

Bank Mini Semarak: School Education Fee Payment Information System using V – Model

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Abstract

SMK PGRI 5 Jember is a vocational high school located in Jember, Indonesia. Established with a mission to provide quality vocational education, SMK PGRI 5 Jember has become a well-known institution in the region. The school offers various vocational programs aimed at equipping students with practical skills and knowledge that are directly applicable to the workforce. The advancement of technology in the education sector has revolutionized various administrative processes, including payment systems. Traditionally, SMK PGRI 5 Jember, like many other educational institutions, has relied on manual payment systems for tuition fees, which involve students or their guardians making payments directly at the school office or through bank transfers. An online payment system offers numerous advantages that address the challenges associated with manual payment processes. Firstly, it enhances the efficiency of the payment process by allowing transactions to be completed quickly and easily from anywhere, at any time, without the need for physical presence at the school. This is particularly beneficial for parents or guardians who may have difficulty visiting the school during working hours. The V-Model emphasizes the importance of testing and validation at each stage of the software development lifecycle, ensuring that the system meets the specified requirements and works as intended.

Keywords : Fee Payment, Information System, V-Model

1 INTRODUCTION

SMK PGRI 5 Jember is a vocational high school located in Jember, Indonesia. Established with a mission to provide quality vocational education, SMK PGRI 5 Jember has become a well-known institution in the region. The school offers various vocational programs aimed at equipping students with practical skills and knowledge that are directly applicable to the workforce.

SMK PGRI 5 Jember is committed to nurturing students' talents and abilities through hands-on training, industry collaboration, and a curriculum that is designed to meet the demands of the current job market. The school has established partnerships with various industries and businesses, ensuring that students have opportunities for internships and real-world experience during their studies.

In addition to its vocational programs, SMK PGRI 5 Jember also emphasizes character education, aiming to develop students who are not only skilled professionals but also responsible and ethical individuals. The school supports extracurricular activities that promote personal growth, teamwork, and leadership skills.

The institution is equipped with modern facilities and laboratories that support the learning process, ensuring that students have access to the latest tools and technologies relevant to their fields of study. SMK PGRI 5 Jember continues to evolve and adapt to changes in the education landscape, striving to produce graduates who are ready to contribute to the development of the nation.

The advancement of technology in the education sector has revolutionized various administrative processes, including payment systems. Traditionally, SMK PGRI 5 Jember, like many other educational institutions, has relied on manual payment systems for tuition fees, which involve students or their guardians making payments directly at the school office or through bank transfers. However, this manual system is increasingly being seen as inefficient, prone to errors, and time-consuming, leading to the need for an online payment system [5].

An online payment system offers numerous advantages that address the challenges associated with manual payment processes. Firstly, it enhances the efficiency of the payment process by allowing transactions to be completed quickly and easily from anywhere, at any time, without the need for physical presence at the school. This is particularly beneficial for parents or guardians who may have difficulty visiting the school during working hours.

Furthermore, research suggests that schools that implement online payment systems experience increased financial transparency and better financial management [1]. By automating payment records and integrating them with the school’s financial management system, SMK PGRI 5 Jember can improve its budgeting, auditing, and reporting processes, ultimately contributing to better financial oversight and governance.

Given these benefits, it is evident that SMK PGRI 5 Jember would greatly benefit from transitioning to an online payment system, which not only meets the needs of the institution but also enhances the overall experience for students and their families.

The V-Model is a popular software development process that is an extension of the waterfall model. The V-Model emphasizes the importance of testing and validation at each stage of the software development lifecycle, ensuring that the system meets the specified requirements and works as intended. The model is represented as a "V" shape, where each phase of development corresponds to a matching phase of testing or validation.[2]

2 RESEARCH METHOD

The V-Model (Verification and Validation Model) is a structured approach to software development that emphasizes the importance of validating each stage of the development process against its corresponding testing phase. When applied to the development of an educational payment system, the V-Model ensures that each component of the system is thoroughly tested and meets the specified requirements before moving to the next stage. This methodology is particularly effective in projects where the requirements are well-defined and unlikely to change significantly [6].

The research design for developing an educational payment system using the V-Model involves several key phases: requirement analysis, system design, architecture design, module design, and coding, each of which is followed by a corresponding testing phase. This research will focus on how each phase of the V-Model contributes to the overall reliability, security, and usability of the educational payment system.

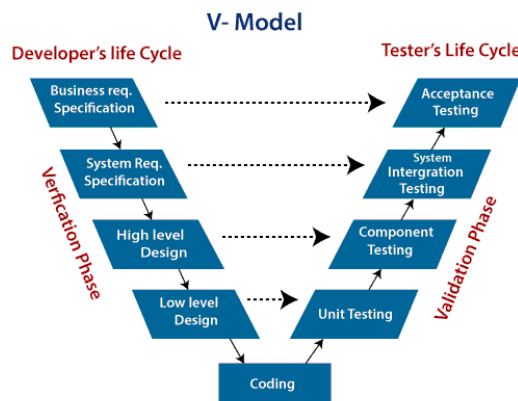


Figure 1. V-Model

3 RESULTS AND ANALYSIS

The implementation and analysis of the educational fee payment information system using the V-Model at SMK PGRI 5 Jember reveals a structured and efficient approach to system development. The V-Model, which emphasizes validation and verification at each stage of the development process, ensured that the system met the specific requirements of the institution.

3.1. System Design

The design of a school fee payment information system typically begins with a use case diagram, which helps to outline the interactions between users (actors) and the system. In this context, the primary actors include students, parents, administrative staff, and the financial department [4]. The system should support essential functions such as fee payment, receipt generation, fee status checking, and report generation. The use case diagram offers a visual representation of these interactions, showing how each actor utilizes different system functionalities [3]. This design ensures that all user needs are addressed, promoting an efficient and user-friendly system. Use case diagrams play a crucial role in clarifying user requirements and aligning system functionality with organizational goals.

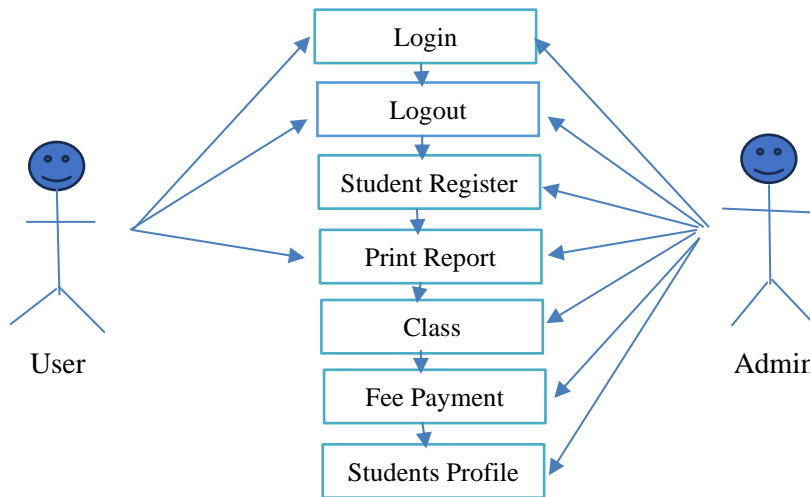


Figure 2. Use Case Diagram

3.2. Database Design

The database system for school fee payments consists of two primary data components: student data and their corresponding educational fee payment records. The student data includes essential information such as student ID, name, grade level, and contact details, which are crucial for identifying and managing individual accounts. The educational fee payment data encompasses details like payment amount, due dates, payment status, and transaction history. By integrating these datasets, the system enables accurate tracking of fee payments, ensuring that each student's financial obligations are clearly recorded and monitored. This structure not only streamlines the payment process but also provides valuable insights for financial reporting and analysis.

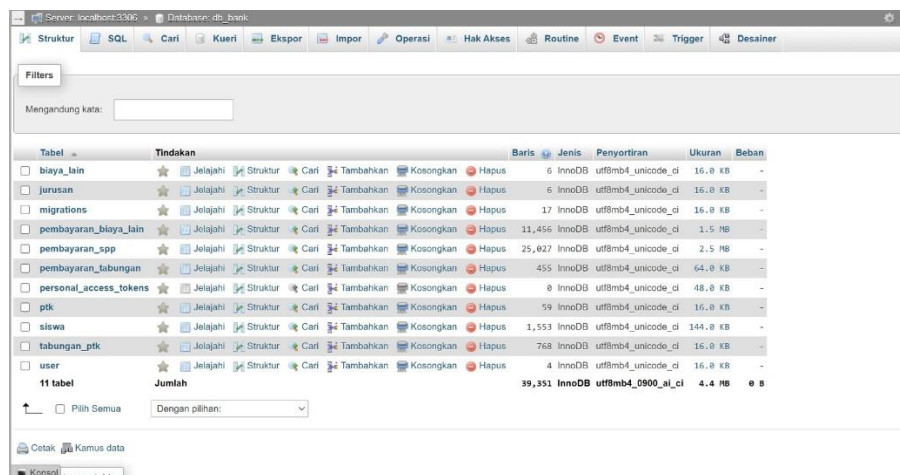


Figure 3. Database System

3.3. Website Design

a. Login System

The login interface of the system is designed to be simple and secure, featuring fields for a username and password. Users are required to enter their unique username, which serves as an identifier, and a corresponding password to authenticate their identity. This dual-entry system ensures that only authorized users can access the system, protecting sensitive information from unauthorized access. The straightforward design of the login screen enhances usability while maintaining a high level of security, making it easy for users to log in quickly and securely.

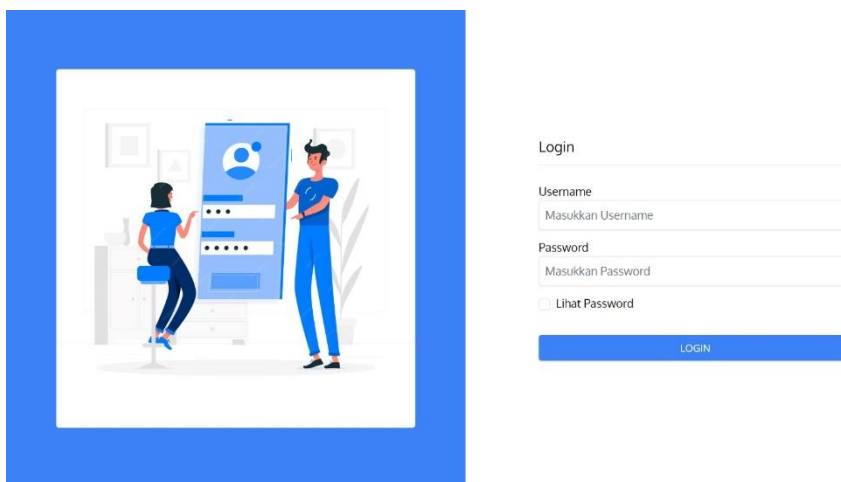


Figure 4. Login System

b. Homepage System

The homepage menu of the educational fee payment system at SMK PGRI 5 Jember includes several key sections: Profile, Majors, Information, Articles, Teacher Directory, and New Student Admissions (PPDB). The "Profile" section provides an overview of the school and its mission, while the "Majors" section details the various academic programs offered. The "Information" section is dedicated to updates and announcements, and the "Articles" section features educational content and news. The "Teacher Directory" lists the teaching staff, and the "PPDB" section guides prospective students through the admissions process. This comprehensive menu structure ensures that users have easy access to essential information and resources.



Figure 5. Homepage System

c. Menu System

The system menu is structured into two main components: the Main Menu and the Master Data section. The Main Menu includes key options such as Dashboard, Account, and Logout, providing users with essential navigation and account management functions. The Master Data section encompasses critical datasets, including User Data, Student Data, Major Data, Additional Fees Data, and Payment Data. This section allows administrators to manage and update the core information necessary for the system's operation. Additionally, the system prominently displays the total number of students and majors, offering a quick overview of these vital statistics. This menu organization facilitates efficient management and access to the system's functionalities.

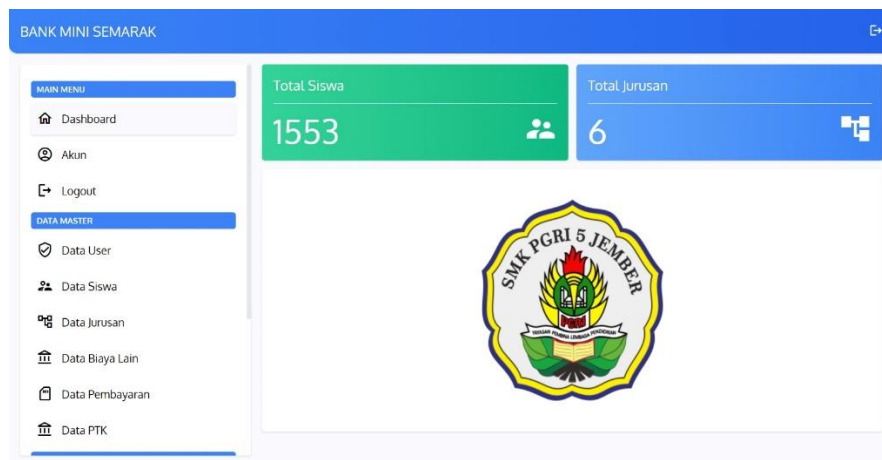


Figure 6. Menu System

d. Payment Data System

Payment system data encompasses a broad range of information essential for processing transactions and ensuring financial accuracy. This data includes transaction records, payment methods, user authentication details, and merchant information, all of which are crucial for maintaining the integrity and efficiency of financial operations. By analyzing payment system data, organizations can detect fraudulent activities, optimize transaction processes, and improve customer experiences, ultimately fostering trust and reliability in financial transactions.

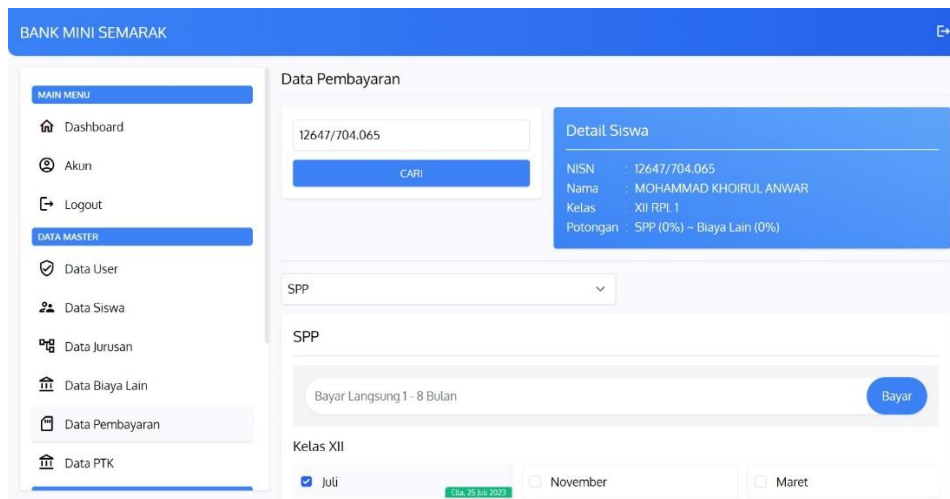


Figure 7. Payment Data System

4 CONCLUSION

The V-Model offers a systematic approach to the development of an educational payment system, ensuring that each phase of development is directly validated through corresponding testing. This methodology not only improves the quality and reliability of the system but also ensures that the final product meets the needs of all stakeholders. The implementation and analysis of the educational fee payment information system using the V-Model at SMK PGRI 5 Jember reveals a structured and efficient approach to system development. The V-Model, which emphasizes validation and verification at each stage of the development process, ensured that the system met the specific requirements of the institution. By aligning the design, coding, and testing phases with corresponding validation processes, the system was developed with a high level of accuracy and reliability. This resulted in a user-friendly and secure payment platform that significantly improved the efficiency of fee transactions, minimized errors, and enhanced overall satisfaction for both students and administrative staff.

REFERENCES

- [1] Ali, A., & Zubair, M. (2021). The Impact of Digital Payment Systems on Financial Management in Educational Institutions. *Journal of Educational Technology Systems*, 50(1), 23-38.
- [2] Balaji, S., & Murugaiyan, M. S. (2012). Waterfall vs V-Model vs Agile: A comparative study on SDLC. *International Journal of Information Technology and Business Management*, 2(1), 26-30.
- [3] Hamuda, J., Taufik, M., & Kurniadi, D. (2022). Pemanfaatan Midtrans Sebagai Gateway Pada Sistem Pembayaran Administrasi Sekolah. *TRANSISTOR Elektro dan Informatika*, 4(3), 202-207.
- [4] Pankaj, K., & Choudhury, T. (2019). A Comparative Study of Software Development Life Cycle Models. *International Journal of Engineering and Advanced Technology*, 8(3), 83-87.
- [5] Smith, R., & Johnson, L. (2020). Enhancing Administrative Efficiency Through Online Payment Systems in Schools. *Educational Administration Quarterly*, 56(4), 605-622.
- [6] Tiwari, P., & Singh, R. (2019). A Review on Software Development Life Cycle Models. *Journal of Emerging Technologies and Innovative Research*, 6(2), 82-89.