

Integrated Information System Model for Academic Integrated Performance Assessment

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Abstract. Data and information become the reporting materials that determine the accuracy of performance reporting in higher education. This study aims to develop an information system for integrated performance assessment (ISIPA) to address the issue of universities' inadequate data management. This deficiency impedes the reporting of lecturer performance, study program accreditation, lecturer career paths, university rankings, and opportunities to obtain competitive grants. The ISIPA program is developed using the System Development Life Cycle model by integrating internal and external information system applications of universities. Using the SDLC model, data analysis was performed. The results of the analysis demonstrate that the system performance has met the predetermined criteria. The performance of the Manager, Administrator, and User menu blocks of the system has satisfied the feasibility criteria. Similarly, the menu block's test results have met the feasibility criteria for design system, configuration, application, precision, dependability, and user-friendliness. The achievement of this system's practicability serves as the foundation for its application in the real world.

Keywords: system_information; academic performance

1 Introduction

The lecturers' performance will determine the university's success in achieving its vision, mission, and goals [1]. Many universities, particularly private universities, struggle with managing the performance of their lecturers and academic staff. The problems faced are due to weaknesses in data and information management [2]. Academic administration, lecturer performance, public administration, and finances are typically managed conventionally, making reporting challenging, particularly for external parties [3].

The primary issue is the inefficiency of data management, which is performed manually and partially [4,5]. In addition to being slow and inefficient, manual data management makes it difficult to ensure data accuracy [4]. Static and dynamic data, including lectures, lecturer assignments, research, community service, and publications, are not managed systematically by university administration [6]. This inefficiency impedes academic reporting, foundations' reports, and the education ministry's reports to the government. In addition, management flaws associated with the performance of lecturers will hamper the salary system and workload

calculation for lecturers. Another impact is the delay in the rank of lecturers, accreditation of study programs/institutions, and quality rankings or university clustering. A further shortcoming of conventional performance management is that the data network or data carrying capacity is not linked to the government-developed external information system with a centralized database.

According to preliminary research results on some private universities in Medan, Indonesia, several universities have encountered the same lecturer performance management issue. On this basis, this university is a research partner in developing an information system for evaluating the performance of lecturers [7]. Preliminary research has identified obstacles to academic performance, including the following: (1) The conventional management of the academic information system hinders academic reporting; (2) Data on academic progress, study period, student achievement, and other activities are not managed in an integrated system; (3) Course coding and PDDikti reporting data are not in sync. (4) The information system has failed to meet the necessary data requirements; (5) The information system is incomplete and lacks the necessary relationships with other systems; (6) There is no integrated information system for research, community service, publication, intellectual property, or recognition [8].

Innovation is required to address this issue, specifically the development of an ISIPA application program that is integrated with other applications to accommodate the following factors: (1) Integration of human resource databases with academic information systems, research, community service, publications, and recognition; (2) Setting up the system's external interface to support reporting; (3) Development of a student academic progress module within the system; (4) Prepare performance applications in the fields of teaching, research, community service, publications, recognition and intellectual property with online access; (5) Creating the M&E system menu integrated into the system.

The research will create ISIPA model products to support a more accurate, effective, and efficient assessment of the academic performance of lecturers. The Master's program results from quality mentoring activities performed in 2020 and 2021. This research is ready to continue development and testing as needed based on the results of user requirements analysis, program configuration, real data input, program performance testing, and feasibility testing [9]. For the academic field, it is generally specific to accommodate a variety of data storage, management, and output requirements [4,10]. This research will help address the issue of conventionally managing the performance of lecturers at private universities. As confirmed by previous research, this information system is an innovation for solving these problems because it will integrate data and information more thoroughly on a decision-making basis [11]. An integrated online access information system will increase the dynamism of university activities to improve management efficiency.

2 Research Method

The constructed information system follows the System Development Life Cycle (SDLC) model, which consists of four phases of work: (a) System investigation, (b) System analysis, (c) System design, and (d) System implementation [9]. Laragon, PHPS and Invite, Sublime

Text, MySQLi/MySQL Improved Extension, Navicat, Laravel Framework, Corel Draw, and Photo-Paint are the software packages utilized.

Following the life cycle procedure, the results of the program compilation are analyzed by testing the system's performance. Multiple tests are conducted, including Stub Testing to verify the control structure of module performance mapping, Unit Testing to test the function of each module with Black Box Testing and White Box Testing, and Integration Testing to test interactions between modules, such as interface functions, user scenarios, data flow, and process flow [12]. The program is executed to pass the feasibility test if it already performs according to the program business that has been determined to meet users' particular needs.

3 Results and Discussion

Development of application system is based on analysis of user needs through feasibility studies. The field study begins by collecting data and information on the performance appraisal system and its reporting. Preliminary studies have identified problems that hinder academic performance, such as the following:

- The academic information system is managed conventionally and causes academic reporting to experience obstacles related to data validity and time delays.
- Data on academic progress, study period, student achievement and other activities are not managed in an integrated system.
- Course coding is not in sync with PDDikti's reporting data.
- The information system has not accommodated the required data needs
- The information system is partial, does not have a relationship with other systems as needed
- There is no integrated information system for research, community service, publication, intellectual property and recognition [7].

In response to this problem, innovation efforts are needed, namely building an information system of Integrated Performance Assessment (ISIPA) which is integrated with other applications to accommodate the following aspects:

- Integration of the human resource database with information systems for academics, research, community service, publications and recognition.
- Setting up the system output interface to support government reporting (feeder importer).
- Develop a student academic progress module in the system.
- Prepare performance applications in the fields of teaching, research, community service, publications, recognition and intellectual property with online access.
- Make the menu for the monitoring and evaluation system of the Quality Assurance Center integrated into the system

The ISIPA application program was developed based on the SDLC model to identify the specific needs of potential users. This model has many advantages to help developers meet the needs of potential users, especially to accommodate specific needs. This is the advantage of application software which is the criteria for using the software for developers [15]. However, there are still weaknesses in program testing due to the lack of specific identification of needs or because user needs continue to develop along with the development of technology and people's lifestyles. Efforts to accommodate user needs, which were initially based on needs analysis, can be increased through seminars and FGDs as well as program trials. This activity has proven to provide a lot of input as an effort to bring the program's performance closer to the needs of users.

The results of the compilation of the ISIPA application program are tested for performance in accordance with the design (business plan). In testing the ISIPA application program, performance shows that in general it is in accordance with the design specified as the output of the system. The research work that has been completed is compiling programs for each system performance, namely Administrator access and User (Lecturer) access. However, the test results are currently only being completed for Administrator access, while the system performance testing for User (Lecturer) access is carried out on the final test of feasibility.

This research produces an application model to facilitate a more accurate, effective, and efficient assessment of the academic performance of lecturers. It continues to develop and test based on the results of user requirements analysis, program configuration, the input of real data, program performance testing, and feasibility testing [9]. The ISIPA model application is designed to process data by integrating multiple applications or accessing existing application programs on the user's side by constructing a program interface (single sign-on). Its development is based on external requirements, including Sister, PDPT, Bima/Simlitabmas, Google scholar, and Sinta [3,13]. The application program is designed to support two user accounts, Administrator and Lecturer. Each group receives a menu tailored to their preferences. The application program's output display is presented in Figure 1.

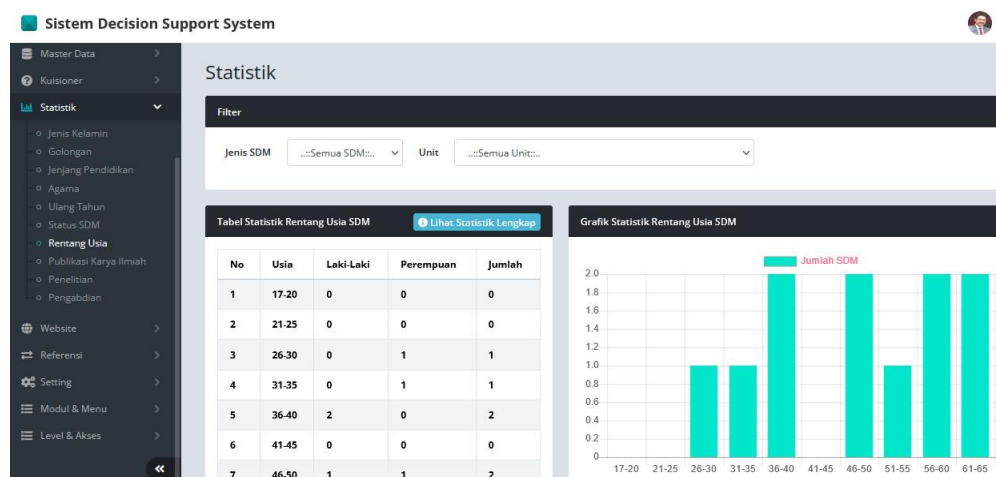


Fig. 1. Display of ISIPA lecturer statistics.

The program feasibility test is carried out on each unit to determine whether the resulting performance is in accordance with the design. The testing process will execute the software to determine whether the system operation is in accordance with the specifications and the desired environment. The summary of program performance test results is presented in the table shown in Figure 2

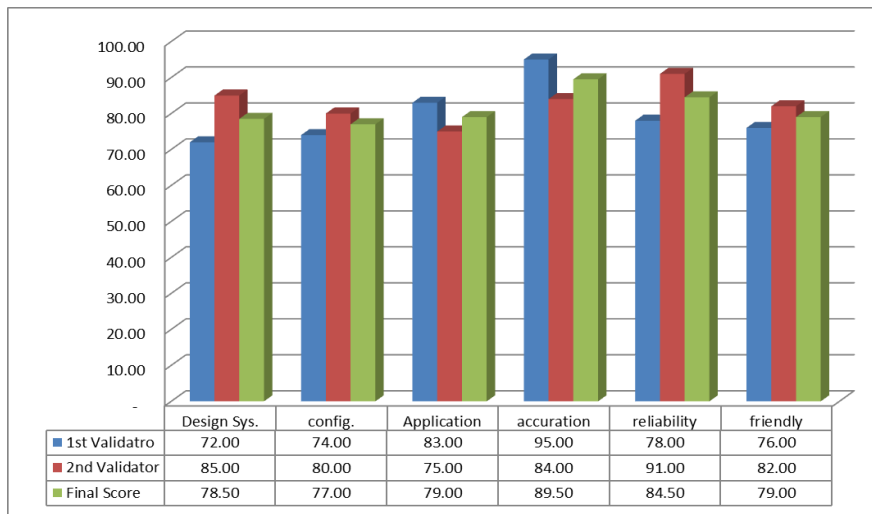


Fig.2. Results of Feasibility Test

The results of the system feasibility test show that the output has met the feasibility limit. For the design system, the average is 78.5; configuration 77.0; application 79.0; accuracy 89.5; 84.5 reliability and 79.0 friendly. Overall, the application program received an average eligibility score of 81.25 which is regarded as satisfactory. Using the ISIPA program application will improve the performance of higher education institutions in managing lecturer performance. This result is in accordance with the results of previous studies which have revealed an increase in university performance after using an integrated computer-based application program [14]. The effectiveness of the program in improving performance because the system runs using applications according to the needs of the university [12].

4 Conclusion

As part of an effort to enhance university performance, management information systems are essential. The feasibility of the developed ISIPA information system has been evaluated in accordance with the application software feasibility indicators. All six test indicators have passed the feasibility threshold, allowing the application to be declared usable. One of the benefits of this application is that it improves the effectiveness and efficiency of management because program development is based on user requirements, allowing the system to accommodate the university's needs in an effort to enhance management performance and efficiency.

References

- [1] Mampilo Phahlane and Ray Kekwaletswe (2014). Management informations systems use in higher education environments. *Proceedings of the Southern Association for Information Systems Conference*, Macon, GA, USA March 21st –22nd, 2014.

- [2] Carol Stoak Saunders & Jack William Jones (1992) Measuring Performance of the Information Systems Function, *Journal of Management Information Systems*, vol.8, no.4, pp 63-82, DOI: 10.1080/07421222.1992.11517939.
- [3] Rachmanto, A. (2021). Decision Support System Analysis Performance Evaluation Lecturer Using Balanced Scorecard Method In a private University. *International Conference on Business, Economic, Social Sciences and Humanities (ICOBEST 2018), Advances in Social Science, Education and Humanities Research*, Vol. 225, pp. 108-113.
- [4] Mishra, L., Kendhe, R., and Bhalerao, J. (2015). Review on management information systems (MIS) and its role in decision making. *International Journal of Scientific and Research Publications*, 5(10), 1–5. <http://www.ijsrp.org/research-paper-1015.php?rp=P464693>
- [5] Diana, C. U. C., and Carlos, C. Z. (2011). A framework for decision support system in inventory management area. *9th Latin American and Caribbean Conference for Engineering and Technology*, WE1-7.
- [6] Katharina Ebner, Benjamin Mueller, Nils Urbach, Gerold Riempp, Helmut Krcmar. (2016). Assessing IT Management's Performance: A Design Theory for Strategic IT Benchmarking. *IEEE Transactions on Engineering Management* vol.63, no.1, pp 113-126.
- [7] Sriadhi, et al (2020a). *Analisis Kinerja Dosen Universitas Budi Darma Medan*. Medan, Laporan Pendampingan Mutu Akademik.
- [8] Sriadhi dan Ahmad Hidayat (2017). *Rancang Bangun Sistem Informasi Inventaris Berbasis Multimedia Akses Online*. Laporan Penelitian HB DRPM.
- [9] Jeffery L.Whitten, Lonnie D.Bentley, Kevin C.Ditman. (2011). *Metode Desain dan Analisis Sistem*. Yogyakarta, Penerbit Andi.
- [10] Virginia, F.Kl., Williams, L., Peace, A.F. (2004) A Performance Evaluation Framework for a Public University Knowledge Management System. *Journal of Computer Information Systems*, vol.44, no.3, pp 9-16.
- [11] Indrajit, R.Eko., & Djokopranoto, R. (2006). *Manajemen Perguruan Tinggi Modern*. Andi Offset, Yogyakarta.
- [12] Sofyani. H., Nazaruddin, I., Puti, C.M., Fatmaningrum, E.S. (2019). Exploring Performance Measurement System for Lecturer (PMSL): Comparison among Three Models in Indonesia, Singapore and Turkey. *Jurnal Reviu Akuntansi dan Keuangan*, vol 9 no 3, p. 269-294.
- [13] Diovianto, P., Rakhmadani and Adhinata, F.D. (2021). A Web-based Information System for Lecturer's Performance Appraisal Using Rating Scale Methods. *Jurnal Riset Informatika*, Vol 3 No 2, Period of March 2021,
- [14] Rindri, Y.A., Rollastin, B. (2021). Lecturer Performance Information Systems Based on IAPS 4.0, Vol. 13, No. 02, pp. 81-89.
- [15] Azhar Basir1, Abdul Fadlil2, Imam Riadi. (2019). Enterprise Architecture Planning Sistem Informasi Akademik Dengan TOGAF ADM. *Jurnal Sains Komputer & Informatika (J-SAKTI)*, vol. 3, no.1, pp 1-10.