# Integration of Repository System in Optimization Data for Graduates' Scientific Paper

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**ABSTRACT**

Academic libraries manage collections and offer the community the best services possible, one of which is library clearance services. In the free management of a library, an institutional repository is an essential aspect because, with it, graduates can publish their writings to the public. However, the number of graduates and repository data from various universities differ. It requires integration, automation, and graduation registration systems, so everything is interrelated. As a result, everything is interconnected and cannot proceed if the first stage is not completed. So it is necessary to create an online library free submission system that can combine these three systems. The study shows that the three systems can be integrated, providing maximum data optimization between graduate and repository data.

**Keywords:** Institutional repository; data integration

## 1. INTRODUCTION

The library is a learning center that is not separate from educational, research, and community service activities to fulfill the goals of higher education (Dwiyanto, 2005; RI, 2007). Academic library at this time is not only tasked with managing the collection of written works/printed works, but also managing non-printed works in digital or electronic forms (Pendit, 2010; Richard E. Jones, Theo Andrew, 2006; Subrata, 2009) to fulfill the objectives of the library, which is to serve patrons' needs for information, research, preservation, and recreation (AD, 2020; Okon et al., 2020; Prayitno & Jakarta, 2015; Saleh, 2014). An institutional repository (IR) is one of the electronic storage media for a scientific paper (Mansyur & Supriyatno, 2019). It is a must for every library to have a repository (Kutay, 2014; Mansyur & Supriyatno, 2019; Marill & Luczak, 2009; Okon et al., 2020; Qurotianti & Rokhimatun, 2019; Richard E. Jones, Theo Andrew, 2006). Students' written works, whether they take the form of final year projects of graduated students, theses, or dissertations, may be stored in a repository at some universities.

Several previous studies have examined related to institutional repositories, including research conducted by Jennifer L. Marill and Edward C. Luczak in 2009, which reviewed the evaluation of digital repository software at the National Library of Medicine. In his research, Marill evaluated repository software with research results from a repository use policy National Library of Medicine (NLM) in increasing digital-based NLM collections (Marill & Luczak, 2009). Another study by Aidilla Qurotianti and Fifin Rokhimatun in 2019 examined the optimization

of the use of digital repository access in supporting the Three Pillars (Tri Dharma) of Higher Education, with took place at the Yogyakarta University Library. Optimization is carried out in several ways, including Leaflets and X-Banners, Socialization, Social Media, and Information Literacy. The author believes this optimization method can optimize the digital repository (Qurotianti & Rokhimatun, 2019). Moh. Mansyur and Hary Supriyatno researched optimizing the use of institutional repositories through the application of Independent Upload. This study examined that by uploading independently, it is expected that IR collections will develop more dynamically in terms of quality and quantity because of the ease of users in publishing the results of their thoughts (Mansyur & Supriyatno, 2019).

As a result, it highlights the significance of improving the digital repository. The current study aims to conduct research that interferes with earlier research concerning repository optimization. The study is carried out more broadly, focusing on optimizing the digital repository integrated with the graduation registration application through an online application. This was brought up to reduce the number of graduates who failed to submit their final projects to the online repository. Using digital repository access to support the Tri Dharma of Higher Education as best practices.

UIN Sunan Gunung Djati Bandung has been using a repository as an electronic storage medium for the final project of students or graduates. The university even requires its graduates to publish their final written work as a requirement for graduation.    However, because the data from the repository and the graduate data recorded in PDDIKTI are incompatible, the final project is registered in recapitulation every few years. Figure 1 depicts the discrepancy between graduate data and incoming repository data. In 2018, the disparity between graduate data and repository data was 279; in 2019, it was 1670; in 2020, it was 397; and in 2021, it was 309. It implies whether there are still flaws in the implementation system. This research is required to solve the issue whether human errors or system errors because graduates can register for graduation if they have uploaded their final project through the repository and have no library loans or arrears.
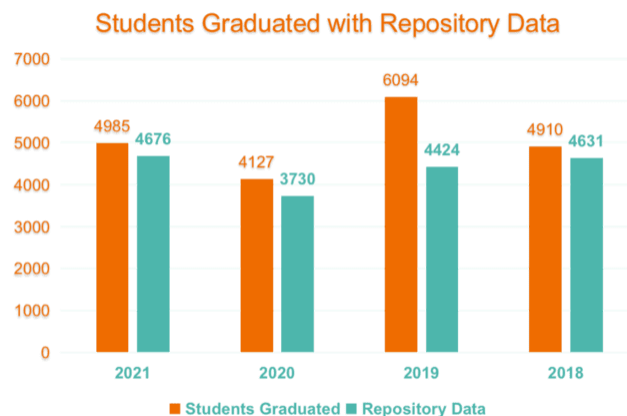


Figure 1. The gap between repository data and graduate data

## 2. METHODS

Two methods are carried out in this study: data collection methods and software development methods. The data collection methods are gathered through literature studies, interviews, and observations. This interview and observation was conducted as the basis for the requirement

analysis; interviews were conducted with the head of the library, coordinators, and service staff, as well as information technology coordinators and staff. Direct observations are made to the service department related to the application for free creation of libraries to their issuance so that ongoing business processes are obtained and implemented in the design of automation of the *pusta-free* service information system. Meanwhile, system development method is used to develop the system using Waterfall method, as seen in Figure 2.
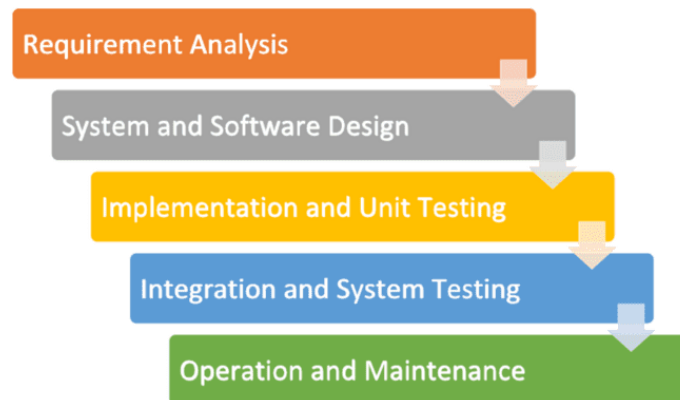


Figure 2. The waterfall method

The waterfall system development process is shown in Figure 2 and is built on a number of stages, including: System and software design: At this stage, a system design is carried out that will be built in accordance with the business processes that have been obtained from the results of previous analysis; requirement analysis: This stage is the first stage where the system to be built is analyzed first according to the needs of its users; The programming stage includes unit testing and implementation. Software development is then divided into smaller modules that will eventually be joined in the following stage; this step is system testing and integration, and the following stage is system integration as a whole; This part of the completed software is user-operated, and maintenance is done at this level. (Darmawan, 2018; Layona & Yulianto, 2016; Lukman, Umar, & Aditia Gerhana, 2022; Nugroho, Remawati, & Widada, 2016)..

## 3. RESULTS AND FINDINGS ANALYSIS

*Requirement Analysis*

In this initial stage, the system that will be developed is examined first in light of the requirements of its intended users. In this case, students must apply for a library clearance form as a formal requirement to attend graduation and receive a degree. Before the COVID-19 outbreak, library clearance form submissions might have been made through library services. Then, submissions can be made using the Google Form URL the library has provided if face-to-face submissions are restricted due to the pandemic. One must still apply document processing programs manually to make library clearance forms. There is a chance that the data entry will be wrong because the submission cannot be combined with student data on the UIN Sunan Gunung Djati Bandung in this manner.

To apply for a library clearance form, students at least should meet the following requirements:

1) Do not have loans for books and other library materials;
2) Does not have arrears of late return fines;
3) Have submitted a hardcover of the Final Project;
4) Have paid/donated Free Library;
5) Have uploaded the final project file, and have been verified by the officer at the UIN Sunan Gunung Djati Bandung Repository

Therefore, to check the requirements above, it is necessary to integrate with other systems, including the  Academic Service Administration System (SALAM), so students' data are automatically filled in and the same as existing data, automation systems for checking arrears and book loans. Digital repository will check whether users who apply for the library clearance form have uploaded the final assignment data and the last one is integrated with the graduation registration application.

*System and Software Design*

At this stage, a system design is carried out that will be built under the business processes that have been obtained from the results of previous analysis. System and software design uses Unifield Modeling Language (UML); the modeling used includes Usecase Diagrams, Class Diagrams, and Sequence Diagrams.

1) *Usecase Diagram*

The usecase diagram illustrates how the user uses a system. It helps determine the software's functionality and features from the user's point of view. What is explained in this process is what the system can do, not how. Usecase describes system interactions with actors/users (Jin & Liang, 2016; O'Docherty, 2005; Presman, 2014). The usecase diagram for library clearance mail applications is shown as follows:
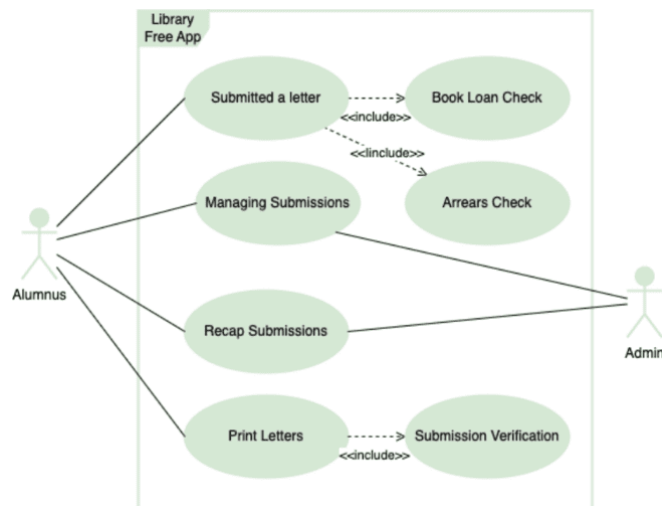


Figure 3. Usecase diagram

2) *Class Diagram*

Class diagrams depict relationships between objects or classes in software (Jin & Liang, 2016; O'Docherty, 2005; Presman, 2014). The class diagram illustrates the relationship between classes in this study based on the Model-View-Controller (MVC) architecture.
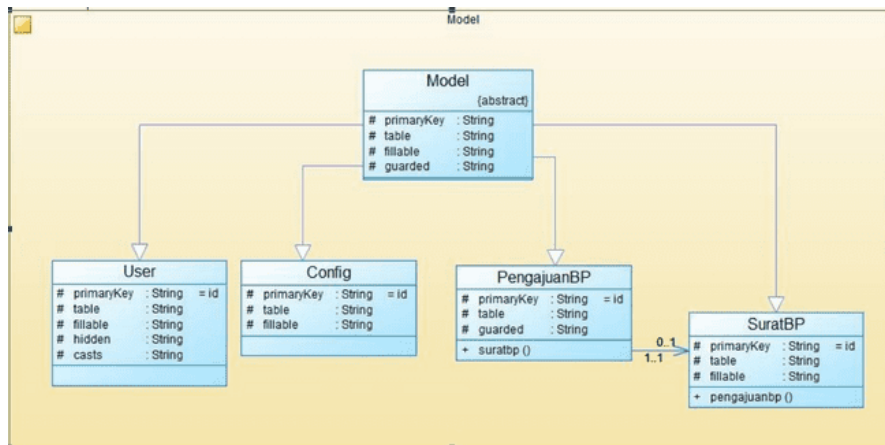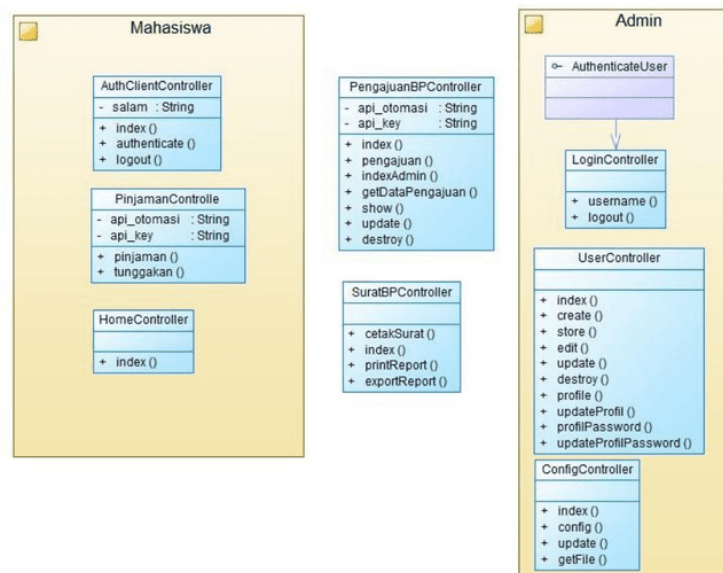
Figure 4. Class diagram model



Figure 5. Class diagram controller

The class diagram is classified into two classes; the model class diagram is depicted in Figure 4, which describes the interaction of objects that occur within the model class. Figure 5 is an overview of the controller in the application. Attributes in the controller class are data needed to execute certain functions. Not all controllers have attributes. While the method or function on the controller is an operation that will be executed according to the request from the user. There are two special sections for users, namely Students and Admins. Controllers that are outside that section mean they can be accessed either by Admins or Students. However, the execution is adjusted based on the request.

*3) Sequence Diagram*

A sequence diagram describes the activities of the system based on the sequence and interaction between objects based on their cases (Jin & Liang, 2016; O'Docherty, 2005; Presman, 2014). These diagrams can make it easier for developers to understand user interaction flow with the system.
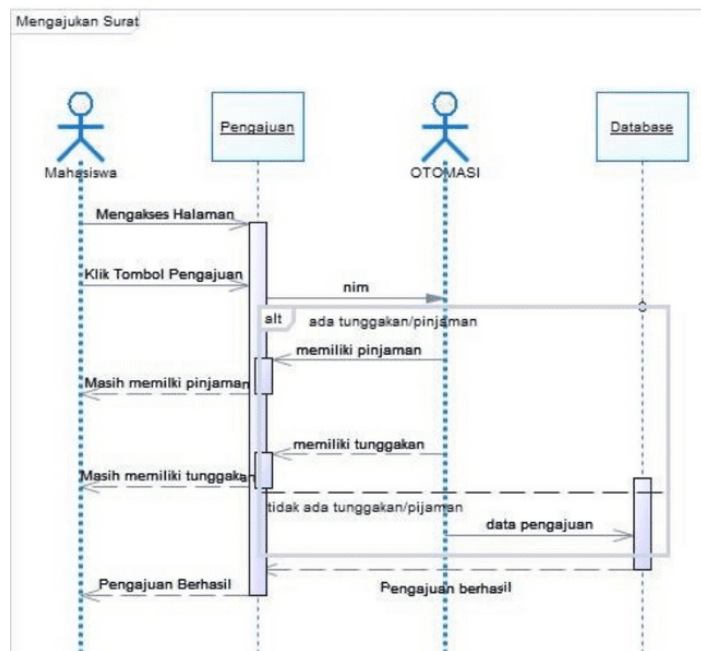
Figure 6. Sequence diagram submitted a form

Figure 6 displays a sequence diagram when students file a form. This case involves a library Automation system to check whether students have book loans or arrears. If there is no loan or arrears, only then the application is processed and stored in the database.
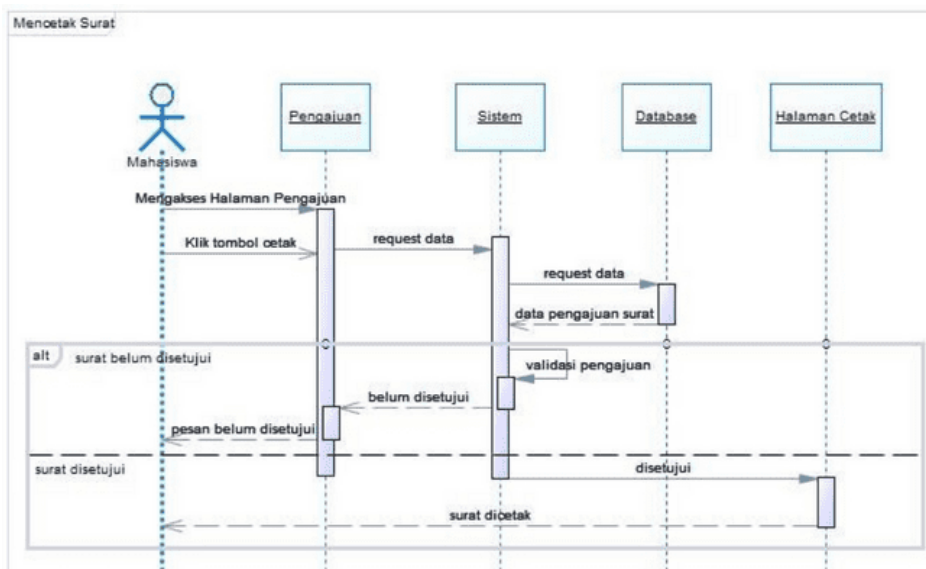


Figure 7. Sequence diagram print form

Figure 6 displays a sequence diagram when students file a form. This case involves a library Automation system to check whether students have book loans or arrears. If there is no loan or arrears, only then the application is processed and stored in the database.
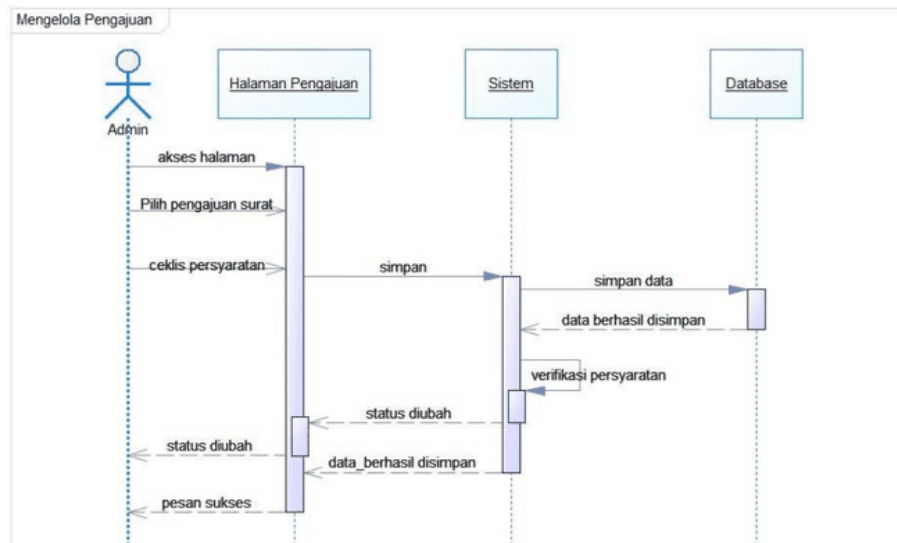
Figure 8. Managing submissions

Figure 8 illustrates the order in which admins manage incoming mail submissions. Admins can approve submissions by checking the requirements that students have met. If all the requirements are met, the status of the application will change to approved.
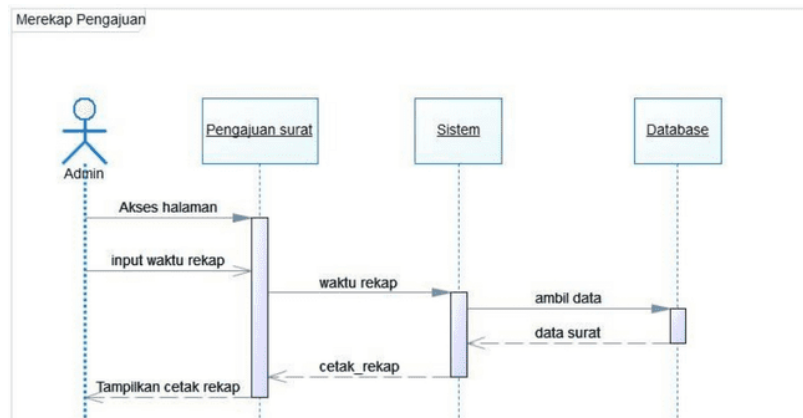


Figure 9. Recap submissions

Figure 9 is a sequence of processes for recapturing incoming mail. The admin needs to enter the recap time of the form to be retrieved. Then, the recap will be processed according to the predetermined time.

After the design process is complete, an implementation and unit testing process is carried out to implement the design results into programming according to the system's functionality that has been obtained from the analysis results. After all units or modules have been implemented, the integration and testing process of the entire system is then carried out. This is done to find out or identify possible system failures or errors. And the last stage is operation and maintenance, the system that has been running is operated and maintenance is

carried out, this maintenance allows the developer to find out errors or failures that are not found at the testing stage.

The research results related to the Repository System Integration in Otimization Data for Science Paper toward Graduates resulted in a Free library application along with its architecture depicted in figure 10. testing of the functionality of the library clearance mail application found that all functions could run properly. Functionally, the library clearance mail application has no errors or bugs so that the application can perform its functions properly. Therefore, the design of library clearance mail applications can be applied well, especially in system functional. System integration is running well, applications that act as external entities, namely, Repository, Automation, SALAM and graduation applications, all of which can be well connected and can be accessed in https://bp.uinsgd.ac.id/surat-bp/login as shown in Figure 11.
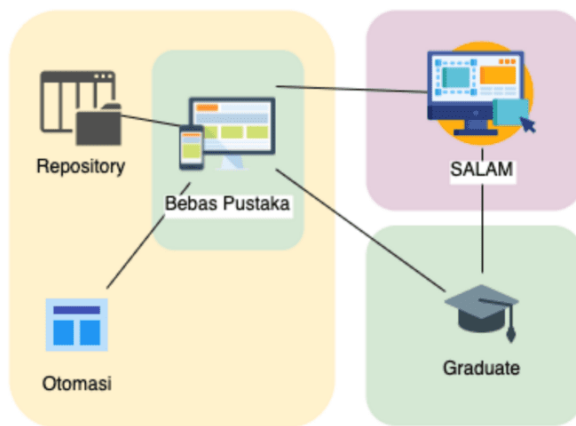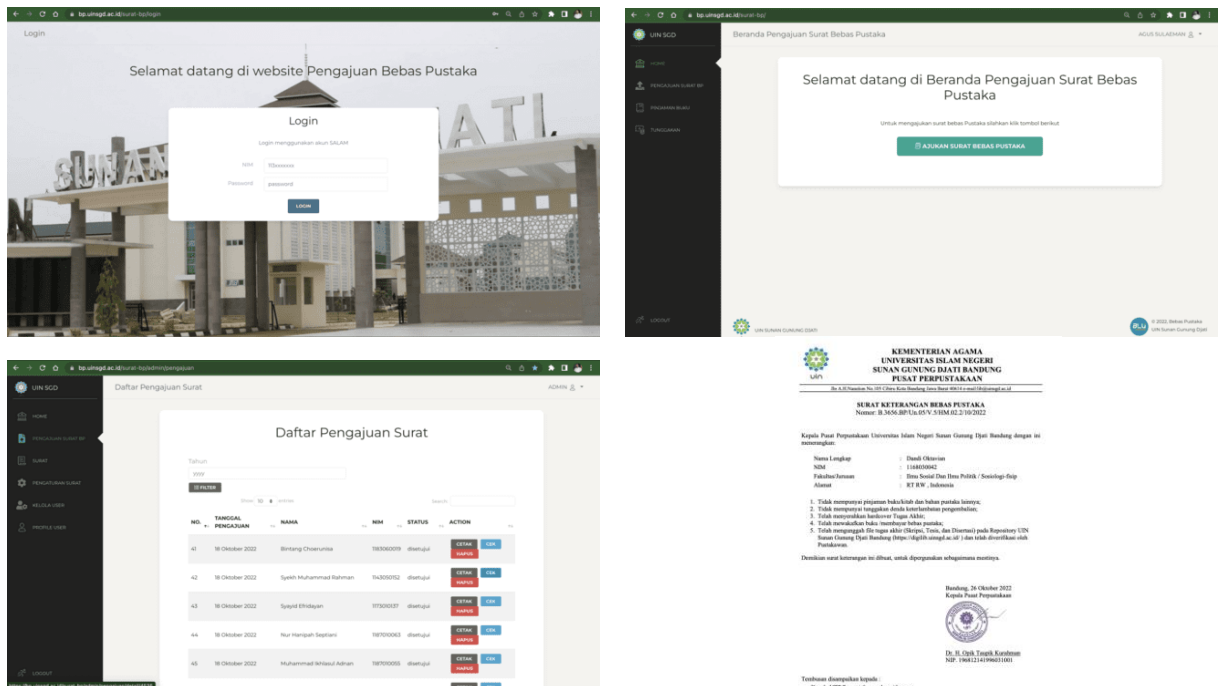


Figure 10. System architecture



Figure 11. Online Library clearance System

## 4. CONCLUSION

The library clearance system is the solution to the problems previously described, as the system developed is an integrated system of several other supporting applications. Graduates must upload their final assignments through the repository for the library clearance system to submit a library clearance form. If there are students who have not uploaded, then the repository-free system cannot submit a library clearance form. Library clearance form submissions can be easily submitted online through a library clearance mail application. With this system, submissions can be made more quickly and efficiently. In addition, the existence of a library clearance mail application can make it easier for the graduation registration system to check student library clearance forms.

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