

Development of a Web-Based Thesis Repository for Information Technology Education Students

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Abstract: This study aims to develop a Web-Based Thesis Repository for Information Technology Education Students at Universitas PGRI Pontianak. The system was designed to address challenges in manual thesis archiving and limited accessibility for students seeking academic references. The research employed the Research and Development (R&D) approach using the ADDIE model, which includes five systematic stages: Analysis, Design, Development, Implementation, and Evaluation. Data were collected through expert validation and user feedback. The system provides key features such as user registration, secure login, thesis upload, metadata management, and advanced search functionality. Validation results from two product experts and one content expert indicated that the system achieved an average product score of 3.34 and a content score of 3.38, both categorized as “Good.” The findings demonstrate that the developed repository is feasible, efficient, and effective in managing digital thesis data while enhancing accessibility and transparency in academic information retrieval. This repository supports digital transformation in higher education by promoting sustainable knowledge management and improving research visibility. The system is recommended for broader implementation and future development through integration with institutional databases and cloud-based storage for enhanced scalability and security.

INTRODUCTION

Communication technology is regarded as the application of communication science principles through the creation of materials (technical tools) to enhance the quality and quantity of communication elements such as source, message, media, target, and impact in accordance with the communication context. Meanwhile, technology in society helps in disseminating information, facilitating communication, promoting social interaction, and assisting in various tasks. Information technology encompasses all forms of technology that assist humans in creating, storing, or distributing information (Ardhana et al., 2024). In today’s era of globalization, Information Technology (IT) has become a fundamental necessity, particularly in the field of education, which cannot function effectively without the support of efficient information and communication technology.

Technology-based education serves as a tool utilized by learners. Therefore, a new concept has emerged, namely the repository. A repository is a set of services offered by a university to its community members for the management and dissemination of digital

materials created by the institution and its members. It essentially reflects an organizational commitment to managing digital materials, including long-term preservation, organization, and appropriate access or distribution (Mudassir et al., 2024). A digital repository is a mechanism for managing and reliably storing digital content, which may include subject-based, institutional, or commercial repositories that cover research outputs such as journal articles or research results, e-theses, e-learning objects, teaching materials, and administrative data (Handayani et al., 2022).

A repository is a concept for collecting, managing, and disseminating all scientific works produced by the academic community of a university or higher education institution (Nurohman, 2024). In higher education institutions, repositories serve as an essential medium for publishing research and academic works. The reputation of a university becomes more widely recognized through the role of its repository. Academic works are not only disseminated through journals but also through repositories, thereby increasing visibility and prestige (Kamala & Wijayanti, 2024). According to Niam & Huda (2024), one form of intellectual work produced by an institution includes theses, dissertations, or papers published in repositories. To further develop these intellectual products, institutions need to establish a series of services for managing and distributing digital materials (Sinaga, 2021).

The University of PGRI Pontianak, as one of the leading educational institutions, particularly through its Information Technology Education Study Program, graduates a significant number of students each year. Therefore, students who have completed their final examinations are required to submit their scientific work in the form of a bound thesis (hardcopy) and a CD containing the thesis files (softcopy) to the department and library staff for data collection and archiving purposes. Each year, the Information Technology Education Study Program produces a substantial number of graduates, resulting in an increasing volume of submitted and recorded theses.

This process, however, is still carried out conventionally. The theses are stored in filing cabinets, and the data are managed manually, which requires considerable storage space. Moreover, when students need to access existing theses, they must search for them one by one within the library archives. In the modern academic environment, libraries are expected to have facilities capable of managing scientific works in digital form (Sinaga, 2021).

Therefore, there is a need for a system that can help the Information Technology Education Study Program store students' theses and facilitate students in finding relevant theses needed for their academic writing process. Based on this background, the author conducted a study entitled "Development of a Web-Based Thesis Repository for Information Technology Education Students." This study is expected to provide convenience in storing and accessing repository information, particularly for students of the Information Technology Education Study Program, ensuring data that are up-to-date, accurate, and easily accessible.

METHOD

The method used in this study is the Research and Development (R&D) method, which is a series of processes or steps aimed at developing a new product or improving an existing one. To produce a product that meets user needs, a needs analysis is conducted, while to assess the effectiveness of the product and ensure its applicability in a broader context, testing and evaluation are required.

The design of this study adopts the ADDIE development model. The ADDIE model is easy to implement because it follows a systematic process with a clear framework that produces effective, creative, and efficient products (Safitri & Aziz, 2022). ADDIE is an instructional design model that represents a general process traditionally used by instructional designers and training product developers.

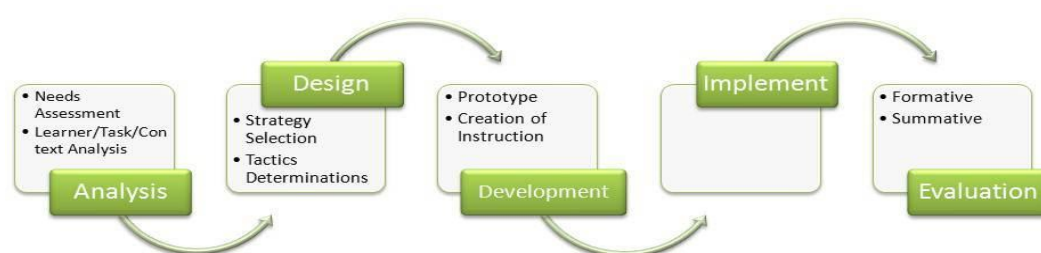


Figure 1. ADDIE Model

RESULT AND DISCUSSION

This study aims to develop a repository application for students of the Information Technology Education Study Program. The development design employs the ADDIE model, which consists of five main stages: *Analysis*, *Design*, *Development*, *Implementation*, and *Evaluation*. The following describes each stage of the research process:

Analysis

The needs analysis in developing the student thesis repository was conducted from two main perspectives:

1. **Student Needs Analysis**
Students require access to information and references related to previously published theses in digital form. This is intended to broaden their knowledge, enhance academic understanding, and support the development of research aligned with their study focus.
2. **Hardware and Software Requirements Analysis**
The developed application is web-based, allowing students to access the repository online. This enables them to upload thesis files conveniently without spatial or temporal limitations, while also facilitating efficient data storage and retrieval.

Design

In the design phase, this study employs the Unified Modeling Language (UML) using a Use Case Diagram to model the system. The diagram illustrates the relationships and interactions between users (actors) and the thesis repository system, ensuring that all system functions and user requirements are clearly defined prior to the development stage.

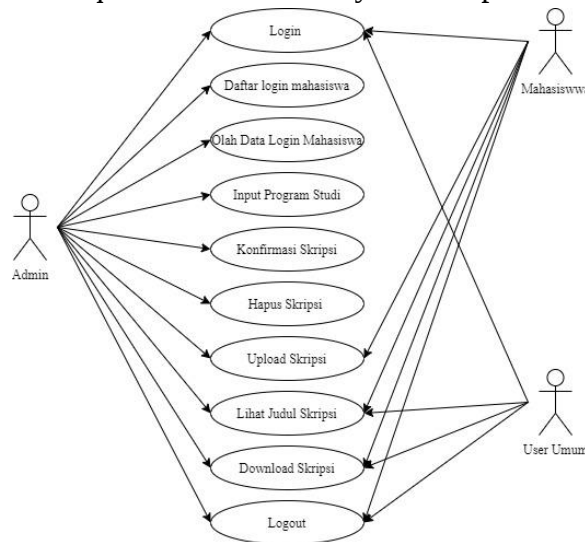


Figure 2. Use Case Diagram Repository

The actors involved in the thesis repository system include admin, students, and general users. Students serve as the primary users of the repository application. Each student is required to have an account to log in to the system. Once logged in, students can upload their theses based on the approved and examined research results. They can also view a list of published thesis titles as additional references for developing their own research.

General users have limited access rights, they can only view and download theses that have been made publicly available. The admin acts as the main system manager with full access privileges. After logging in, the admin can manage student data, approve thesis uploads, delete entries, and assist students in uploading their work. Thus, all system management operations are performed by the admin.

Development



Figure 3. Admin Login

The admin login feature is designed for staff of the Information Technology Education Study Program who are responsible for managing the application. The username and password consist of a combination of letters, numbers, and symbols to enhance system security. The use of unique credentials minimizes the risk of unauthorized access.

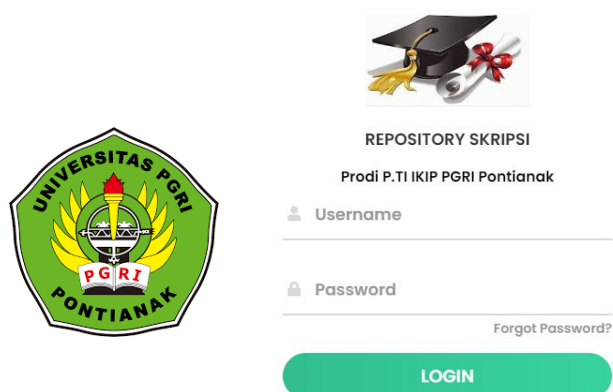


Figure 4. Student Login

The student login feature is intended for students who have completed their thesis examination and revisions as approved by examiners. The username uses the student's full name as listed on the Student ID Card, while the password corresponds to the Student Identification Number (NIM) consisting of numeric digits.

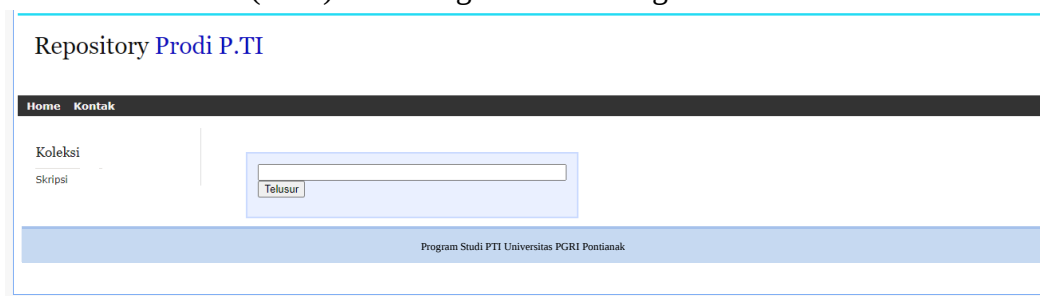


Figure 5. Search Feature

The search feature allows users to search for theses using keywords or complete titles. If the keyword does not match any data in the database, the system displays a message stating "File Not Found." Conversely, if a match is found, the system displays the collection of relevant theses.

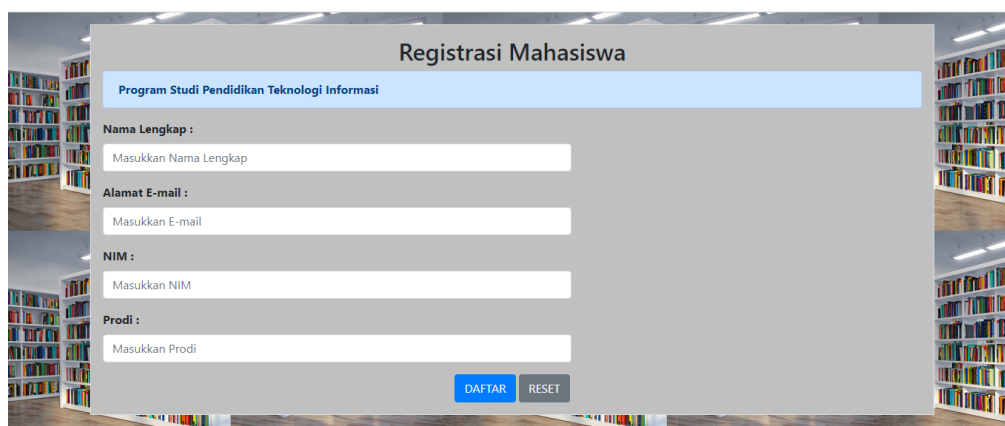


Figure 6. Student Registration

The registration feature is intended for students who have completed their thesis defense and revisions. After successful registration, students gain access to the repository according to their account privileges. The registration form requires the student's full name, student ID number (NIM), study program, and a valid email address for account verification.

Figure 7. Thesis Upload

The upload feature enables students who have passed their thesis defense to submit their files by entering their full name, student ID number, complete thesis title (as approved in the supervisory letter), year of examination, and names of supervisors I and II.

Implementation

Based on the validation results conducted by two product experts and one content expert, the developed thesis repository application was categorized as “Good.”

Table 1. Product Expert Validation Criteria

Average Score	Category
> 3.40	Excellent
> 2.80–3.40	Good
> 2.20–2.80	Fair
> 1.60–2.20	Poor
≤ 1.60	Very Poor

Table 2. Product Expert Validation Results

Evaluation	Expert 1	Expert 2	Average	Category
Product Aspect	3.32	3.36	3.34	Good

The average score obtained from both product experts was 3.34, which falls into the “Good” category according to Table 1.

Table 3. Content Expert Validation Criteria

Average Score	Category
> 3.40	Excellent
> 2.80–3.40	Good
> 2.20–2.80	Fair
> 1.60–2.20	Poor
≤ 1.60	Very Poor

Table 4. Content Expert Validation Results

Evaluation	Score	Average	Category
Content Aspect	3.38	3.38	Good

The content expert's assessment produced an average score of 3.38, which also falls into the "Good" category.

Evaluation

Based on the feasibility instrument distributed to the research subjects, it was found that the development of a Web-Based Thesis Repository for Information Technology Education Students is "Feasible" for implementation and use.

Discussion

The Development of a Web-Based Thesis Repository for Information Technology Education Students was carried out systematically using the ADDIE model, consisting of analysis, design, development, implementation, and evaluation stages. Each stage contributed to ensuring that the product developed was valid, practical, and effective in addressing the academic needs of students and the administrative requirements of the study program.

At the analysis stage, two aspects were explored: student needs and technical requirements. The results indicated that students required a digital platform to access and manage previous theses as references to support their own research development. This finding aligns with the study by Sari and Rahman (2020), which emphasized that institutional repositories can enhance students' research competencies and promote academic writing literacy. On the technical side, the analysis concluded that a web-based platform was the most suitable solution, as it allows users to access the repository anytime and anywhere. This approach supports the principle of ubiquitous learning (Bersin, 2017), which emphasizes flexibility and accessibility of learning resources across digital environments. Therefore, the analysis phase successfully identified both user requirements and technological specifications as the foundation for system development.

The design phase focused on modeling the system using Unified Modeling Language (UML), specifically the Use Case Diagram, to visualize interactions among three main actors: admin, student, and general user. The system architecture emphasized user authentication, privilege differentiation, and data management. Students act as the main users who can upload and manage their theses after the defense process, while general users are allowed to view and download publicly available theses as references. The admin functions as the system manager with access to verify, modify, or delete uploaded data and assist students during the submission process. This structured access hierarchy reflects the principles of data security management in line with ISO/IEC 27001 standards, ensuring confidentiality and integrity of academic data stored in the system.

During the development stage, the system prototype was created based on the design specifications. The primary modules include the login interface for admin and students, a search feature, a registration page, and an upload interface for submitting thesis documents. The login module for administrators requires strong credentials consisting of alphanumeric

combinations and symbols to enhance security, while student login credentials use verified institutional identities. The search function enables keyword-based retrieval, and if no match is found, the system displays a notification message to guide users. The registration form allows students who have completed their thesis examination to register using their student ID (NIM) and active email for verification. The upload module enables submission of thesis documents complete with metadata such as the full title, supervisor names, and year of defense. These structured features demonstrate an implementation consistent with Pressman's (2019) software engineering principles, ensuring usability and systematic verification of functionality.

At the implementation stage, the developed repository system underwent validation by two product experts and one content expert. The average validation scores from the two product experts were 3.32 and 3.36, with an overall mean of 3.34, classified as "Good." The content expert provided an average score of 3.38, also categorized as "Good." These results indicate that both the technical and pedagogical aspects of the repository meet quality standards for functionality, usability, and content validity. This evaluation suggests that the repository system is operationally feasible, technically reliable, and educationally beneficial. In reference to the ISO/IEC 9126 model, the product fulfills the criteria of usability, efficiency, and reliability, indicating that the system provides a stable and accessible digital infrastructure for academic purposes.

The evaluation stage confirmed the feasibility of the system through user testing involving students and academic staff. The findings revealed that the developed repository system is suitable for implementation within the Information Technology Education Study Program. Users reported that the repository provided convenience in accessing academic references, reduced duplication of research topics, and streamlined digital archiving processes. This outcome is consistent with previous studies by Suryadi (2021) and Nugraha (2022), who found that institutional repository systems can increase research visibility and support long-term preservation of academic outputs.

Overall, the findings from all development stages demonstrate that the Web-Based Thesis Repository System not only meets technical specifications but also supports educational goals. From a pedagogical perspective, the repository enhances students' access to scholarly materials, promotes academic integrity, and encourages research continuity. Technologically, it represents an application of cloud-based data management integrated into a secure and efficient web environment. Empirically, the validation results and user responses confirm that the system is both technically functional and educationally relevant. Therefore, the development of this web-based repository system can be regarded as a successful innovation that supports digital transformation and academic resource management in higher education institutions, particularly within the Information Technology Education Study Program.

CONCLUSION

This study was conducted to develop a Web-Based Thesis Repository for Information Technology Education Students at Universitas PGRI Pontianak, aiming to overcome the limitations of manual thesis archiving and improve accessibility to academic

references. The developed system, based on the ADDIE model, effectively addressed these issues by providing digital storage, search, and upload features that simplify data management and retrieval processes. The validation results, with average expert scores of 3.34 for product quality and 3.38 for content quality, demonstrate that the system performs well and is suitable for practical use. The implementation of this repository has a significant impact on enhancing institutional efficiency, promoting digital transformation, and fostering open access to scholarly works. This research offers an advantage in system interactivity, usability, and integration readiness for institutional digital management. Future research is expected to enhance this repository through cloud-based integration, AI-driven metadata indexing, and plagiarism detection systems to ensure security and scalability. The implication of this study lies in supporting higher education institutions to adopt digital academic management systems that encourage sustainable knowledge sharing and strengthen academic visibility in the digital era.

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