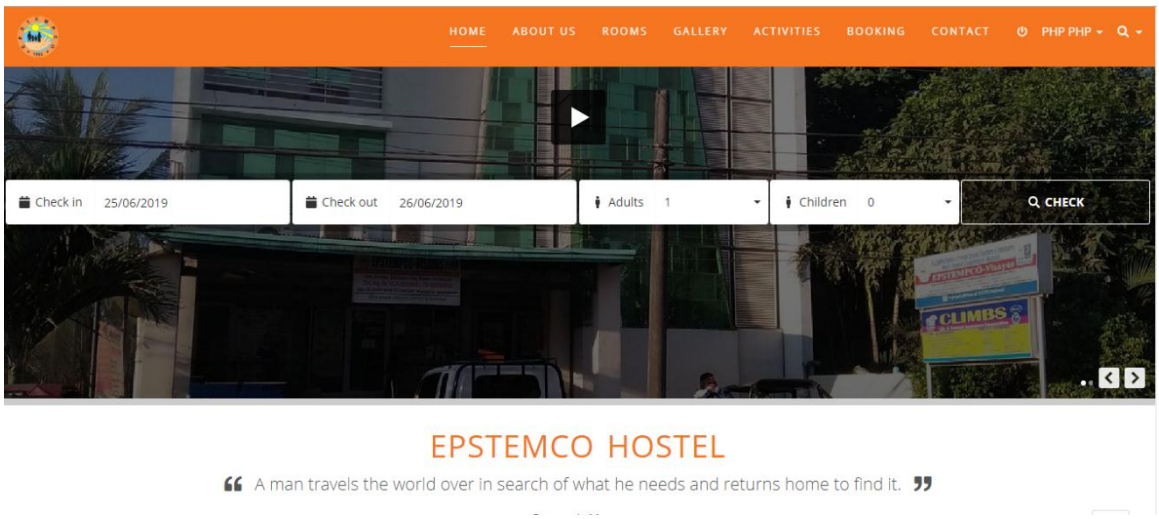
Prototype Design and Development

This phase of the research played a vital role in the direction of the system and was based on the needs of the stakeholders. The gathered data will be carefully analyzed and developed into understandable diagrams and process flow for the system. The system comprises a front-end and backend component. The front end will be for the clients and the management. As to the backend, the researchers will develop the design for modularity and overall system maintainability.

The system was developed using the PHP scripting language for all the transactions and processes, and the MySQL Database will be utilized for the system's data management. An Apache server was used to deploy the system, and the researcher deployed it to a cloud environment for better scalability and availability.

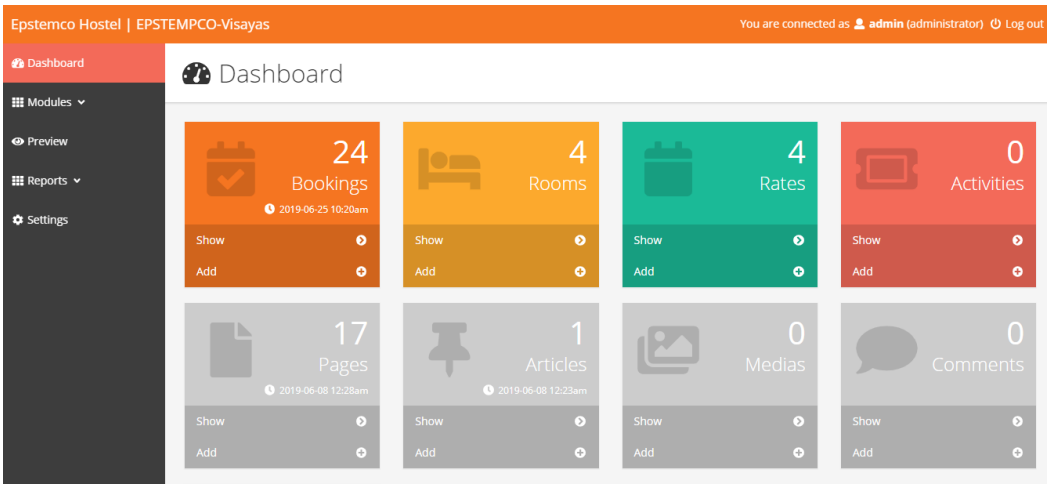
Front End

The system's front end was based on HTML and JavaScript and was responsible for the overall structure of the user interface. The researcher sees that the Graphical User Interface (GUI) was as user-friendly as possible to meet many users, especially those not into computer-based transactions. The transition to a system-based approach was a learning curve for the users and the management. Thus, the GUI needs were designed according to their preferences.



Backend

The system had a backend, which was entirely developed using PHP script and MySQL statements, which will handle the users' details, transactions, time logs, accounts, statistics, and reports. The data was secured to the database, and user-level restriction was applied to further enhance the system's security. The maintenance of the records and transactions had a user-friendly interface similar to the system's front end since the staff and management used it. Therefore, the researchers' goal was to see to it that the navigation of the transactions and processes was well-designed and intuitive to make the users' experience better than their manual process.



Forecasting Method

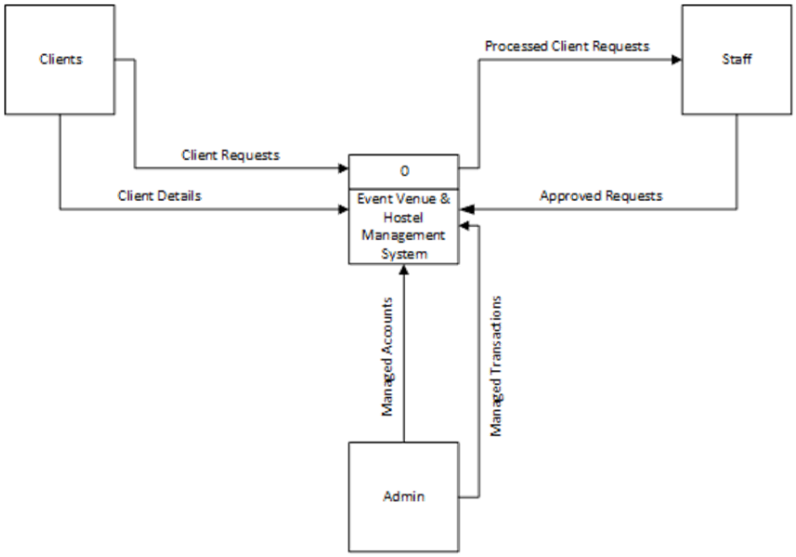
The design of the sales forecasting method feature of the system was based on the simple moving average model. According to Johnston, Boyland, Meadows, & Shale (1999), It is commonly used to estimate the present level of a time series, and this value is projected as a forecast for future observations.

The researchers took a guide from this particular model to develop the sales forecasting method. Since the system was integrated into other modules, relevant data was accessed for project sales.

This feature depended on previous data, which included transactions about the event's venue and hostel operations. The sales forecasting method was better if data were present at least six months before for a reliable sales projection.

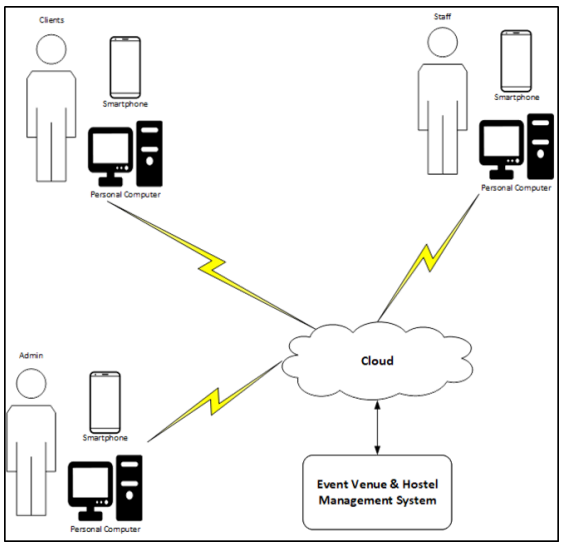
Data Flow Diagram

The system flow took a guide and an overview of the system. The system had three major entities: staff, clients, and admin. It had a corresponding user-level restriction for operating the system. This approach secured each user account from overlapping roles and responsibilities, making the system more robust.



System Architecture

The System Architecture of the system. The architecture was structured according to the type of users and how the system can be accessed. The system was deployed in a cloud-based hosting system, which allowed access to the system anywhere and anytime. This adds to more flexibility when it comes to reaching the clients and, at the same time, managing the system itself remotely. The said structure also allowed the users to use their mobile phones or computers, extending the reach to a broader audience.



Testing Phase

This phase determined the performance and functionality of each system module and how it works on mobile phones and computer browsers. This phase prepared the system for a production environment. All stakeholders' issues, concerns, and suggestions were considered before deploying to avoid malfunctions during operation.

Deployment Phase

Upon completion of the testing, the system was deployed alongside other modules to the Multi-store E-commerce for Escalante Multipurpose Cooperative (EPSTEMPCO) – Visayas. Initial configuration was made to show that the accounts were available, all features were working, and a backup was created.

Implementation Phase

In the Implementation Phase, Feasibility/Performance prototypes are used for the same purposes as in the design phase but would typically be more finely focused. Prototypes will also be used in the implementation phase to begin training users before the system is fully functional and to cross-test system components by comparing system test results to those obtained from corresponding prototypes.

III. Results & Discussions

The system was evaluated based on the adopted Computer System Usability Questionnaire (CSUQ) - 2, an overall satisfaction questionnaire. The items of the evaluation instrument are appropriate for field testing situations. The questionnaire comprises 19 questions with 4-point scales. The results were calculated and divided into four scores: the overall satisfaction score (OVERALL), system usefulness (SYSUSE), information quality (INFOQUAL), and interface quality (INTERQUAL) (Lewis, 1995).

The survey was distributed to (30) people from the cooperative, comprising (15) employees and (15) members. Upon completing the survey, the data were tabulated, and the mean was computed for each instrument question.

Mean of Every Subscale of the Computer System Usability Questionnaire (CSUQ)

Subscales	Criteria Covered in CSUQ	Mean	Description
Overall Satisfaction (Overall)	Items 1 to 19	3.38	Strongly Agree
System Quality (SysQual)	Items 1 to 8	3.33	Strongly Agree
Information Quality (InfoQual)	Items 9 to 15	3.41	Strongly Agree
Interface Quality (InterQual)	Items 16 to 18	3.41	Strongly Agree

The average user rating for Events Venue and Hostel Management was 3.38, suggesting a generally positive view that falls into the 'Strongly Agree' category. This implies that the system was functional and addressed the objectives of this study with high approval from its users. It was also evident that the users were satisfied with the system, which simply means that their existing system had difficulties successfully addressed by the system efficiently and with better reliability and usability. According to Seffah, Donyaee, Kline, & Padda (2006), usability is widely acknowledged as a critical quality criterion for interactive software systems, which include standard GUI-style applications, Web sites, and a wide range of mobile and PDA interactive services. Unusable user interfaces are the main reason why encompassing interactive systems, computers and people fail in practical use.

The system's System Quality (SysQual) had a "Strongly Agree" level of satisfaction with a mean of 3.33. This means that the system was of high quality and was designed according to the needs of the stakeholders. It also means that users found the system simple to use, resulting in increased efficiency and speed in completing their jobs compared to their previous method without the system. Furthermore, this implies that the system helped the users feel at ease by employing the system owing to its simplicity and making them more productive. Zeng (2009) states that when a system has proper interface development, it leads to an engaged user by maintaining their internal control focus and quickly entering the psychological status of flow in doing the work. This is further supported by Gorla, Somers, & Wong (2010) when they said that a system with quality is characterized by employing state-of-the-art technology, a system offering essential functions and features, and is user-friendly, easy to learn, and easily maintainable.

Referring to the Information Quality (InfoQual) subscale, the system got a "Strongly Agree" with a mean of 3.41. This implies that the system could guide its users when specific errors occur during the operation and, simultaneously, provide means of fixing the error by displaying relevant information on the screen. The result also means that on-screen information was consistent, and the contents were clear and concise. According to Gorla et al. (2010), a good content and format system is necessary for decision-making and understandability that meets users' information specifications. Nelson, Todd, and Wixom (2005) mentioned that the accuracy of the information and being up-to-date are vital for a system.

Lastly, the system's Interface Quality (InterQual) got a "Strongly Agree" with a mean of 3.41. This implies that the system's user interface gave the users a better experience performing their desired tasks. It also means that the system could perform its intended function efficiently and provide an advantage to the previous system regarding capability and flexibility. Also, this indicates that the system's interface was user-friendly, which means it is simple to use even for non-technical users. According to Hartmann, Sutcliffe, and Angeli (2008), aesthetics is an essential design quality component, making the user more engaged in the system's interface.

IV. Conclusions and Recommendations

An evaluation of the Events Venue and Hostel Management System revealed that the average response of Items 1 to 19 from the survey instrument was "3.38," which was interpreted as "Strongly Agree." The System Quality (SysQual) of the system, which was taken from the average responses of Items 1 to 8 from the survey instrument, was "3.33," which was interpreted as "Strongly Agree." The Information Quality (InfoQual) of the system, which was taken from the average responses of Items 9 to 15 from the survey instrument, was "3.41," which was interpreted as "Strongly Agree." The Interface Quality (InterQual) of the system, which was taken from the average responses of Items 16 to 18 from the survey instrument, was "3.41," which was interpreted as "Strongly Agree." The system got an overall result of "3.38," which indicates that the users "Strongly Agree" with the usefulness of the Events Venue and Hostel Management System. This means that the system met the objectives of this study. It also indicates that the system provided the cooperative with a system that performed accordingly and delivered a sales forecasting method to improve its hostel operation. Lastly, the system could integrate with other modules seamlessly without any problems.

Upon careful consideration of the findings and conclusion of the study, the following recommendations were given: The system may be implemented in other cooperatives here in the region to further improve their operations and services on both the management and members, other modules may be developed for integration to the system to extend the functions and features further, conduct a comparative study among cooperatives having a similar system to provide baseline data for improvement and possible development of new solutions, development of a new forecasting method based on a different model may be conducted for possible performance enhancement.

REFERENCES

[1]. Lam, C., & Law, R. (2019). Readiness of upscale and luxury-branded hotels for digital transformation. International Journal of Hospitality Management, 79(April 2018), 60–69. https://doi.org/10.1016/j.ijhm.2018.12.015

[2]. Hirschberg, MA (1998). Rapid application development (rad): a brief overview. Software Tech News, pdfs.semanticscholar.org

[3]. Nugroho, S., Hadi Waluyo, S., Agustina, N., Faslah, R., Ali, R. M., & Careca Mauregar, T. (2016). Rapid Application Development of Decision Support System Using Naive Bayes Classification to Classify Dengue Hemorrhagic Diseases, 2(1), 1–5. Retrieved from www.ijsrst.com.

[4]. Johnston, F. R., Boyland, J. E., Meadows, M., & Shale, E. (1999). Some properties of a simple moving average when applied to forecasting a time series. Journal of the Operational Research Society, 50(12), 1267–1271.

[5]. Lewis, J. R. (1995). IBM Computer Usability Satisfaction Questionnaires: Psychometric Evaluation and Instructions for Use. International Journal of Human-Computer Interaction, 7(1), 57–78. https://doi.org/10.1080/10447319509526110

[6]. Seffah, A, Donyaee, M, Kline, RB, & Padda, HK (2006). Usability measurement and metrics: A consolidated model. Software Quality Journal, Springer

[7]. Zeng, L. (2009). Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition) by B. Shneiderman and C. Plaisant. International Journal of Human-Computer Interaction, 25(7), 707–708. https://doi.org/10.1080/10447310903187949

[8]. Gorla, N., Somers, T. M., & Wong, B. (2010). Organizational impact of system quality, information quality, and service quality. Journal of Strategic Information Systems, 19(3), 207–228. https://doi.org/10.1016/j.jsis.2010.05.001

[9]. Nelson, R. R., Todd, P. A., & Wixom, B. H. (2005).Antecedents of information and system quality: An empirical examination within the context of data warehousing. Journal of Management Information Systems, 21(4), 199–235. https://doi.org/10.1080/07421222.2005.11045823

[10]. Hartmann, J., Sutcliffe, A., & Angeli, A. De. (2008). Towards a theory of user judgment of aesthetics and user interface quality. ACM Transactions on Computer-Human Interaction, 15(4), 1–30. https://doi.org/10.1145/1460355.1460357