

Point-of-Sale System with Card Reader for HTM Department

Stephanie C. Arig*, Edmalyn R. Borbon, Thrycee C. De Guzman, Kimberly A. Reynaldo, Mark Leslie D. Melendez

Pangasinan State University

*Corresponding author

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ABSTRACT

In today's digital era, every business must adapt to survive to stay competitive the business needs to be innovative and take advantage of the technology. Incorporating a Point-of-Sale System transforms the transactions and empowers businesses to seamlessly manage sales, and customer interactions. The HM Department at Pangasinan State University Alaminos City Campus will serve this POS System with Card Reader to simulate their bar selling sale process. This study presents the conceptual framework for POS System that ensures smooth transactions, enhances accuracy, and reduces human error for the improvement of the entirely business transactions. The three-tier architecture was used to the proposed system to serve as a support or guide for the development of the system. The Related Literature reviews were used to support the development of the POS System for HM Department and aid the proponents in designing the conceptual framework. Furthermore, interviews and observation were used to understand and gather in-depth data about the process of every transaction in the target area. As the world, and specifically the business industry, embraces technology in our daily lives, the POS System would be a great tool for the HM students of PSU Alaminos City Campus to face the business world in their future.

Keywords: Point-of-sale System, card reader, business transactions, simulation

INTRODUCTION

According to Twi-global.com (n.d.), a simulation involves creating a model that accurately imitates the behavior, operation, or processes of an existing or proposed system. By mimicking these operations in a controlled environment, simulations serve as a tool for analyzing and understanding how a system functions under various conditions. On a business or educational context, a simulation can be used to evaluate the performance of a proposed technological solution, such as a Point of Sale (POS) system, before implementing it in an actual environment (Gutierrez, 2024). This approach minimizes risks, reduces costs, and identifies potential challenges early in the development phase. Furthermore, when integrated with virtual reality technologies, simulations can offer a more immersive experience, allowing users to interact with the simulated environment as if it were real.

Every process begins with a simulation or training phase, serving as a foundational step to ensure understanding, accuracy, and preparedness before real-world implementation. Without simulation and exposure in technology, there's a lack of preparedness in the future especially these students who will be working in the industry. These simulations provide an opportunity to practice skills and knowledge in a safe and controlled environment, helping individuals bridge the gap between academic learning and practical application. Additionally, without engaging with technological materials during training, students may miss out an opportunity in their careers (Cartens et al, 2021). According to Wolff (2021) In today's world, industries are increasingly relying on advanced technology, and exposure to these tools during training helps ensure that future professionals are well-equipped to handle real-world challenges effectively.

This study focuses on developing a simple yet sophisticated Point of Sale (POS) System. Tasked with simulating real-life business scenarios, this innovative system is designed to process orders and payments

seamlessly through card reader transactions. With two distinct levels of access – the cashier view and the admin view – the POS System promises to be a versatile tool for Hospitality Management students, offering practical insights into transactional processes. Moreover, the system incorporates features for inventory management and generates comprehensive monthly sales reports, providing students with invaluable hands-on experience essential for their future careers in the dynamic hospitality industry.

The authors aim to address these issues through the design of Point-of-Sale System that will provide an easy way for business sales transactions and inventory management of HM Department at PSU – ACC.

METHODOLOGY

The research design of POS System with Card Reader involved a combination of descriptive and developmental approaches. Descriptive research using questionnaires and interviews was employed to assess aspects like development, user experience, and educational effectiveness (Hassan, 2024). The developmental approach directs the study in building and developing the software, including the needed features based on the stakeholder's specifications. It describes the cycle phases necessary to produce a consistent and effective system.

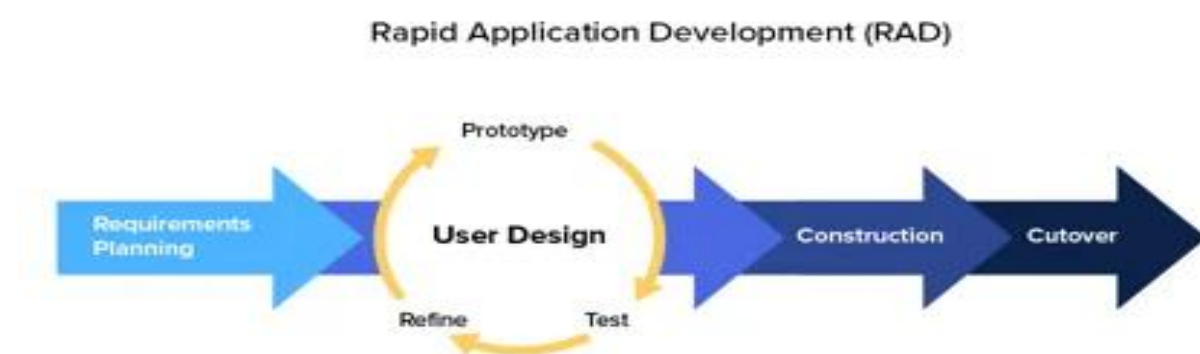


Figure 1. Rapid Application Development

In this model, the system development process starts with the planning of the requirements. In this phase, the proponents will use interviews to gather data from Dr. Pauleen Camba about the current process in terms of their transactions and sales; how they accept and generate their sales. The proponents will also use observation to determine. Through interviews and observations, it identifies the potential opportunities for improvement. By establishing clear communication channels and mutual understanding within the system project, they ensure collaboration and alignment among all team members with the project's goals and objectives.

In the user design phase, the proponents will use figma to create a prototype of the system. In addition, the proponents will also use flowcharts to identify the ins and outs or flow of the whole system and an ERD to have a clear visual representation of complex data. Once layout has been constructed in the figma the proponents will present the design to the user to gather feedback and determine the possible changes needed to be fixed before constructing the system. Once the client provides feedback the proponents will redefine the prototype until the client is satisfied.

During this phase this is where the execution takes place. The programmer will use Microsoft Visual Studio Code as an editor to convert the system specifications into a machine-readable computer code. Furthermore, the developer will also use XAMPP as a web server for the system and MySQL as a database language.

In this final phase, the system will be brought to the IT experts to take a test. The ISO 9126 will be a based standard for the survey questionnaire given by the proponents and will employ a black box testing. Testers will

input valid and invalid data to evaluate how the system handles various scenarios, such as route planning, spatial analysis, or data visualization. Once the system has been checked it will now hand it over to the user. The documentation and training for the users will be conducted to ensure the effectiveness of the usage in the developed system.

Table 1: Respondents of the study

Respondents	Number of Respondents
HM Students	40
HM Instructors	9
IT Experts	5
Total	54

The research was carried out at Pangasinan State University, Alaminos City Campus focusing on the academic year 2024-2025. The selection participants followed a purposive sampling approach, where individuals were chosen based on specific criteria aligned with the research objectives (Hassan, 2024). These participants include the HM Students of the campus, an instructor that are teaching in terms of the bar management, and IT Experts. Table 1 enumerates the participants of the study.

Scale	Statistical Limits	Rating	Descriptive Interpretation
5	4.21-5.00	Excellent	Requirements are met and functioning very well.
4	3.41-4.20	Very Good	Condition is functioning properly.
3	2.61-3.40	Good	Condition is limited and functioning properly.
2	1.81-2.60	Fair	Condition is adequate and functioning is fairly
1	1.00-1.80	Poor	Condition is need by missing.

Table 2. Scale of Measurement

A survey questionnaire was prepared and adapted from the ISO 9126 to assess the developed system in terms of its acceptability. Statistical treatment was utilized to analyze the responses of the respondents on the validation of the system for the usability test. This study used a 5-points Likert Scale where 5 is the highest having the rating of Excellent and 1 is the lowest with the rating of Poor as illustrated in Table 2. Responses were tabulated and analyzed through a weighted mean. Weighted Means are beneficial when some data points deserve more weight due to their greater significance in the context of your analysis.

RESULTS AND DISCUSSION

The development of a Point-of-Sale System with a card reader integration within the HTM Department requires a structured approach to ensure the successful implementation of this feature. Frameworks provide a set of tools and elements that help in the speedy development process. It acts like a template that can be used and even modified to meet the project requirements (Mathur, 2024). The proposed project framework and architecture illustrate the approached use in the development of the POS system with card reader for HTM Department.

The POS system with card reader facilitates two user access level: the admin and the cashier. The admin has the ability to utilize and access all the functionalities of the system. Cashier limits its ability to taking order and facilitates payment transactions. The integration of card reader enables secure card transactions, supporting various payment methods, such as card and cash.

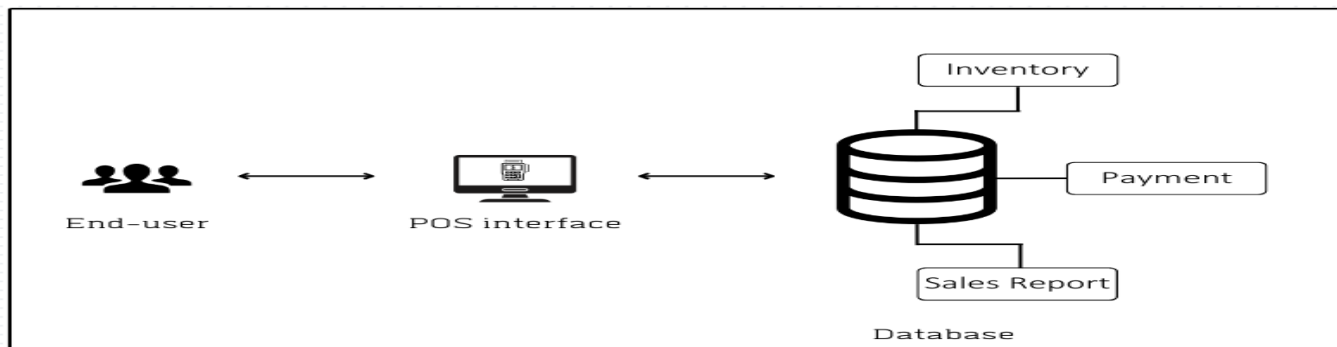


Figure 2: Three-Tier Architecture

A Three-tier application architecture is a modular client-server architecture that consists of a presentation tier, an application tier and a data tier. The three tiers are logical, not physical, and may or may not run on the same physical server (Gillis,2024).

The presentation tier allows for an easy interaction with the end users. It provides different aspects of POS system including ordering system, payment transactions and inventory.

The application tier is responsible for managing the application's flow and processing user's inputs. It is effective in the payment processing of transactions and at the same time protecting the card details used and proper computation of orders.

The data tier for the POS system with a card reader includes a well-organized database for efficient storage and retrieval of transactional data. It supports detailed monitoring and analysis of sales and stock. The proposed system guarantees the immediate availability of necessary data and the necessary freedom for future evolution.

The three-tier architecture plays a significant role in the efficiency and effectiveness of the POS system with a card reader. Each tier—presentation, application, and data—contributes uniquely to the overall functionality and user experience. Collectively, these three tiers ensure that the system operates smoothly, providing reliable service and enhancing operational efficiency for the business.

CONCLUSION

The development and implementation of a Point-of-Sale system with card reader integration is a versatile and indispensable tool for the HM Department, offering practical insights and hands-on experience for students. It exemplifies the transformative impact of technology on business operations, setting a benchmark for efficiency, reliability, and customer satisfaction in the dynamic hospitality industry. By addressing the challenges of manual operations and enhancing transactional processes, this POS system not only meets the current needs of the department but also prepares it for future advancements in technology and business practices.

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