International Journal of Engineering, Science and InformationTechnology
Volume 4, No. 3 (2024) pp. 28-34
ISSN 2775-2674 (online)
Website: http://ijesty.org/index.php/ijesty
DOI: https://doi.org/10.52088/ijesty.v4i3.520
Research Paper, Short Communication, Review, Technical Paper

Analysis of the Web Development of Piksi Ganesha Polytechnic Campus Students With the Integration of the MBKM Program Menu in the Student Information System Project

Johni S Pasaribu*, Arum Tamami

Department of Information System, Faculty of Engineering, Politeknik Piksi Ganesha, Bandung, Indonesia

**Corresponding author Email: [1] johni_0106@yahoo.com,[2]piksi.arum.20402077@gmail.comjohni*

The manuscript was received on 10 January 2024, revised on 28 Feb March 2024, and accepted on 22 June 2024, date of publication 18 August 2024

Abstract

The development of information technology has had a significant impact on higher education, with the campus web becoming one of the main means for interaction and access to information. Politeknik Piksi Ganesha as a progressive educational institution has modernized student services and data management and modified the previously existing web through the student information system (SIM-SIS) project. This study aims to analyze the development of the Piksi Ganesha Polytechnic campus student web with the integration of the Merdeka Belajar Kampus Merdeka (MBKM) program menu in the Student Information System (SIM-SIS) project. In this study, the authors used the waterfall model as a web development model for students of the Piksi Ganesha Polytechnic campus. The result of this study indicate that the integration of the MBKM program menu on SIM-SIM provides a significant increase in the accessibility of information and management of the Merdeka Belajar Kampus Merdeka program for the students. The implications of this research contribute to the understanding and development of educational information systems in the campus environment, and provide a basis for futher improvement in campus web development.

Keywords: *Analysis, Web Development, MBKM, Student, Project.*

1. Introduction

Information technology can be used as a tool to access information. This information system is used as an effective tool for data processing that allows users to transform raw data into relevant and useful information[1]. The advancement of information technology has greatly impacted education, particularly in how information is managed and accessed via online platforms [2]. In today's digital age, campus websites serve as the primary tool for students, faculty, and administrative staff to interact and access the various services offered by educational institutions. Politeknik Piksi Ganesha is one example of an institution that has progressively adopted information technology. Traditionally, organizations implemented information systems to address internal business issues, often resulting in isolated systems within the organization. However, with the emergence of technologies that focus on external interactions[3], there is an increasing need for organizations to integrate legacy systems with newer technologies. Research indicates that the main objective of integrating information systems is to improve business performance, productivity, and overall organizational efficiency, ultimately boosting effectiveness and competitiveness[4], [5].

As an educational institution committed to providing the best service to students, Piksi Ganesha Polytechnic continues to update and develop its information system. In line with this commitment, the Student Information System (SIM-SIS) development project has been initiated with the integration of the Merdeka Belajar Kampus Merdeka (MBKM) program menu on the Piksi Ganesha Polytechnic campus web. In this context, analyzing the development of the Piksi Ganesha Polytechnic student web is very relevant to study.

The purpose of this paper is to explore how information systems have been utilized for integration purposes and to examine the impact of integrated information systems from both internal and external perspectives on the quality of electronic services. This research highlights the significance of integration in building and maintaining high levels of customer service quality. Additionally, it underscores the role of

information system integration in delivering high-quality electronic services as an innovative strategy to engage with customers in the digital marketplace. Poorly integrated information systems are often cited as a major obstacle to effective investment in information technology. Moreover, enhancing e-service quality is viewed as a critical competitive strategy for survival in the digital marketplace.
Through the integration of the MBKM program menu, it is hoped that the student information system can provide grater benefits for all stakeholders, including students as the main users, lecturers, and administrative staff.

2. Literature Review

2.1. Organizational Integration

Integration has been a key area of research across multiple disciplines, such as organizational theory, production/operations management, strategy, and information systems [6], [7]. In the context of information systems, organizational integration specifically refers to the coordination between various departments and functional units within a company. Sikora and Shaw describe it as the connection between these diverse parts[8]. Barki and Pinsonneault define it as the extent to which distinct and interdependent organizational units or components work together as a unified entity [9]. These components may include people, processes, and technology, and can involve different departments, units, or partners within the organization [10].
Organizational integration has both relational and structural dimensions, encompassing relationships with customers, retailers, manufacturers, and suppliers [11], [12], [13]. Rather than eliminating the specialization of different units, the aim of organizational integration is to allow distinct and complementary parts to function together smoothly without merging them into a single, undifferentiated entity[9].
Organizational integration can be divided into internal and external forms. Internal integration takes place within a single firm, while external integration involves at least two independent organizations. To further analyze internal integration, the value chain and process perspectives are commonly used. Internal integration includes two types: operational integration, which deals with core processes, and functional integration, which focuses on support processes.
External integration similarly includes operational and functional types but is broken down further. Operational forward integration refers to coordination in areas like distribution and retail, backward integration focuses on supply chain processes, and lateral integration involves connecting components. External functional integration, in contrast, addresses the integration of support processes across different organizations [9].

2.2. Information System Integration

In the field of information systems, integration is viewed from two primary perspectives. The first perspective, from a technical standpoint, suggests that integration serves as a mechanism to illustrate the interconnectedness of information technologies within an organization and the extent to which a common conceptual representation of data elements is shared[7], [14]. In this context, integration refers to the degree to which various systems within an organization are linked and can communicate with each other, often described as the "islands of technology integration" [15], [16], [17], [18], [19], [20], [21].
The second perspective considers integration as the extent to which two or more independent organizations have standardized their business processes, connecting them through telecommunications technologies and computer systems.
The primary objective of information system integration is to enable the exchange and sharing of information within an organization[22], [23], and to promote inter-organizational coordination—such as between buyers and suppliers—to improve monitoring capabilities, especially in supply chain management [24], [25]. In terms of technological integration, it has been consistently emphasized that all applications, data, and communication systems should be integrated [26], [27] to provide real-time and consistent connectivity across functional components within supply chains [25].

3. Research methods

This system was developed using the UML (Unified Modeling Language) research method. UML is a tool in the development of object-oriented systems. UML provides a modeling language that is easy to understand and equipped with an effective mechanism for making good system development[28]. The waterfall model is the model used by the author in developing the Piksi Ganesha Polytechnic student web. The waterfall model is a series of phases in sequence. In this method, each phase of the project must be fully completed before moving on the next phase. The waterfall model is recursive in that each phase can be repeated endlessly until it can be refined again[29].
This method is suitable for use in conjunction with UML because UML provides tools to model the software development process in structured manner. Waterfall methodology is a software development approach that follows sequential steps, starting from analysis, design, implementation, and testing stages[30]. The following is an example of an illustrative image of the waterfall system development stages :

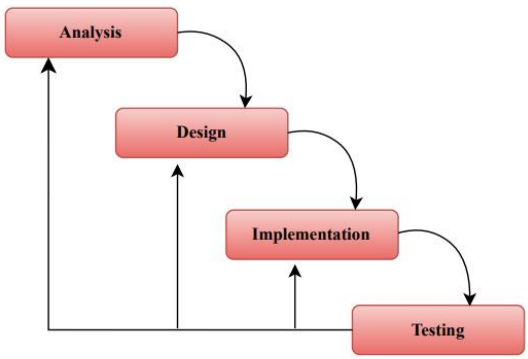

Fig 1. Stages of development waterfall method

4. Resault and Discussion

4.1. Analysis

Starting from the stage of describing a system which will then be designed in accordance with what is needed by the system design, such as the needs of hardware analysis, software, and also the interests of the input or output process and data interest analysts and the process of collecting a data[31]. This stage is an important step in web development that ensures that the final product meets user expectations and project goals. This process includes identifying barriers and user expectations to design a system that user needs.
In this stage the author obtains information by taking steps including:

4.1.1. Interview

Interview is a data collection technique that is carried out by asking a question or asking questions directly to the research subject[31]. Interview allow researchers to get in-depth information from users or stakeholders regarding their needs, experiences, and expectations of the development of the Piksi Ganesha Polytechnic campus student web.

4.1.2. Observation

The author makes direct observation on the pre-existing system to understand the current system and analyze the needs and evaluate the system. Observation is a data collection technique by making direct observations on conditions or situations in subject in research[31].

4.2. Design

4.2.1. Use case diagram

To describe the functionality of the system, the author uses a use case diagram. Use case diagrams help identify and define the role of each actor in the system to be implemented[31]. By describing the interactions between actors and use cases on a use case diagram, it can help in designing a system architecture that meets user needs and specisications that have been set[32]. The process of managing student information system activities is described through the use case diagram as follows :

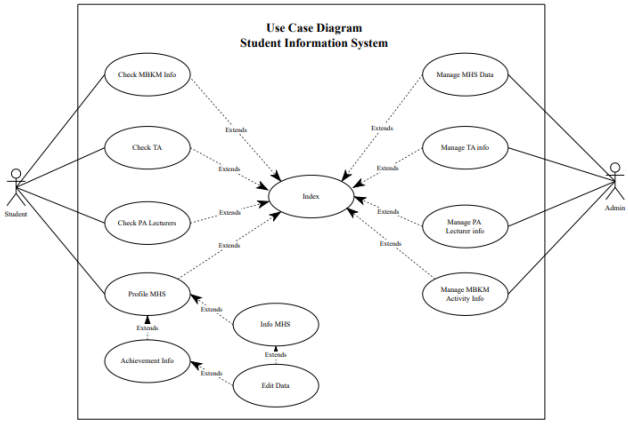

Fig 2. Use case diagram of Student Information System

4.2.2. Activity diagram

Modeling that describes the various workflows of a system activity is done in the activity diagram. So that the workflow on the system can be easily understood, activity diagrams have techniques in visualizing procedural logics, business processes, and workflows[31], [33]. The process of managing student information systems is described the activity diagram as follows :

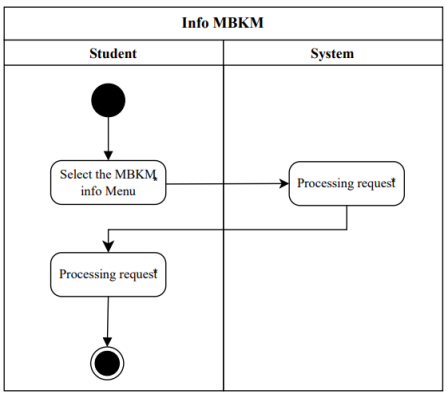

Fig 3. Activity diagram of MBKM Information

4.3. Implementation

To make it easier for users to understand a Student Information System (SIM-SIS) the author applies a User Interface (UI). The user interface is the point of interaction between the user and the system, the UI is designed to allow users to interact with the system effectively and efficiently. So that a series of elements are easily understood, user interface access is used as a facility for implementing the proposed design so that it is synchronized with the wishes of the user. The following is a view of the Student Information System (SIM-SIS) project with the integration of the MBKM program menu :

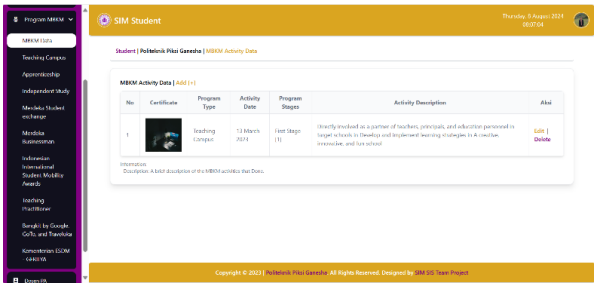

Fig 4. MBKM data menu

On the MBKM data page, provides information related to MBKM activities that have been carried out by the Piksi Ganesha Polytechnic campus.

Fig 5. Teaching campus menu

On the teaching campus page, it provides information related to learning channels that provide opportunities for students to study off campus for one semester.

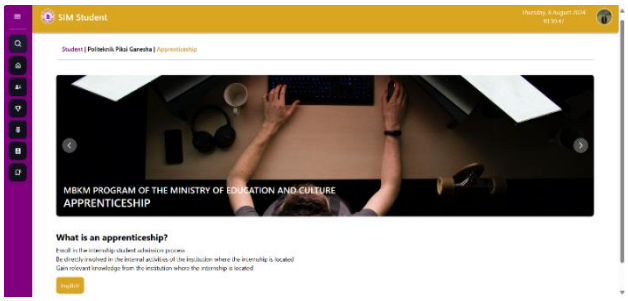

Fig 6. Apprenticeship menu

On the apprenticeship page, contains information related to one of the ministry of education and culture MBKM programs, namely the internship program.

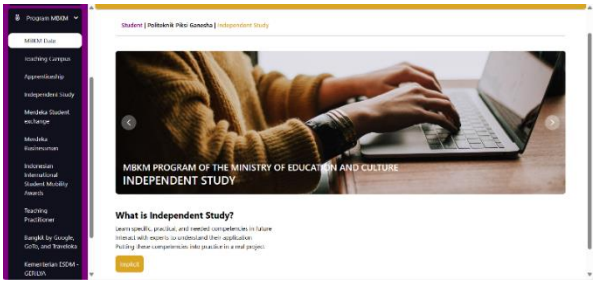

Fig 7. Independent study menu

The independent study page, contains information about specific, practical, and future competencies.

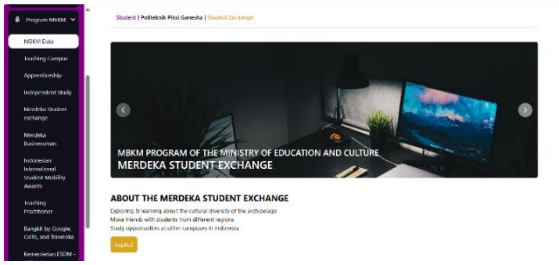

Fig 8. Merdeka student exchange menu

On the merdeka student exchange page, provides information related to the cultural diversity of the archipelago with the opportunity to study at other Indonesian campuses, with merdeka student exchange programs.

Fig 9. Merdeka businessman menu

On the merdeka businessman page, displays information on registered entrepreneur data.

Fig 10. IISMA menu

On the IISMA page, it contains information related to student exchange programs with other universities from around the world.

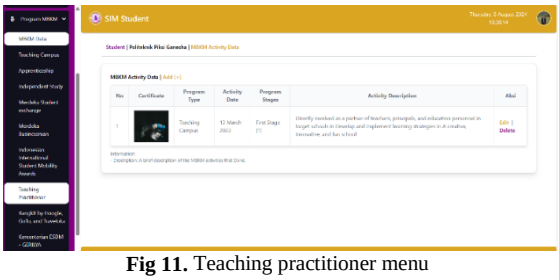

Fig 11. Teaching practitioner menu

On the teaching practitioners page, it provides information about a program initiated by the ministry of education related to active collaboration between expert pratitioners and champion lecturers so that university graduates are better prepared to enter the world of work.

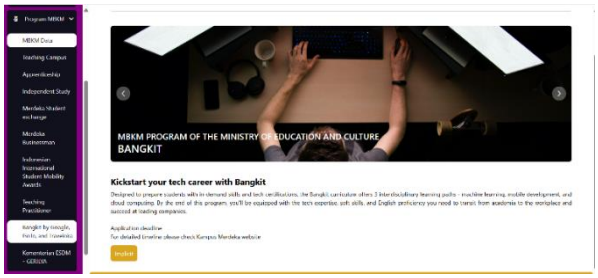

Fig 12. BANGKIT menu

On the BANGKIT page, provides information related to the independent study program certified by Merdeka campus.

Fig 13. GERILYA menu

On the GERILYA page, contains information related to the Internship and Certified Independent Study (MSIB) program The Solar Electricity Initiative Movement (GERILYA) is a program that provides space for students to gain experience in knowing the professional world and creating a professional workforce, especially in the field of the latest energy industry.

4.4. Testing

The blackbox method is used to test the Ganesha Polytechnic Piksi campus student web which has been integrated with the MBKM program menu. Blackbox testing is a system testing technique where the tester does not need to know the internal structure or implementation of the system being tested[34]. The main focus of this method is on software specifications and functionality to ensure that the system functions as expected. Tabel 1 displays the test results

Table 1. Blackbox testing

No	Testing	Results
1	Display, add, edit, delete data on the MBKM	success
2	Displays the teaching campus page	success
3	Displays the apprenticeship page	success
4	Displays the independent study page	success
5	Displays the Merdeka student exchange page	success
6	Displays Merdeka businessman page	success
7	Displaying the IISMA (Indonesia International Student Mobility Awards) page	success
8	Featuring teaching practitioners	success
9	Displays BANGKIT by Google, Go To, and Traveloka pages	success
10	Displays the ESDM-GERILYA page	success

From this research, the Ganesha Polytechnic Piksi campus student web has been integrated with the MBKM program menu which is able to facilitate and accelerate students to obtain accurate information.

5. Conclusion

The results of thjs study indicate that the addition of the MBKM program menu can increase efficiency for students, lecturers, and administrative staff in obtaining information. With the integration of the MBKM menu, students can find out the programs that are currently running on the Ganesha Piksi Polytechnic campus so that it increases interest for students, in participating in program that have been recommended by the ministry of education.

References

[1] Meilinda Eva ; Jayanti Eka Wanty, “THE ROLE OF WATERFALL AS A DEVICE DEVELOPMENT METHOD SOFTWARE ON THE LAND TAX DATA COLLECTION INFORMATION SYSTEM AND BUILDING,” *THE ROLE OF WATERFALL AS A DEVICE DEVELOPMENT METHOD SOFTWARE ON THE LAND TAX DATA COLLECTION INFORMATION SYSTEM AND BUILDING*, vol. 14, pp. 1–12, 2022.

[2] J. Pasaribu S *et al.*, *PENGANTAR TEKNOLOGI INFORMASI:KONSEP DAN PERKEMBANGANNYA*. 2023.

[3] M. Rees and P. Hopkins, “Towards the Integration of Social Media with Traditional Information Systems,” 2008.

[4] G. D. Bhatt, “An empirical examination of the effects of information systems integration on business process improvement,” *International Journal of Operations & Production Management*, vol. 20, no. 11, pp. 1331–1359, Jan. 2000, doi: 10.1108/01443570010348280.

[5] G. D. Bhatt and V. Grover, “Types of information technology capabilities and their role in competitive advantage: an empirical study,” *Types of information technology capabilities and their role in competitive advantage: an empirical study, Journal of Management Information Systems*, vol. 22, pp. 253–277, 2005.

[6] C. Chandra and S. Kumar, “Enterprise architectural framework for supply-chain integration,” *Industrial Management & Data Systems*, vol. 101, no. 6, pp. 290–304, Jan. 2001, doi: 10.1108/EUM0000000005578.

[7] R. Hsiang-Li CHIANG, E. Peng LIM, V. C. Storey, R. Hsiang-Li, and E. Peng, "A framework for acquiring domain semantics and knowledge for database integration," 2000. [Online]. Available: https://ink.library.smu.edu.sg/sis_research/160
[8] R. Sikora and M. J. Shaw, "A multi-agent framework for the coordination and integration of information systems," *A multi-agent framework for the coordination and integration of information systems*, pp. S65–S78, 1998.
[9] H. Barki and A. Pinsonneault, "A model of organizational integration, implementation effort, and performance," *A model of organizational integration, implementation effort, and performance*, vol. 16, pp. 165–179, 2005.
[10] H. J. Leavitt, "Change in industry: structural, technical and human approaches, in Management and Motivation," 1971.
[11] J. W. Dean and S. A. Snell, "Integrated manufacturing and job design: moderating effects of organizational inertia," *Integrated manufacturing and job design: moderating effects of organizational inertia*, vol. 34, pp. 776–804, 1991.
[12] J. E. Ettlie, *Taking Charge of Manufacturing: How Companies Are Combining Technological and Organizational Innovations To Compete Successfully*. 1988.
[13] T. G. Gunn, *Manufacturing for Competitive Advantage. Becoming a World Class Manufacturer*. 1987.
[14] D. L. Goodhue, M. D. Wybo, and L. J. Kirsch, "The impact of data integration on the costs and benefits of information systems," *The impact of data integration on the costs and benefits of information systems*, vol. 16, pp. 293–310, 1992.
[15] A. Dan, D. M. Dias, R. Kearney, and T. C. Lau, "Business-to-business integration with tpaML and a business-to-business protocol framework," *Business-to-business integration with tpaML and a business-to-business protocol framework*, vol. 40, pp. 68–90, 2001.
[16] T. W. Malone, K. Crowston, J. Lee, B.Pentland, C. Dellarocas, and G. Wyner, "Tools for inventing organizations: toward a handbook of organizational processes," *Tools for inventing organizations: toward a handbook of organizational processes*, vol. 45, pp. 425–443, 1999.
[17] K. Srinivasan, S. Kekre, and T. Mukhopadhyay, ", Impact of electronic data interchange technology on JIT shipments," in , *Impact of electronic data interchange technology on JIT shipments*, vol. 40, 1994, pp. 1291–1304.
[18] P. M. C. Swatman and P. A. Swatman, "EDI system integration: a definition and literature survey," in *EDI system integration: a definition and literature survey*, vol. 8, 1992, pp. 169–205.
[19] G. E. Truman, "Integration in electronicexchange environments," *Integration in electronicexchange environments*, vol. 1, pp. 209–244, 2000.
[20] N. Venkatraman and A. Kambil, "The checks not in the mail-strategies for electronic integration in tax return filing," *The checks not in the mail-strategies for electronic integration in tax return filing*, pp. 33–34, 1991.
[21] N. Venkatraman and A. Zaheer, "Electronic integration and strategic advantage: a quasi-experimental study in the insurance industry," *Electronic integration and strategic advantage: a quasi-experimental study in the insurance industry*, vol. 1, pp. 377–393, 1990.
[22] J. Auramo, J. Kauremaa, and K. Tanskanen, "Benefits of IT in supply chain management: an explorative study of progressive companies," *International Journal of Physical Distribution & Logistics Management*, vol. 35, no. 2, pp. 82–100, Jan. 2005, doi: 10.1108/09600030510590282.
[23] Y. Yusuf, A.Gunasekaran, E. Adeleye, and K. Sivayoganathan, "Agile supply chain capabilities: determinants of competitive objectives," *Agile supply chain capabilities: determinants of competitive objectives*, vol. 159, pp. 379–392, 2004.
[24] E. K. Clemons, S. P. Reddi, and M. C. Row, "The impact of information technology on the organization of economic activity: the move to the middle 55 hypothesis," *The impact of information technology on the organization of economic activity: the move to the middle 55 hypothesis*, vol. 10, pp. 9–35, 1993.
[25] A. Rai, R. Patnayakuni, and N. Seth, "Firmperformance impacts of digitally enabledsupply chain integration capabilities," *Firmperformance impacts of digitally enabledsupply chain integration capabilities*, vol. 30, pp. 225–246, 2006.
[26] M. Müller and S. Seuring, "Reducing information technology-based transaction costs in supply chains," *Industrial Management & Data Systems*, vol. 107, no. 4, pp. 484–500, Jan. 2007, doi: 10.1108/02635570710740652.
[27] S. School Of Management, J. W. Ross, and C. Massachusetts, "CENTER FOR INFORMATION SYSTEMS RESEARCH Creating a Strategic IT Architecture Competency: Learning in Stages Massachusetts Institute of Technology," 2003. [Online]. Available: http://ssrn.com/abstract=416180
[28] J. S. Pasaribu, "An Analysis and Survey of Polishing Dents Warehouse Inventory Development," 2022, doi: 10.52088/ijesty.v1i1.242.
[29] Y. Herlita *et al.*, "DESIGN OF A WEBSITE-BASED SPP PAYMENT INFORMATION SYSTEM AT FAJRUL ISLAM HIGH SCHOOL JAKARTA," vol. 8, pp. 1–6, 2021.
[30] J. Pasaribu S, N. Heryana, and A. Maulana, "Rekayasa Perangkat Lunak : Konsep, Metode, dan Praktik Terbaik," *2023*.
[31] A. Nurseptaji and Y. Ramdhani, "APPLICATION OF WATERFALL METHODOLOGY TO LIBRARY INFORMATION SYSTEM DESIGN," *JURNAL DEVICE*, vol. 11, pp. 1–12, 2021.
[32] J. Pasaribu S, Irmawati, and R. Komalasari, *Analisis dan Desain Sistem Informasi : Pendekatan Terstruktur dan Berorientasi Objek*. 2023.
[33] K. Nistrina and L. Sahidah, "UNIFIED MODELLING LANGUAGE (UML) FOR THE DESIGN OF NEW STUDENT ADMISSION INFORMATION SYSTEM AT SMK MARGA INSAN KAMIL," 2022.
[34] J. S. Pasaribu, "Uji Responsif Multi-Perangkat pada Proyek Sistem Informasi Mahasiswa (SIM-SIS) Politeknik Piksi Ganesha," *Jurnal ICT : Information Communication & Technology*, vol. 23, pp. 355–360, 2023.