

Design and Build a Legal Service Information System Using the Personal Extreme Programming Method at the Legal Service Center of the Kalimantan Institute of Technology

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Abstract – Each institution has services that play an important role in supporting smooth operations, just as the Kalimantan Institute of Technology (ITK) has legal services through the Legal Service Center (PLH). PLH is tasked with providing administrative support and legal information to the academic community. However, in its implementation, PLH faces various obstacles such as existential challenges related to clarity of roles, duties, services, and functions, as well as a lack of transparency, especially in the process of making the Rector's Decree. In addition, the lack of an integrated system causes service data management to be scattered, causing inefficiencies in data management and business processes that run on each service. To overcome these problems, a website-based Legal Service Information System was developed using the *Personal Extreme Programming* (PXP) method with stages of system needs analysis, planning, iteration initiation, design, implementation, system testing, and retrospective. This system was developed using the Laravel framework with features such as checking the status of decision letters, reviewing memoranda of understanding and agreements, reviewing rector regulations, and legal consultation. The system was completed by the developers with 6 iterations and 41 *user stories*. There are 4 main actors: the head of PLH, PLH staff, rectorate staff, and users. The test was carried out using the black box testing method in each iteration with the Legal Service Center of the Kalimantan Institute of Technology, and the results were in accordance and successfully carried out.

Keywords—Integration, Services, *Personal Extreme Programming*, Legal Service Center, Transparency

I. INTRODUCTION

In the context of higher education, educational institutions are required to provide services that support the continuity of campus operations and meet the needs of the academic community, both in academic and non-academic aspects. In accordance with the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 139 of 2014 concerning Guidelines for Statutes and Organizations of Higher Education, it is stated that the administrative implementing unit is divided into two fields, namely academic and non-academic [1]. One of the important forms of non-academic administrative services is legal and legislative services, which include the preparation of consideration materials and the provision of legal assistance in decision-making, increasing legal awareness of the academic community, and protecting intellectual property in research activities.

The Kalimantan Institute of Technology (ITK) as one of the state universities in Indonesia, also implemented this through the establishment of a Legal Service Center (PLH) unit on October 23, 2023. PLH is tasked with providing administrative services and legal information based on the principle of *Lex Prospicit Non Respicit*, which is forward-looking in providing legal certainty and justice. PLH ITK has five main types of services, namely: review of rector

regulations, review of memorandum of understanding, review of cooperation agreements, legal consultation, and services for making Rector's Decree (SK) which is currently accessed through Google Form. However, in its implementation, PLH faces various challenges, such as unclear roles and functions of the unit, low legal awareness of the academic community, and lack of transparency in the service process, especially in monitoring the status of making the Rector's Decree which causes an excessive communication burden for staff through messaging applications.

In addition, the use of systems that have not yet been integrated, such as Google Forms and separate spreadsheets, leads to inefficiencies in data management and slows down business processes, especially in services with high demand numbers such as SK generation. This condition hinders PLH's efforts to provide responsive and organized legal services, while making it difficult for academics to access information quickly and efficiently.

Responding to these conditions, an integrated and centralized legal service information system is needed to support efficient and transparent business processes. This system is designed to increase the accessibility of legal service information to ITK academics, as well as allow users to independently monitor the status of applications. The selection of information system development methods is very important to produce a system that meets expectations [2]. In this study, the development of the system was carried out using the *Personal Extreme Programming* (PXP) method, which was chosen for its flexibility to changing needs and suitability for development by individual programmers [3],[4]

The results of interviews with related parties at PLH and UPT TIK ITK show the urgent need for an information system that is able to contain information about PLH, SK status checking features, and centralized legal service data management. Previous research at Sam Ratulangi University also showed the importance of web-based systems to improve access to online legal aid services [5]. Therefore, this study aims to design and develop a website-based Legal Services Information System at the Legal Service Center of the Kalimantan Institute of Technology using the PXP method, in order to support increasing efficiency, transparency, and accountability in legal services in the campus environment.

II. MATERIALS AND METHODS

The flow chart in figure 1 shows the stages carried out in the research, consisting of literature study, application of personal extreme programming (pxp) methods, and finally handover.

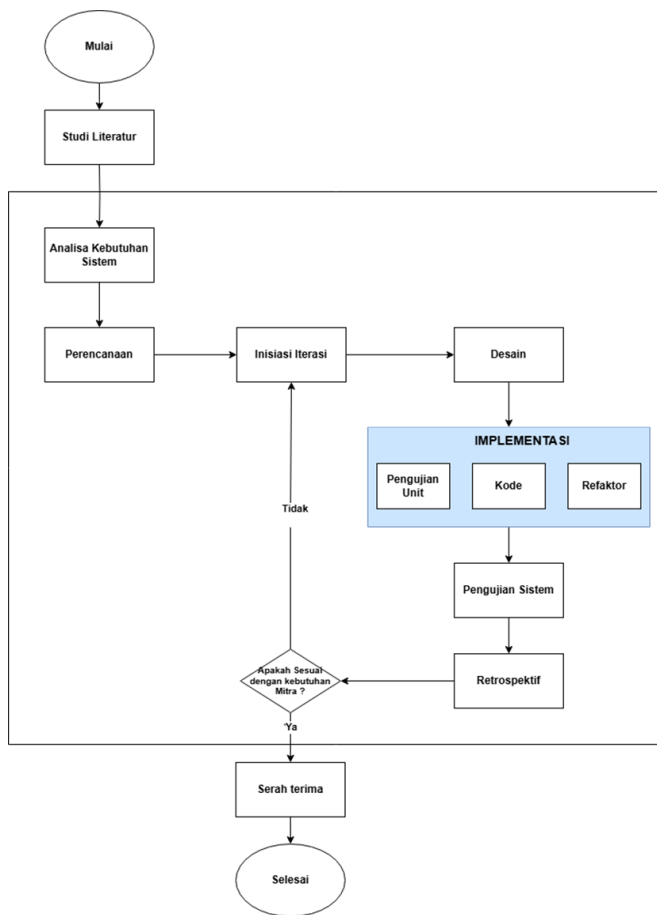


Figure 1. Research flow

A. Literature Studies

At this stage, the researcher takes material from various references, including books and journals that have been accessed. Then all the results of the material taken from the reference become the basis for being able to apply the personal extreme programming method in the development of this website. [6]

B. Application of the Personal Extreme Programming (PXP) method

The process of developing a legal service system uses the personal extreme programming (pxp) method. As shown in Figure 2, according to Dzhurov, the pxp method has 7 stages, namely [4]:

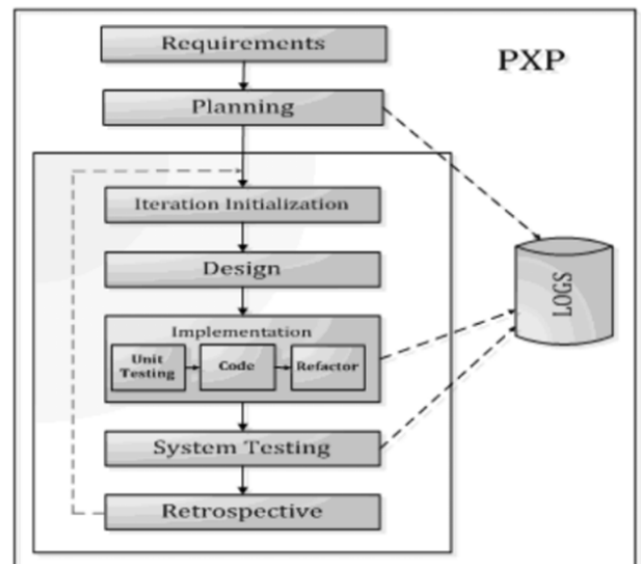


Figure 2. Stages of the PXP Method.

1) System Needs Analysis

At this stage, identification of system users and collection of necessary information is carried out. After that, the next step is to design the structure or architecture of the program. [7]

2) Planning

At this stage, the developer compiles a set of tasks based on a needs list document. Each task can consist of sub-tasks grouped based on specific categories. The estimated time required for each sub-task is calculated based on data from previous projects, or if the data is not yet available, the developer estimates the time based on his or her best experience. The total estimated time for the main task is the sum of the estimated time for its sub-tasks. Before task planning, key design decisions such as programming language selection, development framework, and application model are decided [4]

3) Iteration Initiation

The initiation of iterations marks the start of each iteration. Each iteration begins with the selection of tasks to focus on in that iteration. The duration of iterations can vary between 1 to 3 weeks, depending on the scope of the project. Each iteration can result in a candidate version of the release or a version of the product that has already been released [4]

4) Design

In this phase, the developers independently design the modules and classes that will be implemented in the current iteration. The goal is to meet the client's current needs without trying to estimate future needs. Developers are free to choose the design method, but it is recommended to use tools that are as simple as possible [4]

5) Implementation

In the implementation phase, the actual coding is performed. The developer implements all the objects that have been defined in the previous design phase and tests each object. This phase consists of three sub-stages, namely unit testing, code generation, and code refactoring. To complete the implementation phase, the code must be error-free, and all unit tests must be successful [4]

6) System Testing

After all the features developed so far, testing is carried out to ensure that the entire system runs properly. This phase aims to detect problems or bugs in the system as a whole and ensure the quality of the resulting product. [4]

7) Retrospective

This stage aims to evaluate the results of the system that has been developed. If there are any flaws or errors, the process will revert to the iteration initialization stage for fixes and revisions. [7]

C. Handover

The handover stage is carried out when all iterations have passed system testing and retrospectives or in other words, all the system needs desired by PLH are in place. The developer submits the system which in this case is accepted by PLH ITK, the submission also includes the system source code, system development documents, and guidebook for its users.

III. RESULTS AND DISCUSSION

A. Application of the Personal Extreme Programming (PXP) method

1) System Needs Analysis

At the stage of analyzing system needs, interviews and discussions were conducted with related parties, which in this case was PLH ITK. This discussion aims to understand the legal service process at the Kalimantan Institute of Technology Legal Service Center and identify the expected functional needs in the development of the Legal Service Information System at the Kalimantan Institute of Technology Legal Service Center. Here are some questions asked during the interview

TABLE I INTERVIEW QUESTIONS

1	What services are available at ITK Legal Service Centers?
2	For now, does the ITK Legal Services Center have an organizational support system?
3	What underlies why this system needs to be created?
4	What features are expected to be present in this system?
5	Who are the actors who will be involved in the system to be developed, and what can these actors do to the system?
6	What kind of display, information, and color selection are desired in this system to support the services and information that will be accessed by users?
7	Are there any feature priorities of the system that you want to develop as soon as possible?

2) Planning

In the planning stage, a thorough arrangement is made to determine the functionality of the system based on the user stories that have been identified at the system needs analysis stage. In addition, a need for system development is made which contains a list of features, roles, and a list of tasks that can be done in the form of user stories in accordance with the needs of system development at ITK. The following is an overview of the list of *roles* and tasks that exist in the system

TABLE II. LIST OF ROLES AND DUTIES

Yes	Actor	Information
1	Head of PLH	Conduct management of SK disposition data, and data related to PLH system information. Conducting a review of the draft memorandum of understanding and cooperation agreement service, draft rector regulations, and validating the schedule of legal consultation appointments
2	Staff PLH	Conduct management of SK disposition data, and data related to PLH system information.
3	Rectorate Staff	Validating the draft memorandum of understanding and cooperation agreement, as well as validating the draft of the rector's regulation
4	User	Playing a role in the use of services and information provided by PLH

3) Iteration Initiation

The iteration initiation stage is the beginning of a series of iterations in the development of legal service Information Systems. This iteration method aims to improve the efficiency of the workmanship and show the progress of the system development in stages. At this stage, each step of system development is broken down into smaller units, with the main focus on selecting core tasks based on the user stories document and its story point values.

TABLE III LIST OF ITERATIONS

User Stories Code	User Stories	Stories Point
ITERATION 1		
US-01	Log in	2
US-02	Log out	2
US-03	Adding a PLH profile	3
US-04	Delete a PLH profile	3
US-05	Change your PLH profile	3
US-06	View PLH profile	3

User Stories Code	User Stories	Stories Point
Total 12		
ITERATION 2		
US-07	Adding SK records	3
US-08	Delete SK records	3
US-09	Changing the SK record	3
US-10	Check the status of the SK	3
US-11	Import excel SK post	2
US-12	Adding PLH SOPs	2
US-13	Removing PLH SOP	2
US-14	Changing PLH SOPs	2
Total 20		
ITERATION 3		
US-16	Add legal documents	2
US-17	Deleting Legal documents	2
US-18	Changing legal documents	2
US-19	View legal documents	2
US-20	Download legal documents	2
US-21	Adding FAQs	1
US-22	Deleting FAQs	1
US-23	Changing FAQs	1
US-24	View FAQ	1
US-25	Changing the Footer	1
US-26	Viewing the Footer	1
Total 16		
ITERATION 4		
US-27	SK Notification	3
US-28	Input for draft memorandum of understanding and cooperation agreement	3
US-29	Validation of draft memorandum of understanding and cooperation agreement	3

User Stories Code	User Stories	Stories Point
US-30	Validation of draft memorandum of understanding and cooperation agreement	3
US-31	Notification of the results of the draft memorandum of understanding and cooperation agreement	3
US-32	Download the results of the draft memorandum of understanding and cooperation agreement	3
Total 18		
ITERATION 5		
US-33	Input form review of the rector's regulations	3
US-34	Validation of the Rector's Regulation	3
US-35	Validation of the Rector's Regulation	3
US-36	Notification of the results of the draft memorandum of understanding and cooperation agreement	3
US-37	Download the results of the rector's regulations	3
Total 15		
ITERATION 6		
US-38	Legal Consultation form input form	3
US-39	Validation of legal consultation appointment schedule	3
US-40	Notification of reply letter results of legal consultation, and results of appointment request	3
US-41	Download a legal consultation reply letter	3
Total 12		

4) Design

At this stage, the design of the system to be built is carried out, namely by creating a database design in the form of a class diagram to describe the relationship between interrelated data objects in the system to be built

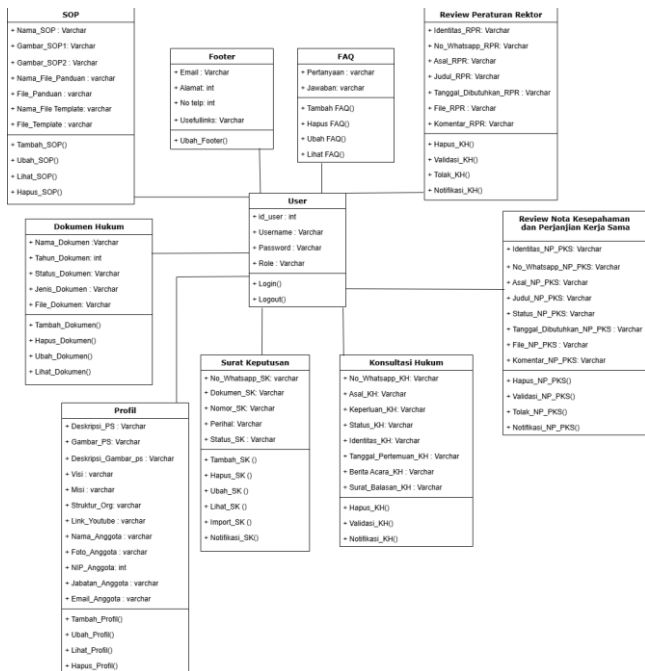


Figure 3. Class Diagram

Layanan Konsultasi Hukum

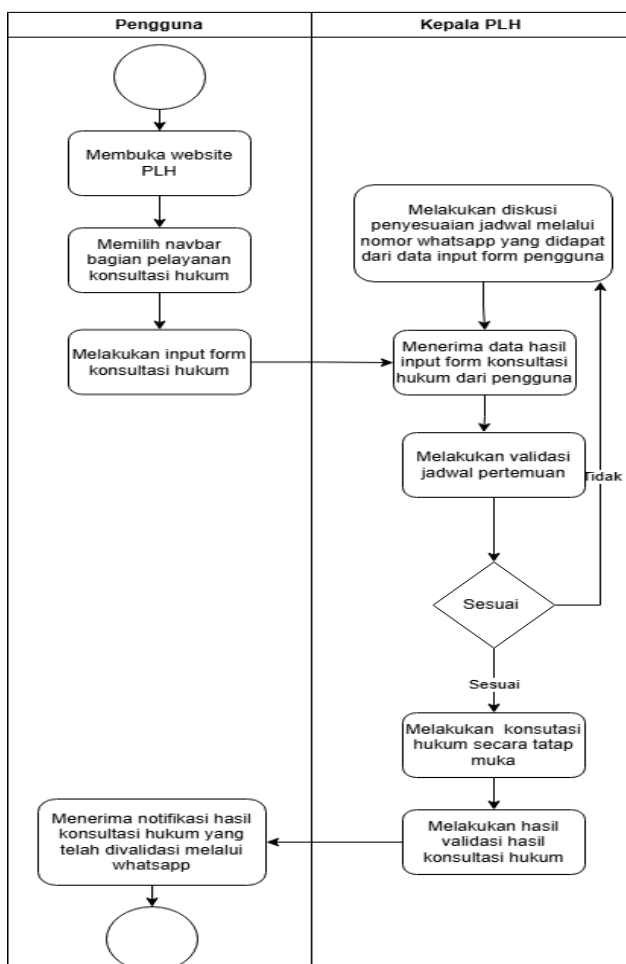


Figure 4. Legal Consulting Services Activity Diagram

5) Implementation

The implementation phase aims to develop the system through several steps, including coding using the PHP programming language and Laravel framework, as well as the MySQL database.

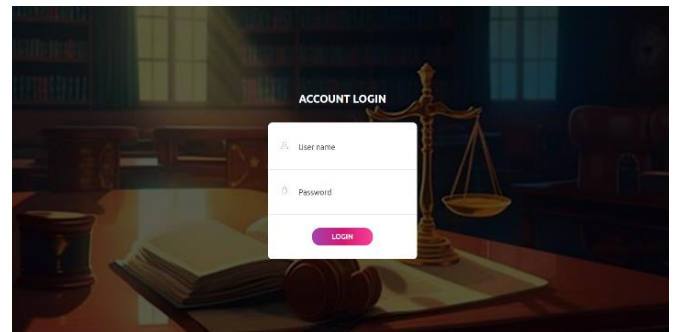


Figure 5. Login View.

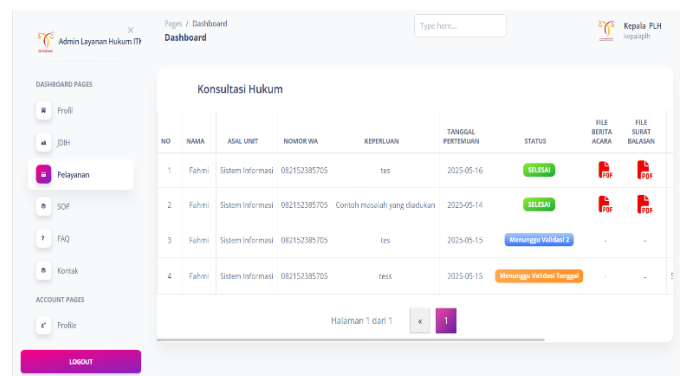


Figure 6. Legal Consulting Services Management View.

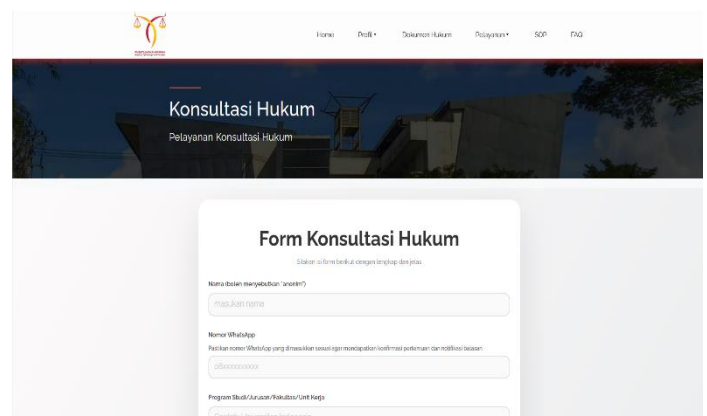


Figure 7. Legal Consultation Service Form Display.

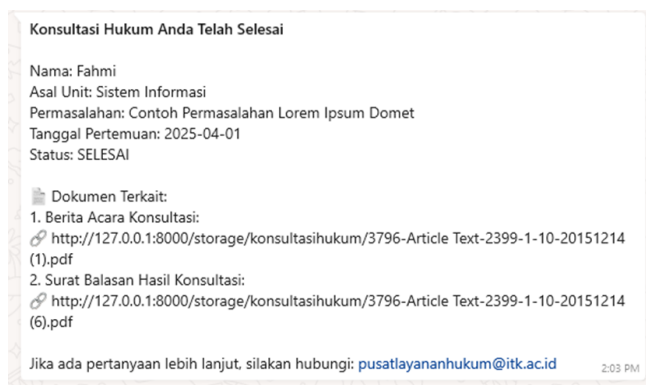


Figure 8. Legal Consulting Service Notification Display

6) System Testing

The system testing stage is carried out by testing the functionality of the system using the *Black Box Testing method*. The way to conduct testing is to run the program and observe the results of the program that has been carried out whether the results are in accordance with or not as expected. This testing process is carried out with PLH who checks all features in all iterations. The results of this test can be summarized in the table below

TABLE IV TESTING SYSTEMS

User Stories Code	Expected Result	Result
ITERATION 1		
US-01	Log in to the system according to the access rights and display the <i>dashboard page</i>	Appropriate
US-02	Log out of the system and display the login page	Appropriate
US-03	Get "Data added successfully"	Appropriate
US-04	Get a notification "Are you sure you want to delete this data?", if yes then you will get "Data deleted successfully" notification	Appropriate
US-05	Get "Data changed successfully"	Appropriate
US-06	Successfully viewed PLH profile data (vision and mission, structure, short profile, and organizational structure)	Appropriate
ITERATION 2		
US-07	Get "Data added successfully"	Appropriate

User Stories Code	Expected Result	Result
US-08	Get a notification "Are you sure you want to delete this data?", if yes then you will get "Data deleted successfully" notification	Appropriate
US-09	Get "Data changed successfully"	Appropriate
US-10	If the official memorandum number entered is appropriate, it will get the status of the decision letter, and vice versa if not, it will display a notification "The official memorandum number does not exist, please make sure the writing of the official memorandum number is correct"	Appropriate
US-11	Get a "Data successfully imported" notification	Appropriate
US-12	Get "Data added successfully"	Appropriate
US-13	Get a notification "Are you sure you want to delete this data?", if yes then you will get "Data deleted successfully" notification	Appropriate
US-14	Get "Data changed successfully"	Appropriate
US-15	Successfully view PLH SOP data	Appropriate
ITERATION 3		
US-16	Get "Data added successfully"	Appropriate
US-17	Get a notification "Are you sure you want to delete this data?", if yes then you will get "Data deleted successfully" notification	Appropriate
US-18	Get "Data changed successfully"	Appropriate
US-19	Successfully view legal document data	Appropriate
US-20	Download and receive pdf document files	Appropriate
US-21	Get "Data added successfully"	Appropriate
US-22	Get a notification "Are you sure you want to delete this data?", if yes then you will get	Appropriate

User Stories Code	Expected Result	Result
	"Data deleted successfully" notification	
US-23	Get "Data changed successfully"	Appropriate
US-24	Successfully view PLH FAQ data	Appropriate
US-25	Get "Data changed successfully"	Appropriate
US-26	Successfully viewed the FAQ Footer data containing PLH	Appropriate
ITERATION 4		
US-27	Receive SK notifications when the status has been completed via whatsapp	Appropriate
US-28	Get "Data added successfully"	Appropriate
US-29	Get "Data validated successfully" notification	Appropriate
US-30	Get "Data validated successfully" notification	Appropriate
US-31	Receive notifications of the results of the draft memorandum of understanding and cooperation agreement that has been reviewed via whatsapp	Appropriate
US-32	Download the draft results of the memorandum of understanding and cooperation agreement in docx form via whatsapp notification	Appropriate
ITERATION 5		
US-33	Get "Data added successfully"	Appropriate
US-34	Get "Data validated successfully" notification	Appropriate
US-35	Get "Data validated successfully" notification	Appropriate
US-36	Receive notifications of the results of the rector's draft that has been reviewed via whatsapp	Appropriate
US-37	Download the results of the rector's regulation in docx form via whatsapp notification	Appropriate
ITERATION 6		

User Stories Code	Expected Result	Result
US-38	Get "Data added successfully"	Appropriate
US-39	Get "Data validated successfully" notification	Appropriate
US-40	Receive notifications of the results of legal consultations via WhatsApp	Appropriate
US-41	Download the results of the legal consultation in the form of reply letters and minutes of the results of the legal consultation in pdf form through whatsapp notifications	Appropriate

The following are the results of the system tests that have been carried out.

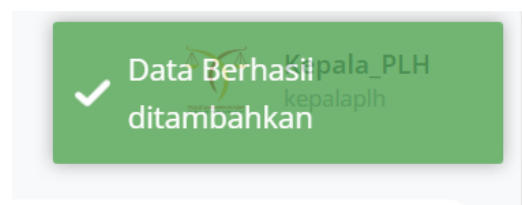


Figure 9. Results of the Legal Document Data Add-on System (US-16)



Figure 10. Results of the Legal Document Data Change System (US-18)

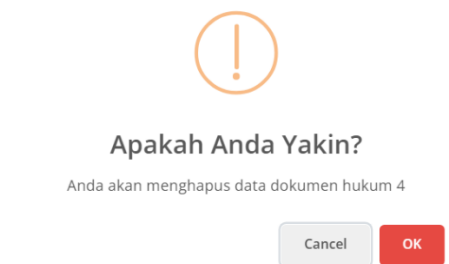


Figure 11. Legal Document Data Deletion System Test Results (US-17)

Based on the results of the system testing, the results were obtained that all test scenarios in each iteration were in accordance with expectations, therefore the system development process can be continued to the next stage, namely retrospective.

7) Retrospective

The retrospective stage is the final step in the *Personal Extreme Programming* methodology. At this stage, a final decision is made regarding the readiness of the system that has been developed. The main focus at this stage is to assess whether the system is ready to deploy. If the system is considered not ready, then the development process will return to the iteration initialization stage until the system meets all the needs of stakeholders, in this case PLH. This stage is considered complete when all the needs listed in the *user stories* have been met and have successfully passed the system testing stage. Based on the results of all iterations and *user stories* that have been tested through the implementation stages of the unit testing section, refactoring and system testing stages with *blackbox testing* together with PLH, the results are obtained that all iteration and user story work is in accordance with the test scenario, in addition to all the features listed in each *user story* has been in accordance with the needs of PLH ITK obtained from the system needs analysis stage. Therefore, at this stage, a final decision is made that the PLH system that has been developed is ready for use.

IV. CONCLUSION

Based on the results of the research that has been carried out, it is concluded that the development of Legal Service Information Systems using the *Personal Extreme Programming* method can be carried out. The development of Legal Service Information Systems using *Personal Extreme Programming* obtained 99 story points with 41 *user stories*. The development of the Legal Service Information System using the *Personal Extreme Programming method* was carried out iteratively with a total of 6 iterations. In the testing stage of the Legal Service Information System, the results were obtained that the

system that had been worked on was in accordance with the needs of the ITK Legal Service Center in line with the business process documents in the unit. This application has also been handed over to stakeholders along with the application use manual.

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