



Asset Lending Information System at Faculty of Languages and Arts

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Abstract. The Faculty of Language and Arts (FBS) is a part of the State University of Surabaya, which is a government-owned institution that provides higher education services for the society. In providing educational services, of course, adequate facilities are needed. Information about these facilities should be easy to find and easily accessible to those in need. The Faculty of Languages and Arts Unesa has created a website-based Information System to be able to borrow educational facilities. However, the website is considered unfavorable for various reasons, including the display that is less responsive and the system and programming that is not updated. The development of information system really needs to be done to support the educational process which began to be carried out directly on campus after previously only being done online. Analysis of the problems in this study using the PIECES method (Performance, Information, Economic, Control, Efficiency, Service). Meanwhile, the development of this information system uses PHP, MySQL, and AdminLTE templates. While the development method using Agile Development Method. The most important result of this research is the assessment of the old information system that is not good enough so that a new, better and responsive new information system design is needed.

Keywords: Information System · PIECES · AdminLTE · Agile Development Method

1 Introduction

Facilities and infrastructure are important parts of an institution that must be managed properly in order to provide benefits, as well as support the achievement of the goals of the organization/institution. Facilities and infrastructure are parts of the assets. Means are all types of equipment that function as the main tool / direct tool to achieve the goal. Meanwhile, infrastructure is a set of tools that function indirectly for its purpose [1]. Definition of assets according to PSAK No. 16 The 2011 revision is all assets owned by individuals or groups that are tangible or intangible, which have a value that will benefit everyone or the company.

The Faculty of Languages and Arts Unesa as an educational institution has many assets in the form of facilities and infrastructure to support the student education process. Facilities provided and often used by students in the educational process at the Faculty of Languages and Arts Unesa include: laptop/computer, LCD projector, table, chair, blackboard, air conditioner and others. While the infrastructure that is often used includes: buildings, classrooms, auditoriums, joglo, fields, places of worship, laboratories and others. These facilities and infrastructure are generally provided for the student education process, but there are some facilities and infrastructure that are also allowed for public purposes such as an auditorium for weddings, rooms/classes for the JLPT (Japanese Language Proficiency Test) test, the UTBK (Writing-Based Test) test. Computer) and others. Students, lecturers, and the general public who wish to use facilities and infrastructure outside of educational activities must contact the faculty officer to obtain permission to use facilities and infrastructure.

The Non-Academic Sub-Section of the Faculty of Language and Arts is in charge of managing every existing facility and infrastructure, including the management of the borrowing of facilities and infrastructure by the academic community and external parties. In the borrowing process, there are several obstacles, including limited access to information on the availability of infrastructure because they have to meet directly with the authorities.

In regulating the use of facilities and infrastructure at the Faculty of Languages and Arts, Unesa requires management in the form of asset management. Asset management is the process of managing demand and acquisition of guidance, use and sale of assets to take advantage of service potential, and manage risks and lifetime costs of assets [2]. Asset management needed at the Faculty of Languages and Arts Unesa is the loan of facilities and infrastructure that regulates usage scheduling, borrowed infrastructure, period of use and others.

In the process of borrowing facilities and infrastructure, the Faculty of Languages and Arts Unesa has provided a website-based Information System. Information System is a systematic technique for collecting, entering, processing, and storing data so that the business achieves the goals that have been set, controls and reports in an orderly manner [3]. Before a web-based information system was provided, the borrowing process was still manual by having to meet a loan officer with documents for submitting a loan. This requires a longer process because the loan documents must be submitted directly to the loan officer. The information system provided is expected to speed up the borrowing process without having to bring together officers and users while minimizing the use of excessive paper for printing loan documents. However, the information system still needs to be developed on an ongoing basis.

In 2022 the COVID-19 pandemic conditions began to subside, so the government began to implement face-to-face lectures. Students will begin to actively carry out lectures on campus so that facilities and infrastructure will begin to be widely used, therefore research and development of asset lending information systems is very necessary.

2 Methods

Various problems that existed in the old information system were analyzed using the PIECES method (Performance, Information, Economic, Control, Efficiency, Service).

PIECES is to correct or improve information systems for decision makers in an organization [4]. Then various shortcomings will be found so that it can be concluded to develop an information system. From the PIECES analysis will result in the identification of the main problems of a system and provide solutions to these problems [5]. The six variables in PIECES are:

- a. Performance
Performance analysis is to find out how the performance of an information system. How fast data and information can be displayed without wasting a lot of time.
- b. Information
Information analysis is used to find out how clear the information displayed on the Information System is when a search is carried out on the system.
- c. Economics
Economic analysis aims to assess an information system in terms of its economy or cost. How much does it cost to build and maintain a system.
- d. Control
Control analysis needs to be done with the aim that the system can always run properly and safely.
- e. Efficiency
Efficiency analysis aims to assess the information system is able to work effectively and efficiently. Menus and features that are displayed on an information system greatly determine the efficiency of a system.
- f. Service
Service analysis is carried out so that the information system can be assessed through what services are provided.

The development of information systems must be supported by the selection of the right software development life cycle (Software Development Life Cycle). Agile Development Methods is a modern software development methodology based on the principles of short-term system development that requires rapid adaptation of developers to changes of any kind [6]. The following series of activities are carried out using the agile method:

- a. System Requirements Analysis
At this stage, activities are carried out to explore in detail the software requirements needed by the user.
- b. Design
At this stage, the system design is carried out to adjust the borrowing process which has been running manually. The tools used in this stage are to create use cases and class diagrams.
- c. Developing
At this stage, the program code is written using the PHP language with the help of AdminLTE tools, while for database management using MySQL.
- d. Testing
This testing activity is carried out by the research team to minimize errors and to test or ensure that the resulting system is in accordance with user requirements.

e. Deploy

This activity aims to deploy applications that have been developed and have gone through the testing stage by the development team.

f. Review

This activity is carried out to follow up on changes requested by the user after the system is handed over to the user. Changes can occur due to errors that appear and are not detected during testing or adaptation to new needs.

3 Results and Discussion

3.1 Analysis of Old Information Systems Using the PIECES Method

The real problem in this research is the old Information System. So it is necessary to analyze the problem. Problem analysis is a stage to define the scope of the system. This stage studies the existing system and analyzes the problems that arise to find solutions to the problem [7]. Analysis of the system is a step to evaluate existing problems so that improvements can be made [8].

In this stage usability testing is carried out. Questionnaires were distributed to users in order to obtain data and conduct analysis. Questions were given regarding the use of the old Information System covering performance, information, economics, control efficiency, and services. The list of questions for each category of PIECES analysis can be seen in Tables 3, 4, 5, 6, 7, and 8. A total of 23 questions were distributed in the google form. While the measurement of the questionnaire using Likert's Scale as in Table 1. This Likert scale is a scale that can be used to measure attitudes, opinions, and perceptions of a person or group of people regarding a symptom or phenomenon [9].

The following are the basic questions in making questionnaire questions (Table 2):

The stages of analysis that have been carried out using the PIECES method include:

- a. Performance is very important in an application or system, where performance shows real system performance. Performance shows a system can be accessed quickly. Sometimes the appearance of a very attractive website takes a long time to access. A good system is one that provides maximum speed when accessed. To see the performance of the Unesa FBS Asset Management Information System, a test is needed to get results whether the information system has good performance. As a

Table 1. Likert's Scale

No	Code	Agreement	Value
1	SA	Strongly agree	5
2	A	Agree	4
3	JA	Just Agree	3
4	DA	Disagree	2
5	SD	Strongly Disagree	1

Table 2. Basic questions in the questionnaire

Performance	
1	Easy access to open the Information System
2	Speed access of the Information System
3	Processing speed in Information System
4	Easy access to Information System menu
Information	
1	Information Clarity
2	Complete Information
3	Information System usage guide
Economic	
1	Effort used when using Information System
2	Difficulty in accessing Information System
3	Use of data quota in accessing Information System
4	The use of Information System helps speed work
Control	
1	Information System security that does not cause device damage
2	Information System does not experience errors when accessed
3	Use of Information System according to access rights
4	Virus free
Efficiency	
1	Information System according to current conditions
2	Ease of processing in Information System
3	Is it easy to fix when something goes wrong
4	Information System can be used as decision making
Services	
1	There is a manual for using Information System
2	Information System reliability
3	Information System accuracy
4	There are suggestions and criticism features in Information System

supporting tool that is used to carry out the analysis using Google PageSpeed Insight, the results are in Table 3.

From the results of the analysis, it was found that the speed in accessing the Unesa FBS Asset Management Information System got a value of 100 or, where the speed

Table 3. Analysis Result Using Tools Google PageSpeed Insight

No	Metrics	Value
1	Performance	100
2	First Contentful Paint	0.5 s
3	Speed Index	0.8 s
4	Largest Contentful Paint	0.5 s
5	Time to Interactive	0.5 s
6	Total Blocking Time	0 ms
7	Cumulative Layout Shift	0.027

when the application was first opened (first contentful paint) was 0.5 seconds, the speed index shows how fast the content opens on each page. Available is 0.8 seconds, the speed of opening the image (largest contentful paint) is 0.5 seconds, the speed at which the user interacts with the system selecting existing features (time to interactive) is 0.5 seconds, the total amount of time when interactive occurs and performs storage, which is 40 milliseconds, and the total time for the process of moving motion or images automatically (cumulative layout shift) is 0.027.

At the stage of information analysis carried out, namely analyzing the needs that exist in the Faculty of Language and Arts, Unesa. Based on the results of distributing questionnaires to Information System users, it was obtained a score of 4.2, which is quite good. In addition, the Unesa FBS Asset Management Information System also does not provide information about facilities and infrastructure, especially in its description. Detailed descriptions of the facilities and infrastructure are still little described in the Information System.

At the stage of economic analysis carried out, namely analyzing the relationship between costs and the information provided in the Information System. Based on the results of the questionnaire given to the users of the Unesa FBS Asset Management Information System overall, they got a good score. Information System Developers no longer store databases on rented hosting because Unesa already provides internal hosting and has very good performance. The speed of 0.5 s when accessing the Information System also makes it easier for users and does not consume a lot of internet quota for users.

At the control analysis stage, which is to analyze the security of the Unesa FBS Asset Management Information System, Based on the results of the questionnaire that has been distributed, this information system is considered to be not good. In terms of the content of the Unesa FBS Asset Management Information System application, it is easy to understand but the table display still displays empty columns without any content. The position settings of the content images and the font used are good. Control analysis is more focused on application security from virus attacks that can interfere with computer performance. At this control stage, application security is also measured using the Qualys tool which can be accessed via the <https://www.ssllabs.com/ssltest/> page and the results of the control analysis can be seen in Fig. 1.

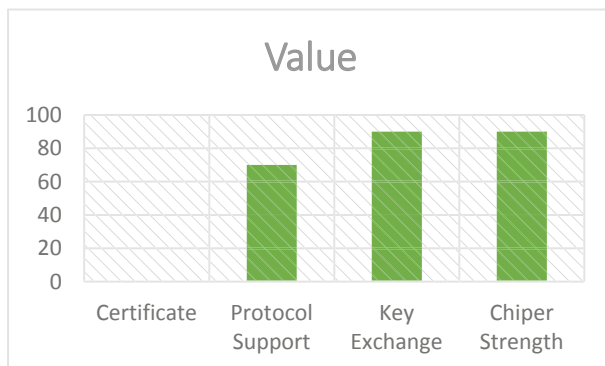


Fig. 1. Result of Control Analysis

From the results of the control analysis carried out by the Unesa FBS Asset Management Information System, it got a B rating which means the control assessment is not good, the Unesa FBS Asset Management Information System still contains many errors in its programming and is also still not trustworthy listed in the analysis certificate using the previous Qualys Tools.

Efficiency analysis was conducted to analyze the level of efficiency provided by the Unesa FBS Asset Management Information System. The results of the distributed questionnaires indicate that the information displayed provides benefits for users. The Unesa FBS Asset Management Information System lacks good efficiency. The application that is built provides information and also outputs as desired but the table display is not good. For efficiency, it is expected to be further improved in order to get a very good value in the table view and less detailed description information.

Service analysis is carried out to see the services provided by the Unesa FBS Asset Management Information System. Based on the results of the questionnaire for service analysis, it resulted in a good score. The Information System has provided the services needed by users, starting with photos of facilities, number of facilities, locations, loan flows, and Contact Persons. To improve services, it is necessary to add a more detailed description of the facilities so that potential users can know more about facility information.

Based on testing using PIECES analysis, the overall test results are as in Table 4.

3.2 Information System Development

After analyzing the old Information System, the decision was made that it was necessary to develop an Information System. Initially it is necessary to make a use case diagram that is tailored to the needs. Use Case Diagram is a technique for recording the functional requirements of a system. Use Case describes a typical interaction between system users and the system itself, 23 by providing a narrative about how the system is used [10]. Use Case Diagram shows which actors use which use cases, which uses cases include other use cases and the relationship between actors and use cases. Sub Coordinator for

Table 4. Test Results using the PIECES method

No	Categorize	Result	Value
1	Performance	The information system is very fast and easy to access	B
2	Information	Information of facilities and infrastructure in the information system lacks clear information	C
3	Economic	The Information System has a good speed so that it makes it easier for users and does not consume a lot of internet quota for users	B
4	Control	Administrator access still do not have a system login, so it is not very good for data security	C
5	Efficiency	There is still a flow that requires users to contact the administrator, so love is considered less efficient	C
6	Services	The main features in the information system have described the needs that deserve to be displayed, even though the system has not been running well	C

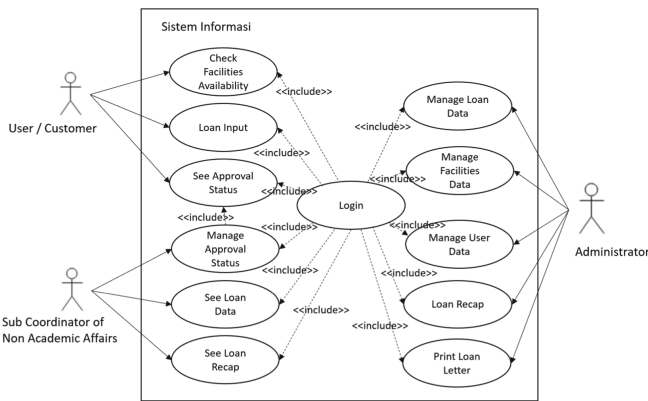


Fig. 2. Use Case Diagram

Non-Academic Sector. Each manager has rights and tasks that can be done and all of them must be entered in the system login for system security. In general, there are 5 important things to do in this system, namely the login process for security, checking availability, ordering, approval, and reporting.

Users or customers can check in advance about the availability of facilities and infrastructure. If the desired facility can be used, then it can carry out the data input process, then wait for approval whether it is allowed or not. Administrators manage loan data, facility data, user data, and recapitulation data. All these data are always reported to the non-academic sub-coordinator. The Non-Academic Sub-Coordinator approves the request for facilities and sees the recapitulation of the loan.

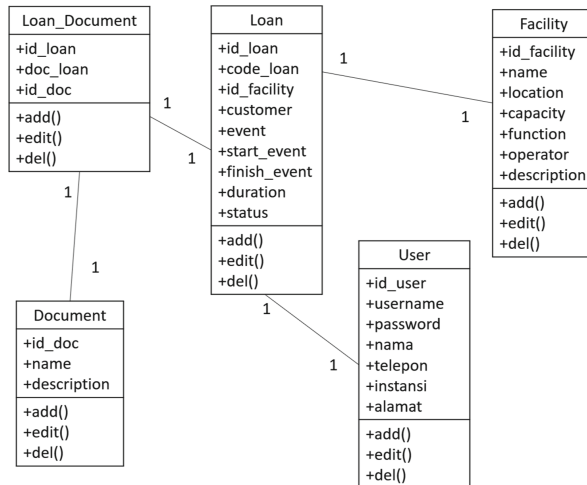


Fig. 3. Class Diagram

In addition, class diagrams also need to be made to design a description of the classes in a system and the relationships between one another, which include attributes and operations. Class diagram for the latest Information System as shown in Fig. 3.

From the class diagram in Fig. 3 it can be explained that each class has a relationship. Among the five classes that have many relationships are the borrowing classes which are related to 3 classes, namely the document lending class, the user class, and the facility class. While the document borrowing class has 2 relationships to the borrowing class and the document class. All classes have their own attributes and all classes have the same operations, namely adding data, changing data, and deleting data.

4 Conclusion

Through this research, it can be concluded that the old information system is not suitable for use anymore considering its many shortcomings. From the analysis that includes Performance, Information, Economic, Control, Efficiency, and Service, the conclusions are not good, so it is indeed feasible to develop an Information System.

In the development carried out, the system design when viewed from use case diagrams and class diagrams is expected to be able to overcome the weaknesses that exist in the old information system.

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