Switch : Jurnal Sains dan Teknologi Informasi
Volume. 3, No. 1, Tahun 2025
e-ISSN : 3032-3320; and p-ISSN : 3032-3339; Page. 126-141
DOI: https://doi.org/10.62951/switch.v3i1.338
Available online at: https://journal.aptii.or.id/index.php/Switch

Implementation of UINSU Repository System for Publication of Electronic Collections of UIN Sumatera Utara Academic Community

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Abstract. *The need for an efficient system to manage academic works in digital format is growing in universities, including at Universitas Islam Negeri Sumatera Utara (UINSU). Despite previous developments in digital repository systems, many academic institutions, including UINSU, still face challenges related to data management, security, and accessibility. This study aims to develop a web-based repository system for UINSU using the Waterfall method, to improve the storage, management, and accessibility of academic resources. A structured quantitative approach was adopted, focusing on the development and implementation of the repository system. The Waterfall methodology was chosen due to its step-by-step approach, ensuring a thorough and organized development process. The implementation of the system resulted in an organized, user-friendly platform where students, faculty, and staff can upload, manage, and access academic documents efficiently. The system features a clear interface for searching, uploading, and managing documents, with administrative controls for approving and maintaining submissions. The repository system significantly improves data management at UINSU, providing a long-term solution for archiving academic work. Continuous evaluation and system upgrades are essential to ensure it adapts to future needs and technological advancements.*

Keywords*: Digital Repository; UINSU; Waterfall Methodology; Academic Resources; System Implementation; Data Management.*

1. BACKGROUND

The repository of Universitas Islam Negeri Sumatera Utara (UINSU) serves as a platform to publish all types of electronic collections produced by the academic community of UIN Sumatera Utara. This repository system is important for maintaining the accessibility and preservation of academic information in digital form, a necessity in the era of digital transformation to ensure that academic works can be accessed and utilized by future generations. As technology continues to evolve, the need to manage data effectively in higher education institutions has become more urgent, especially in the context of Indonesia, where educational data management is often still done manually (Hidayat et al., 2022).

Information technology, particularly web-based repository systems, has become an efficient solution to meet the data storage needs of various higher education institutions (Ibrahim et al., 2023). Previous research by Nurseptaji (2021) showed that using the Waterfall model in the development of library information systems in academic institutions could improve information management efficiency. Another study by Kharisma et al., (2020) focused on the development of a repository system for theses, which could reduce the risk of data loss and improve accessibility for students and lecturers. However, the existing repository system

Received: Oktober 30, 2024; Revised: November 30, 2024; Accepted: Desember 24, 2024;
Online Available: Desember 27, 2024;

at UINSU is still not optimal and needs improvement in terms of both efficiency and data storage security (Theodorus Yagoyamu, 2020).

This study aims to implement a repository system at UINSU using the Waterfall model, which is a systematic and sequential software development method that starts from requirement analysis to system maintenance (Kurniyanti & Murdiani, 2022). This method was chosen due to its ability to ensure that each development stage is carried out as planned and can be measured. Furthermore, the Waterfall method allows for complete documentation at each stage, which is crucial for the system's sustainability and future maintenance (Wahid, 2020).

The significance of this research lies in its potential to optimize the management and storage of academic works produced by the UINSU academic community. With a structured repository system, it is expected to create easier access for students, lecturers, and researchers to search for and use relevant references for their academic activities (Azhar & Amri, 2020). Additionally, this system will support transparency and the preservation of digital data, allowing the institution to preserve the knowledge generated in the long term (Hidayat et al., 2022).

However, the main challenge in this development is ensuring that the repository system not only functions as a data storage solution but also adapts to the increasing volume and complexity of data. This research aims to provide solutions to this challenge and produce a robust system that is easily accessible by users at various levels (Aris & Wirani, 2020).

This study is expected to make a significant contribution to the development of educational technology at UINSU and serve as a model for other universities with similar needs. The results of this research are expected to provide a deeper understanding of the implementation of the Waterfall method in academic repository systems and become a reference in the future development of digital-based information systems (Purnia et al., 2019).

2. METHOD

Research Approach

A structured quantitative approach was used in this study, focusing on the development and implementation of a web-based repository system using the Waterfall method (Nurseptaji, 2021). The Waterfall method was chosen due to its sequential approach, allowing each development stage to be thoroughly completed before proceeding to the next stage (Kharisma et al., 2020).

Research Subject

This study focuses on the development of a repository system within the academic environment of Universitas Islam Negeri Sumatera Utara (UINSU). The primary users of the system include the academic community of UINSU, such as students, lecturers, and administrative staff. The system is designed to enable users to upload, manage, and access academic data, particularly scholarly works such as final projects and publications (Azhar & Amri, 2020; Kharisma et al., 2020).

Implementation of Research Procedures

This study adopts the Waterfall method, which consists of several stages (Meilinaeka, 2024), namely:

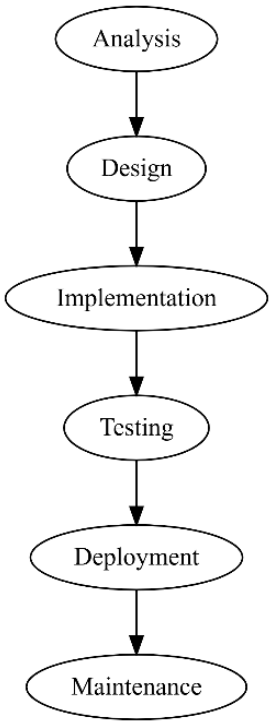

Figure 1. Waterfall

a. Analysis: Analyzing system requirements from users and stakeholders.
b. Design: Designing a system that includes architecture, data flow, and user interface.
c. Implementation: Implementing the design into code or programs that meet the needs.
d. Testing: Testing the system to ensure all functions run according to specifications.
e. Deployment: Launching the system so that it can be used by end users.
f. Maintenance: Performing maintenance for continuous improvement and enhancement.

Use of Materials and Instruments

This system is developed using the Laravel framework (MatTaib et al., 2020), MySQL database for data storage (Theodorus Yagoyamu, 2020), *Bootstrap for the user interface* (Mandasari & Kaban, 2022), and jQuery for page interactions (Usada et al., 2012). Visual Studio Code is used as the primary editor for development (Nofiati & Daru, 2021). The instruments used include interviews and surveys to understand user needs, as well as black box testing to evaluate the system's functionality (Soekmawati et al., 2024).

Data Collection Techniques

Data collection is carried out through surveys and interviews with potential users at UINSU to identify the specific needs of the repository system. This data collection provides clear insights into the features expected by users (Soekmawati et al., 2024).

Data Analysis Techniques

The data is analyzed using descriptive analysis and functional testing through black box testing to ensure that all system features work according to specifications. This analysis helps identify any issues or shortcomings that may require further adjustments.(Soekmawati et al., 2024)

Research Flow

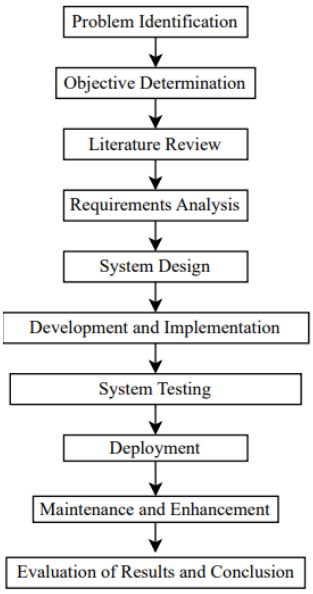

Figure 2. Research Flow

3. RESULT AND DISCUSSION

Repositori UIN Sumatera Utara adalah webiste yang menyediakan akses ke berbagai karya ilmiah dari civitas akademika UIN Sumatera Utara. Website ini menyimpan koleksi

lengkap karya ilmiah yang telah dipublikasikan dalam repositori UINSU, termasuk buku, jurnal ilmiah, laporan penelitian, skripsi, tesis, disertasi, dan berbagai jenis dokumen lainnya.

Home Page

The home page is designed to provide a brief overview of the web-based application. Its main purpose is to be the center of publication and storage of various electronic collections produced by the academic community of UIN North Sumatera. This page also contains in-depth information about the repository, the history of its establishment, and the types of scientific works available.

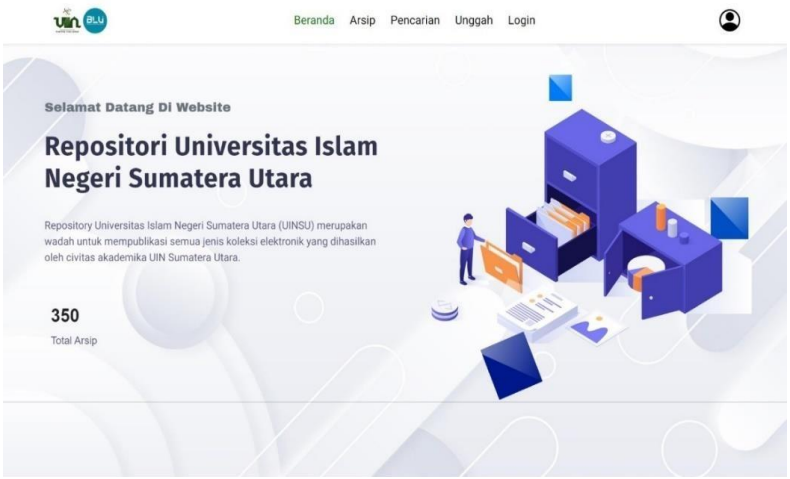

Figure 3. Home Page

Archive Page

The Archive menu in UINSU Repository is the main access for various scientific works of the UIN Sumatera Utara academic community, such as books, journals, research reports, theses, theses, and dissertations. This filter helps users efficiently find documents relevant to their needs. The menu is designed to support research and learning, with collections that can be browsed using four main filters:

a. Filter by Year: Filter the archive by year of publication, making it easy to find works from a specific period or analyze research trends.
b. Filter by Faculty: Display documents by division or faculty, such as the Faculty of Science and Technology or the Faculty of Sharia and Law.
c. Filter by Author: Allows searching of works by author name, to explore the contributions of specific individuals.

Figure 4. Archive Page (1)

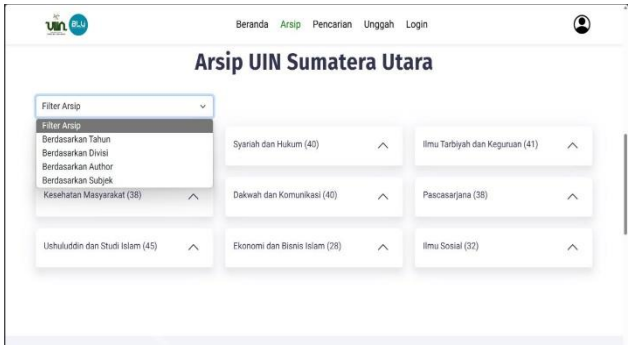

Figure 5. Archive Page (2)

Search Page

The Search menu in UINSU Repository offers a quick and easy search feature with a user-friendly interface. Users can search for documents by title, author, keywords, editor, or division. The search is done in real-time without the need to press a button, so the search results are immediately displayed below the search box, making it easier to find the required documents more efficiently.

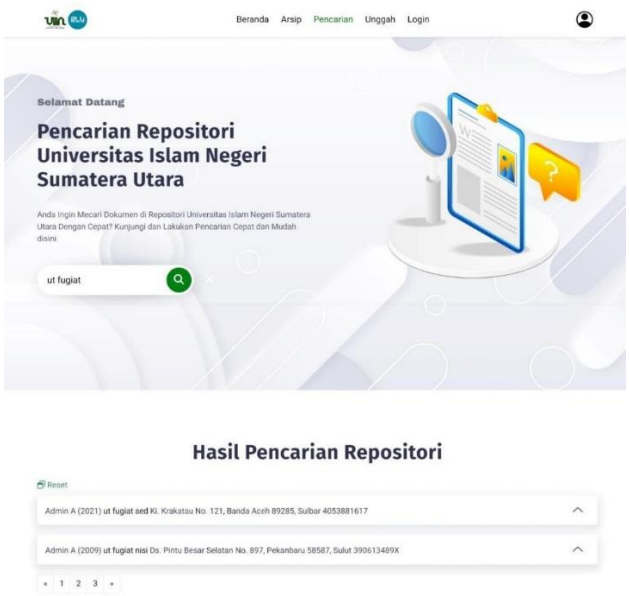

Figure 6. Search Menu

Login Page

Users who open the website for the first time and have not logged in, will be directed to the login page if they try to access the upload menu. Users are required to enter their student SIA portal account in order to access the UINSU repository account.

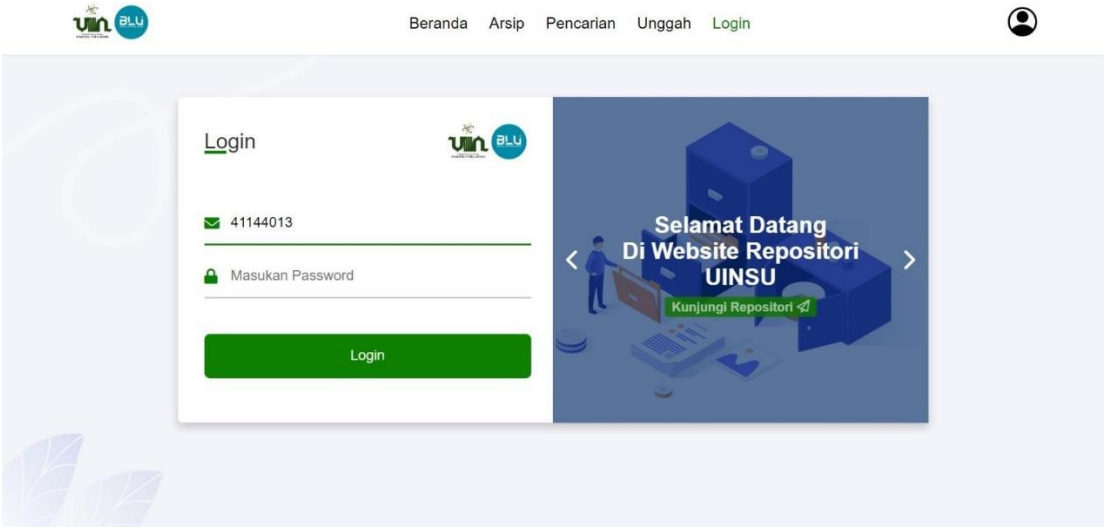

Figure 7. Login Page

Upload Page

After successful login, users will be directed to the upload page. This page has only one upload button. When the button is pressed, a pop-up or modal will appear containing a form to fill in the details of the document to be uploaded.

Figure 8. Upload Page

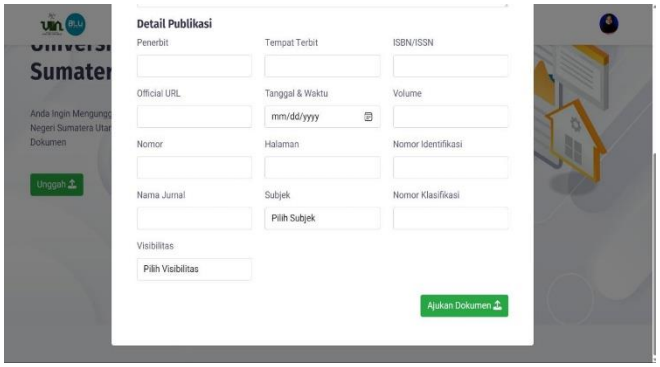

Figure 9. Upload Archive (1)

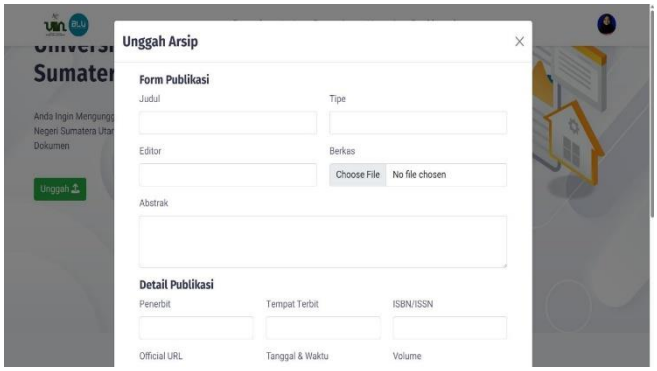

Figure 10. Upload Archive (2)

Students are required to fill in all fields on the upload form, which consists of two parts: Publication Form and Publication Detail Form. Make sure all fields are filled in correctly before pressing the upload button to upload the document.

Figure 11. Dashboard Page

The Student Dashboard menu displays archives or documents that have been uploaded by students, with three document statuses: Processing, Rejected, and Accepted. Students can use status filters to monitor the status of their documents more easily.

Admin Page

To be able to enter the admin dashboard page, we need to log in first with the admin account that has been previously provided.

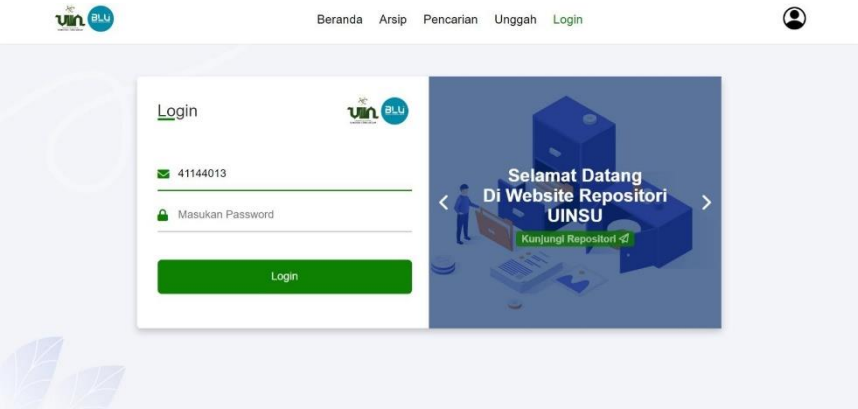

Figure 12. Login Page

After login, the admin will be directed to the dashboard page which displays statistics in the form of bar charts. The statistics include the number of archive downloaders and uploaders each month for a full year. Admins can also filter data based on the desired year.

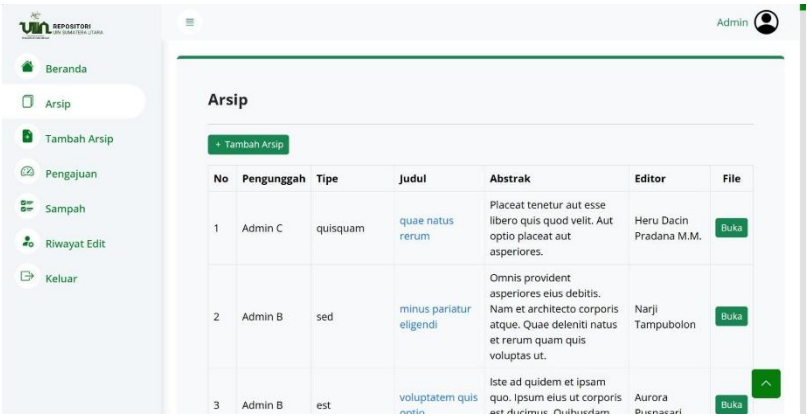

Figure 13. Admin Archive Page

The Archive page displays a list of archives on the UINSU repository website that have been accepted and published. Archives with pending or rejected status are not displayed. Available information includes uploader name, type, abstract, editor, and file content.

In this add archive menu we can add archives directly, there are several forms that we must fill in before uploading the archive from the admin side.

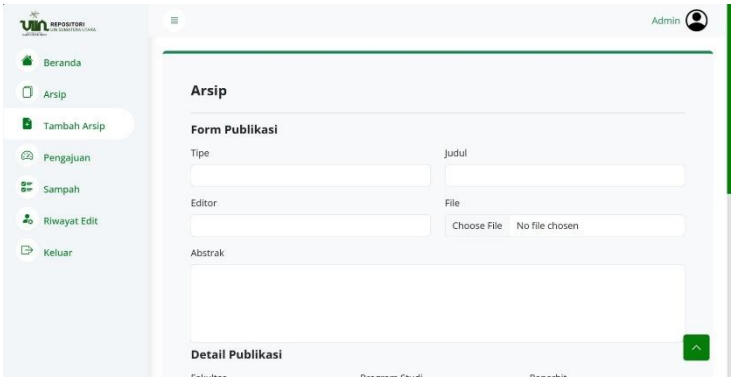

Figure 14. Admin Add Archive Page

The Submission menu displays a list of archives submitted by students with filter and search options based on uploader, type, title, editor, and abstract. In the action column, four buttons are available:

1. Eye Icon (Blue): Displays the contents of the archive in form.
2. Checklist Icon (Green): Approves the submitted document.
3. Cross Icon (Yellow): Rejects the filed document.

4. Trash Icon: Deletes the submission and moves it to the trash menu, used to resolve duplicates or other reasons.

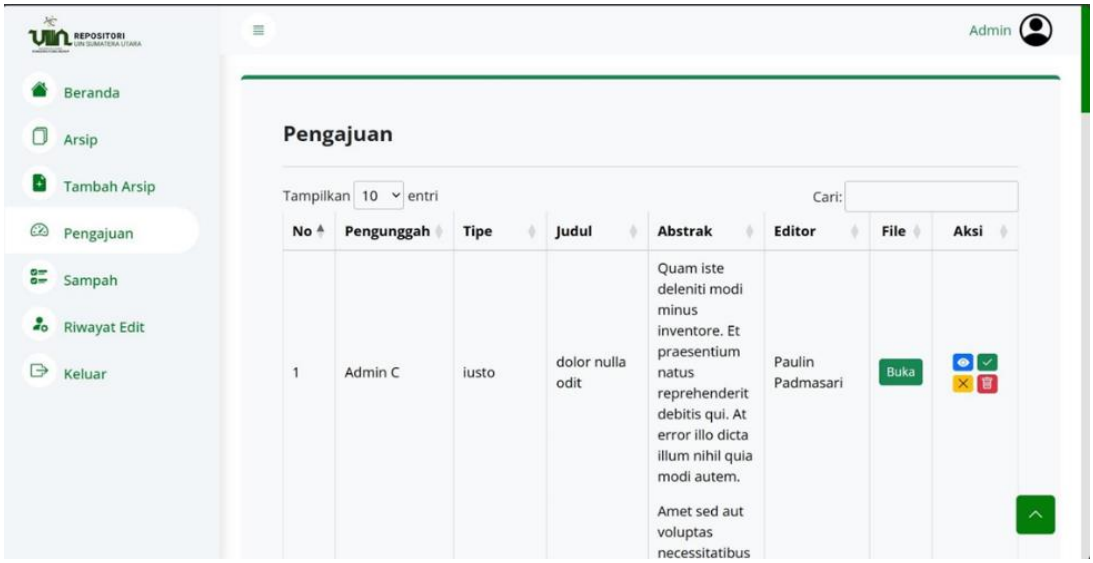

Figure 15. Submission Page

Upon pressing the blue button with the eye icon, the filed archive page will be displayed as a form with pending status. As an admin, you can review the archive submission and edit the input fields if there are any errors. There are three action buttons below it:

1. Accept: Accepts the submission and publishes the archive.
2. Reject: Reject the submission with a reason.
3. Delete: Moves the submission to the trash menu.

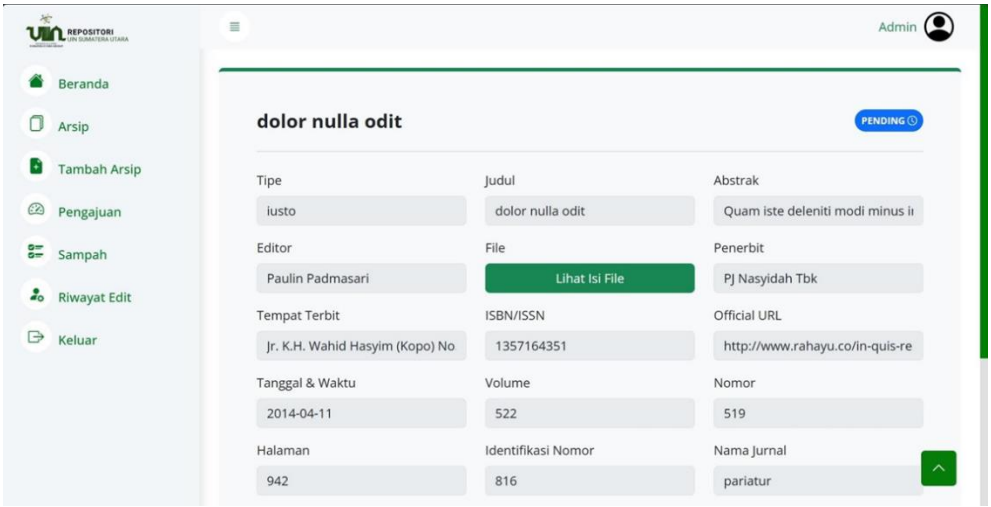

Figure 16. Submission Filling Page (1)

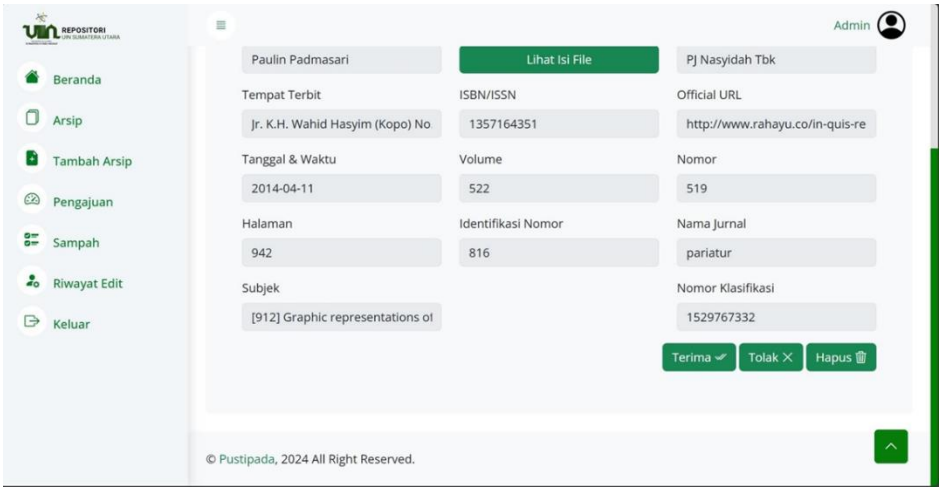

Figure 17. Submission Filling Page (2)

If we press the rejection button, it will display a column of reasons why we reject the submission from the student, if the reason is sufficient, we can press the reject button to reject the submission, then the reason for rejection will be sent to the student account dashboard.

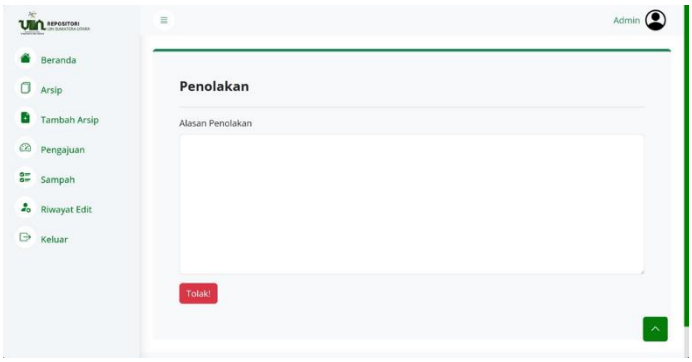

Figure 18. Rejection Page

The Trash menu displays a list of archives deleted from the student submission menu. Here, the admin can perform two actions:

1. Recovery: Restore the archive to the submission list.
2. Permanent Deletion: Permanently removes the archive from the trash menu.

Figure 19. Trash Page

4. CONCLUSION

The implementation of a web-based repository system at Universitas Islam Negeri Sumatera Utara (UINSU) marks a significant step toward enhancing the management and accessibility of academic resources. The system not only addresses existing inefficiencies in data storage and retrieval but also offers a user-friendly platform for students, faculty, and staff to share and access academic works with ease. While the system effectively meets the basic needs of digital archiving and publication, continuous improvement is necessary to ensure scalability, security, and adaptability to future technological advancements. Future developments should focus on integrating more advanced search features, improving data security protocols, and ensuring the system remains responsive to the evolving needs of the academic community. Additionally, regular user feedback and performance evaluations will be critical in identifying areas for optimization and ensuring the system's long-term sustainability.

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