JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. XI No 4, September 2025, hlm. 621 – 628 ISSN 2550-0201 (Online)
DOI: http://dx.doi.org/ 10.33330/jurteksi.v11i4.4106
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

CLOUD-DRIVEN OPTIMIZATION OF LECTURER PERFORMANCE DOCUMENT DIGITALIZATION USING AGILE UNIFIED PROCESS

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Abstract: The advancement of digital technology has driven improvements in the efficiency of data management, particularly in recording and reporting faculty performance. Based on interviews, many lecturers have not yet digitalized their performance documents, resulting in difficulties when reporting through the SISTER application, such as challenges in locating physical archives or requesting duplicate documents from colleagues. These issues hinder the effectiveness of reporting and limit the transparency of performance information, particularly in faculty performance evaluations. This study aims to optimize the digitalization of faculty performance documents using a cloud computing-based approach supported by the Agile Unified Process (AUP). The system was developed by utilizing Google Drive as the primary storage medium. AUP was selected due to its flexibility and ability to iteratively adapt to user requirements. System testing was conducted using the Equivalence Partitioning method, which demonstrated results in line with expectations. The findings of this study present a digital document management system model that enhances accessibility, ensures efficient archival storage, and facilitates more effective faculty performance reporting.

Keywords: Agile Unified Process; Cloud; Digitalization; Lecturer Performance.

Abstrak: Perkembangan teknologi digital mendorong peningkatkan efisiensi pengelolaan data, terutama dalam pencatatan dan pelaporan kinerja dosen. Berdasarkan wawancara, banyak dosen masih belum mendigitalisasi dokumen kinerja mereka, sehingga mengalami kesulitan saat pelaporan di aplikasi SISTER, seperti kesulitan mencari arsip fisik atau bahkan meminta dokumen ke rekan kerja untuk dokumen yang sama. Hal ini menghambat efektivitas pelaporan dan keterbukaan informasi, khususnya untuk proses pelaporan kinerja bagi dosen. Penelitian ini bertujuan mengoptimalkan digitalisasi dokumen kinerja dosen berbasis cloud computing menggunakan pendekatan Agile Unified Process (AUP). Sistem dikembangkan dengan memanfaatkan Google Drive sebagai media penyimpanan. AUP dipilih karena fleksibel dan mampu menyesuaikan kebutuhan pengguna secara iteratif. Pengujian sistem menggunakan metode Equivalence Partitioning menunjukkan hasil sesuai harapan. Hasil penelitian ini berupa model sistem manajemen dokumen digital yang mendukung kemudahan akses, penyimpanan arsip, dan membantu pelaporan kinerja dosen secara lebih efektif.

Kata kunci: Agile Unified Process; Digitalisasi; Kinerja Dosen, Komputasi Awan.

INTRODUCTION

In the digital era, information systems have become an essential requirement for effective and efficient data recording and management. The implementation of information systems enables business processes that were previously

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unstructured to become more systematic, faster, and optimized. This is particularly relevant in the field of higher education, where lecturer performance data must be reported through the SISTER application in accordance with national regulations. These regulations encompass activities within the Tri Dharma of Higher Education, namely teaching and learning, research, community service, and supporting activities. The establishment of an integrated and unified system is therefore expected to ensure greater transparency, effectiveness, and efficiency in performance evaluation [1], [2], [3].

Based on the data collected, many lecturers at UIN Palangka Raya still face challenges during the performance reporting process in the SISTER application. Generally, they experience difficulties such as having to search for their performance documents, scan them, upload them to digital storage, and then proceed with the reporting process—resulting in a lack of efficiency.

The digitalization of documents is essential for lecturers as it facilitates the organization of documents and improves data accessibility [4], [5]. Moreover, given that digital records have become a fundamental requirement in administrative processes, proper data management is indispensable [6], [7]. Considering the significance of Tri Dharma data for lecturers in supporting the advancement of higher education institutions, there is a need for effective integration of such data, supported by a robust system [8], [9], [10]. A system that merits consideration is a web-based application, which offers advantages such as real-time accessibility, ease and speed of development, cross-platform compatibility, as well as user-friendly operation and understanding [11], [12]. Furthermore, integration with Google Drive, a cloud-based storage service, enhances efficiency by providing secure storage without overburdening system performance [13].

n the system development process, Object-Oriented Analysis (OOA) [14], [15] and Object-Oriented Design (OOD) [15], [16] were applied to support the design development using the Unified Modeling Language (UML) [15], [17]. The Agile Software Development (ASD) approach [18], [19] was employed, as it enables the rapid development of software solutions. Among the various ASD approaches, the Agile Unified Process (AUP) [19], [20] was selected in this study due to its iterative and flexible nature, which aligns with the objectives of the system being developed.

METHOD

Research Flow

To enhance comprehension of the contextual position of this research, the research flowchart is presented below..

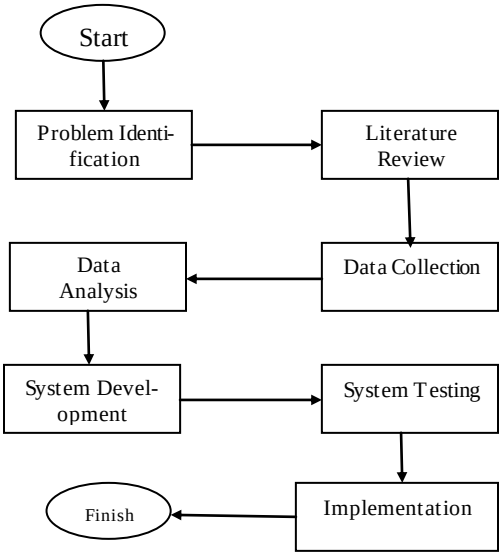

Figure 1. Research Flow Diagram

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Agile Unified Process (AUP)

This research applies the Agile Unified Process (AUP), which encompasses four iterative phases: Inception, Elaboration, Construction, and Transition [19], [20].

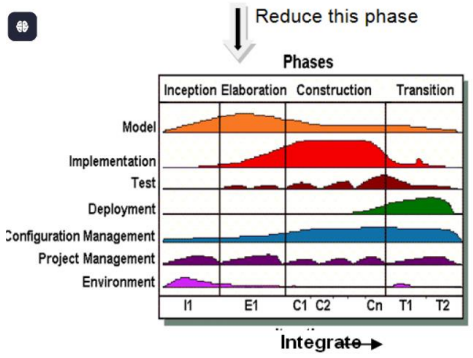

Figure 2. Agile Unified Process Phases

The Agile Unified Process (AUP) adopted in this study consists of several structured phases, outlined as follows, to provide a systematic framework for guiding the analysis, design, and implementation of the integrated system:

1. Inception

   At this phase, an analysis of the system to be developed was carried out, focusing on the identification of both functional and non-functional requirements. The analysis was aligned with the needs derived from the data collection process to ensure that the resulting system design accurately represents and addresses user requirements in a measurable manner.
2. Elaboration

   At this phase, system modeling was conducted based on the results of the previous analysis. The modeling process was carried out through model engineering using Unified Modeling Language (UML) to visualize system requirements [14], [17]. This model serves as the foundation for both system design and development, ensuring a more structured and measurable implementation.
3. Construction

   This phase marks the beginning of system coding, which was implemented based on the previously designed model using the Laravel framework [21], [22]. In addition, software testing was conducted to ensure system quality and reliability. The testing process applied the Usability Testing method [23], [24] to evaluate the ease of use of the system, along with the Equivalence Partitioning technique [25], [26], [27] to validate system functionalities and non-functional requirements against the predefined specifications.
4. Transition

   The phase concludes with the deployment process, whereby the software is formally delivered and made operational within the stakeholders' environment, ensuring readiness for institutional use.

RESULT AND DISCUSSION

Problem Identification

The analysis revealed that the absence of a digital system for managing lecturer performance documentation generates multiple obstacles and challenges, including:

1. Lecturer digital documentation is not systematically organized or effectively managed, leading to significant difficulties in retrieval and utilization during academic or administrative processes.
2. Physical documents expand in volume annually, resulting in increasingly unmanageable archives that hinder efficiency and sustainability.

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3. The requirement for lecturer performance data in accreditation processes remains difficult to fulfill, as access to such information typically necessitates direct communication with the lecturer in question.

System Development

The outcomes of the system development process, implemented through the Agile Unified Process (AUP) methodology, are outlined in the following section.

Inception Phase

In this phase, the analysis focuses on the design of the new system and the identification of system requirements, both of which are derived from the findings of the problem identification process.

1. Analysis of the Proposed System

At this stage, the business process design is illustrated based on the results of the data collection.

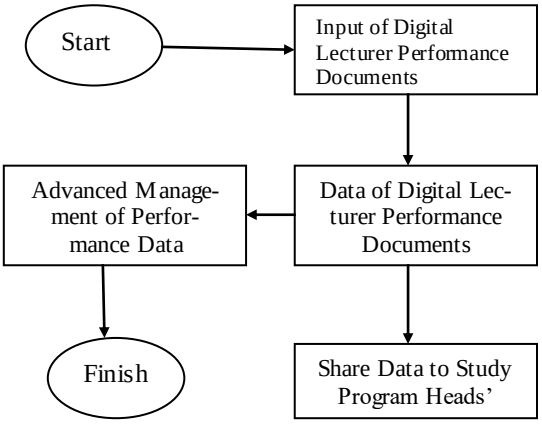

Figure 3. Proposed System Analysis

2. Requirements Analysis for the Proposed System

At this stage of the analysis, the functional and non-functional requirements that must be fulfilled by the system are elaborated in detail.

Table 1. Functional Requirements Specification for the System

No	Test Code	Classification of Functional Requirements for the System
1	KF.01	The system shall implement user authentication and verification mechanisms to ensure secure access.
2	KF.02	The system shall provide comprehensive data entry and recording capabilities.
3	KF.03	The system shall enable authorized users to modify existing data records.
4	KF.04	The system shall support the deletion of records in accordance with data management policies.
5	KF.05	The system shall include functionality for uploading performance-related documents.
6	KF.06	The system shall facilitate detailed data review, allowing users to examine lecturers' performance records.
7	KF.07	The system shall support document classification and selection based on Tri Dharma categories.
8	KF.08	The system shall incorporate robust search functionality to enable efficient document retrieval.
9	KF.09	The system shall enable the Study Program Head to access and review lecturers' performance documentation efficiently for administrative and accreditation purposes.

Table 2. Non-Functional Requirements Specification for the System

No	Test Code	Classification of Non-Functional Requirements for the System
1	KNF. 01	The system shall facilitate the upload of documents in PDF format to maintain standardization.
2	KNF. 02	The system shall enforce a maximum upload file size of 1 MB to optimize storage and

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		performance
3	KNF. 03	The system shall guarantee that all uploaded documents are immediately visible and accessible in the user's account
4	KNF. 04	The system shall implement real-time search capabilities, allowing users to efficiently locate documents by name.

Elaboration Phase

During this phase, the system's engineering design is developed employing UML-based modeling techniques, specifically through Use Case.

Figure 4 illustrates the Use Case Diagram, which models the interactions between system users (actors) and the proposed system.

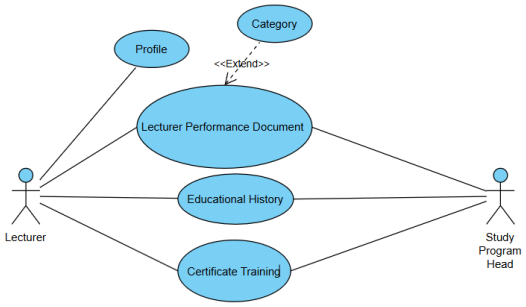

Figure 4. Use Case Diagram of System

The lecturer role is characterized by a restricted set of functionalities, primarily oriented toward the management of digital performance documentation for archival and reporting purposes. Beyond this, lecturers are empowered to maintain their personal profile, academic history, and records of professional certifications or other certified activities.

The Study Program Head role is granted access to review and retrieve performance documentation of all lecturers affiliated with their study program, facilitating administrative oversight and accreditation processes.

Construction Phase

During this phase, the system development process is initiated using the Laravel programming framework. Key steps in this development phase include:

1. Cloud Connection Google Drive API

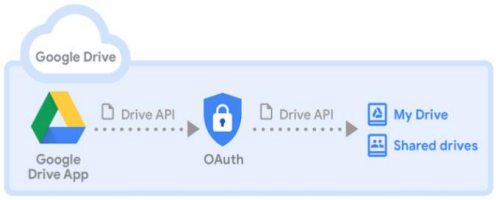

Figure 5. Interconnection Between the System and Google Drive

Given that the system relies on Google Drive as the repository for digital lecturer performance documents, an Application Programming Interface (API) is required to enable seamless integration and interaction between the developed system and Google Drive, ensuring efficient data management and accessibility.

2. User Interface

The results of the system development are depicted through a user interface, providing a functional representation of each web page and demonstrating the interactive capabilities of the developed application.

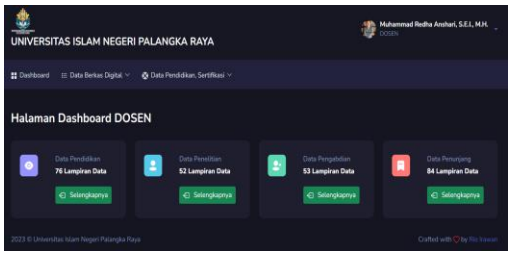

Figure 6. Lecturer Dashboard Interface Displaying System Functions

The lecturer dashboard provides an overview of the uploaded performance documents, presenting a summary categorized according to Tri Dharma activi-

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ties: Education/Teaching, Research, Community Service, and additional supporting activities, thereby facilitating easy monitoring and management of performance data.

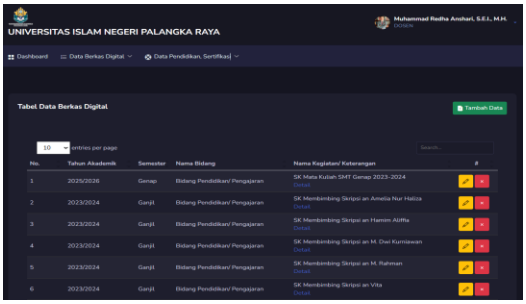

Figure 7. User Interface for Managing Lecturer Performance Document Data

This page provides an interface for managing lecturer performance documents, encompassing all records aligned with Tri Dharma categories. Lecturers are able to add, edit, view detailed information, copying a document link and remove documents as needed, ensuring accurate and up-to-date performance documentation.

3. Usability Testing

The results derived from this testing phase are presented as follows:

Table 3. Equivalence Partitioning Testing Outcomes

No	Test Code	Results of System Testing
1	KF.01	As Expected
2	KF.02	As Expected
3	KF.03	As Expected
4	KF.04	As Expected
5	KF.05	As Expected
6	KF.06	As Expected
7	KF.07	As Expected
8	KF.08	As Expected
9	KF.09	As Expected
10	KNF.01	As Expected
11	KNF.02	As Expected
12	KNF.03	As Expected
13	KNF.04	As Expected

The testing outcomes indicate that the system, developed in accordance with its functional and non-functional requirements, has been fully implemented and performs effectively, meeting the specified criteria and objectives.

Transition Phase

At this stage, the developed software is demonstrated to stakeholders to ensure alignment with the specified functional and non-functional requirements.

CONCLUSION

The results of this study demonstrate that the developed Lecturer Performance Document Digitalization System is capable of functioning effectively by adopting the Agile Unified Process method. Google Drive serves as a viable alternative for storing digital documents in file format, ensuring that the system's performance is not overloaded while providing broad accessibility to the required data. The Equivalence Partitioning testing confirms that the system successfully addresses both functional and non-functional requirements defined in the design phase. Furthermore, the system effectively enhances accessibility to digital performance documents and archives, while also facilitating the reporting of lecturer performance in a more efficient manner.

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