

# DESIGNING ONLINE LEGALIZATION INFORMATION SYSTEM FOR HIGHER EDUCATION DIPLOMA DOCUMENT (SILEGION) AT UNIVERSITAS PEMBANGUNAN NASIONAL “VETERAN” JAWA TIMUR

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## ABSTRACT

*Process of legalizing diplomas and academic transcripts in the Universitas Pembangunan Nasional "Veteran" Jawa Timur has been carried out with manual processes which alumni must come directly to their faculties and carry their original diploma document. The process will make it impossible if the alumni live outside the city or outside the island which is time consuming and requires more money to carry out the legalization process. Therefore, with the existence of an information system that legalizes diplomas online, called SILEGION, it is hoped that it will be easier for alumni to carry out the process of legalizing diplomas, especially those outside the city and outside the island. With this SILEGION, alumni of Universitas Pembangunan Nasional "Veteran" Jawa Timur, do not need to come to campus, if they want to legalize their diplomas. Document copies of diplomas and academic transcripts that have been legalized are then sent to the applicant's address. According to the results of system interface design testing, in terms of ease of use get a value of 84.9% and from the ease of learning, it reaches a value of 92.1%.*

**Keywords:** legalization online; information system, diploma document, academic transcript, Universitas Pembangunan Nasional “Veteran” Jawa Timur

## Introduction

Legalization is the process of affixing the original stamp and signature done by the authorities on the photocopy document which aims to prove that the photocopy of the document is in accordance with the original. Based on the decision of the head of the state employment agency No. 11, Year 2002, it was said that either Chancellors or Deans or Assistant Deans of Academic Affairs are authorized officials who are permissible to approve and legalize university diplomas (Badan Kepegawaian Negara, 2002). Process of legalizing higher education diploma documents commonly also includes transcript documents. At Universitas Pembangunan Nasional “Veteran” Jawa Timur (UPNVJT), legalization of diploma document is manually carried out by each faculty. In general, the process is as follows, initially, alumni register at the counters by photocopying academic documents that they want to legalize and submit them to the faculty administration employee, then students wait until the legalization is complete. If the diploma has been legalized, the

student picks it up at the counter, then pays the legal fees according to the number of documents and fills in the logbook.

This manual legalization process has the consequence that alumni must come directly to the faculty administration which is authorized and responsible for all processes related to legalization. The manual operation will become a time consuming process especially when the alumni coming from either outside the city or outside the island (out of Java island). It will get worse if it could not be processed on the same day, e.g. because of the absence of responsible officials, so it requires more financial effort in it. Thus, a computer-based information system is needed. The availability of a good information system will help improve the process of activities at educational institutions, especially legalization diplomas process (Sobari, 2011). Information system was defined as a system made by humans, which consists of components within the organization to achieve a goal that is presenting information (Steven, 2002)(O'brien, 2010)(Kadir, 2003) (Davis, 1999)(Ackoff, 1994).

Recently, some works have been carried out to develop a legalized certificate (diploma) information system. Hidayat (2015) & Andula (2018) proposes a diploma verification system in a digital and online diploma legalization system. The verification system is Quick Response (QR) code based and watermarking method. Verification is done to avoid fraudulent diplomas. Fitri (2018), Andula (2018), Hidayat (2015), & Suparman (2014) develop an online and web-based diploma legalization information system that has features ranging from registration, queuing, and checking legalized order status. However, the systems that have been developed are not a comprehensive system. It is indicated that legalized documents are not sent by administrative staff directly to the alumni delivery address. They are not fully remote. Alumni still have to come to campus to take legal documents for their diplomas.

In this work, we propose an online higher education diploma legalizing information system, called SILEGION, for UPNVJT alumni. SILEGION is an online based system using a web platform and is designed to run on a codeigniter framework using PHP programming language. In accordance with its purpose, this system should be accessible anywhere and anytime, also fully remote. With SILEGION, alumni can register applications, check application status, and just wait until legalized diplomas are sent to their homes. The design of the SILEGION uses the SDLC waterfall method which consists of planning, requirement analysis, design, coding, & testing.

## Research Methods

The steps in designing the SILEGION are based on the SDLC Waterfall software engineering method shown in Figure 1 (Mulyani, 2017).

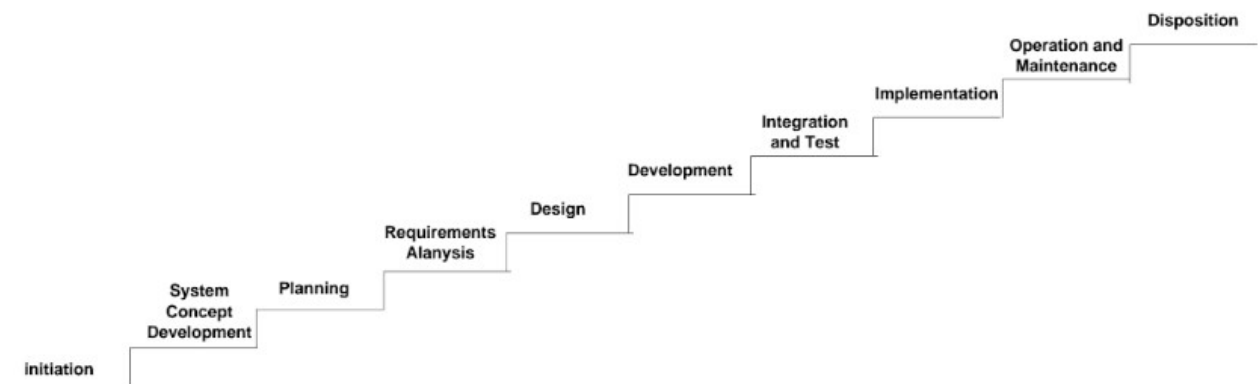


Figure 1. SDLC Waterfall. Image source: (Mulyani, 2017)

**Planning.** Planning is the stage where the system is described globally along with the objectives to be planned for the system to be developed.

**Requirement Analysis.** At this stage the analyst tries to describe the system problems and describes them in several diagrams to describe the current situation.

**Design.** At this stage the solutions that have been described globally at the requirement analysis stage are described in detail both in the form of diagrams, layouts, as well as other documentation.

**Coding.** At this stage the system starts to be built or developed. This stage creates an application program to support the system.

**Testing.** At this stage the system that has been built or developed is tried by a team of testers or users.

## Requirement

Requirement stage is a crucial phase in software development. In this phase interviews and observations were employed to explore system requirements. System requirements specification was carried out at the faculty level instead of university level, because the process of legalizing diplomas and transcripts is carried out by faculties, not university level. In UPNVJT, there are seven faculties, for the legalization process all faculties have the same process, so that in this work, we do not determine the specification requirements to all faculties. As a sample case, only one faculty is chosen: Faculty of Computer Science.

Focus of the requirement process is:

- Process flow: the legalization process before the system exists.
- Parties involved in the legalization process.
- Set of documents used in the legalization process.

In order to achieve this, we use interview and observation methods in the process requirements. An important task that was employed, was to explore the flow of the legalization process in the faculty. Process flow results obtained from the interview process, identified by the parties involved. Furthermore, the documents needed in the legalization process are prepared. Those three items (legalization flow, parties involved, and documents) form the basis of the next process.

## Design stage

The output of the previous process (requirement specification) will be transformed at the design level. In order to design a database, we use the results of the required documents used in the legalization process. In addition, data / characters / attributes from related parties (faculty and alumni administrative offices) also needed, such as names, student IDs, addresses, and so on. From the legalization process flow that has been obtained, a system architecture design will be developed which includes what modules need to be built in the system.

The last stage is designing the interface. The interface design is based on the process flow and data obtained in the requirements process (flow, documents, and other data). Focus of this research is system design. Therefore, outputs of our work are three main designs, including system architecture design, database design, and interface design.

### Interface design testing

From the results of the design generated in this work, for designing the interface, we will do testing to determine usability level of the system user interface that was built. The usability level of the system is obtained through a questionnaire. Instrument of the questionnaire is USE Questionnaire which has been widely used to calculate the level of usability of a system. USE Questionnaire method is a method of measuring usability systems that considers four components, including usefulness, satisfaction, ease of learning and ease of use (Lund, 2001) (Aelani, 2012). Total number of questions in the questionnaire are 30 questions. In this study we only use the ease of learning component (4 questions) and ease of use (11 questions) only, because the purpose of this testing is to focus on ease of use on the system interface, moreover the system is built only to the design level (interface design). USE Questionnaire uses 1-7 Likert scales for assessment (Lund, 2001):

- Scale 1: strongly disagree
- Scale 2: moderately disagree
- Scale 3: slightly disagree
- Scale 4: neutral
- Scale 5: Slightly agree
- Scale 6: Moderately agree
- Scale 7: strongly agree

### Interface design testing scenario

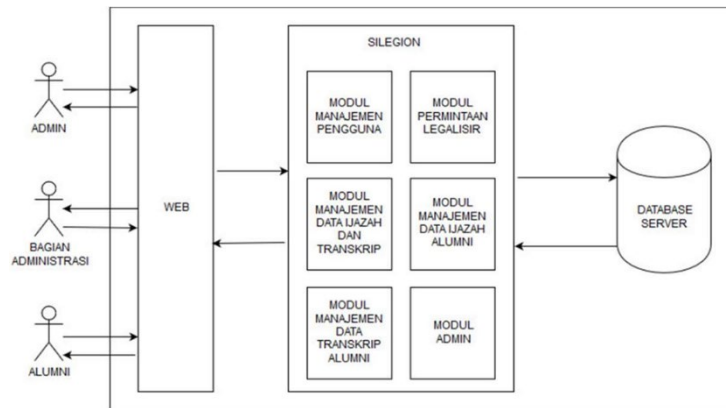
In order to test the usability of the SILEGION system interface, this work used 5 participants from the faculty administration employee. Five of these participants were chosen because they represented the party who would use the SILEGION system. The stages of the testing

- Make a series of simple instructions for participants that are carried out on the system interface.
- Conduct training to participants how to carry out the instructions given.
- Participants repeat the instructions without looking at the instruction document.
- Participants filled out the USE Questionnaire.

### Results and Discussion

In this section, there are several steps that we take as follows:

1. System Architecture Design



**Figure 2. System Architecture Design**

In the system architecture design in SILEGION, the system built has three users with different tasks, they are system admin, administrative staff, and alumni. System admin is a super user who has full access rights to the system. Administrative staff has the authority to receive and process alumni legal requests. While alumni have the authority to make legal requests and monitor the course of requests legalized.

The architecture is built from three main parts including web server, SILEGION application, and database server. The first part is the web server. The task of the web server is to accept requests from users (system admin, administrative staff, and alumni) to the

The SILEGION application consists of several modules including admin module, user management module, legalization request module, diploma and academic transcript data management module, alumni diploma data management module, alumni academic transcript data management module. The purpose of mapping applications into the module is to make the system more modular so that it will be easily developed.

A more detailed explanation of the modules in the SILEGION is presented as follows:

- Admin module: can only be accessed by system admin role. In this module users can do data management, especially data administration. In addition, the admin module contains system configuration.
- Legalization request module: this module can be accessed by administrative staff. The main function of this module is to manage legalized requests from alumni. Starting from the request registration step to completion.
- Higher education diploma document and academic transcript data management module: this module can be accessed by the administrative staff, the main function of this module is managing diploma and academic transcripts data owned by the university. This data is valid data which will later be used as cross-check data uploaded by alumni.
- Alumni diploma data management module: this module can be accessed by administrative staff and alumni. The main function of this module is to manage diploma data uploaded by alumni.
- Alumni academic transcript data management module: this module can be accessed by administrative staff and alumni. The main function of this module is to manage academic transcript data uploaded by alumni.

## 2. Database Design

In accordance with the requirements process that has been done, the SILEGION design

tables relating to alumni data as requests for legalizing diplomas or academic transcripts. Second group is related to data that is managed directly by the administrative employee and system admin, including tabel admin, tabel mhs, tabel mhs\_ijazah, table mhs\_transkrip.

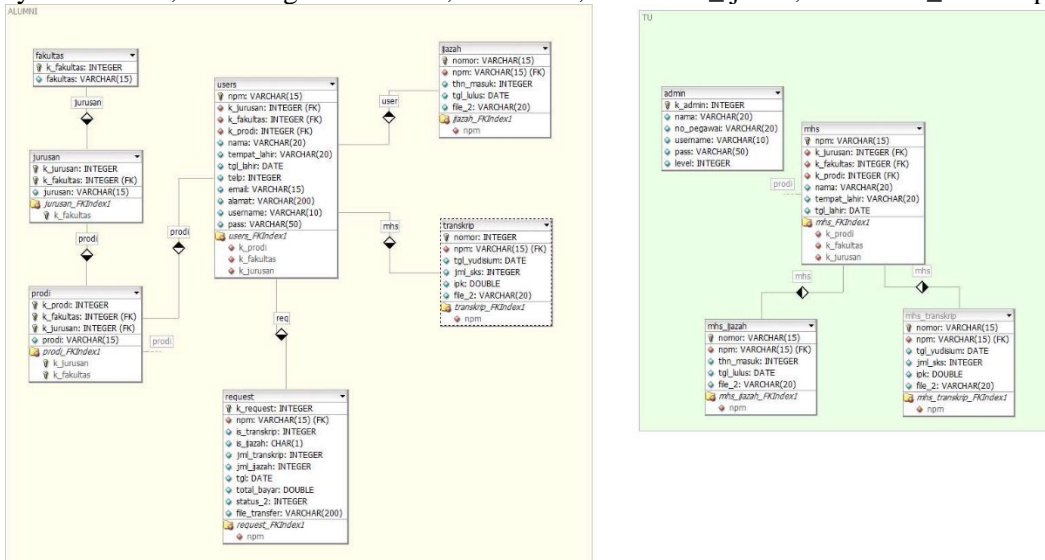


Figure 3. Database Design

All data in mhs\_ijazah and mhs\_transkrip tables contain diploma and academic transcript data owned by university. The data is used to cross-check information on data uploaded by alumni. All legalization requests are stored in the request table, and diploma and academic transcripts data that will be legalized by alumni, respectively, are stored in the transkrip table and ijazah table.

### 3. System Interface Design

The following is a general description of the system interface design. The system interface is divided into three main parts, including header, sidebar, and content. The header contains existing module menus and user account menus (user information and logout buttons). The sidebar of the application is main system menu, containing sub-menus in a module. A sub-menu relates to the functionality of a module. The last part is main content, in process, and so on. Figure 4, Figure 5, & Figure 6 show the system interface design.

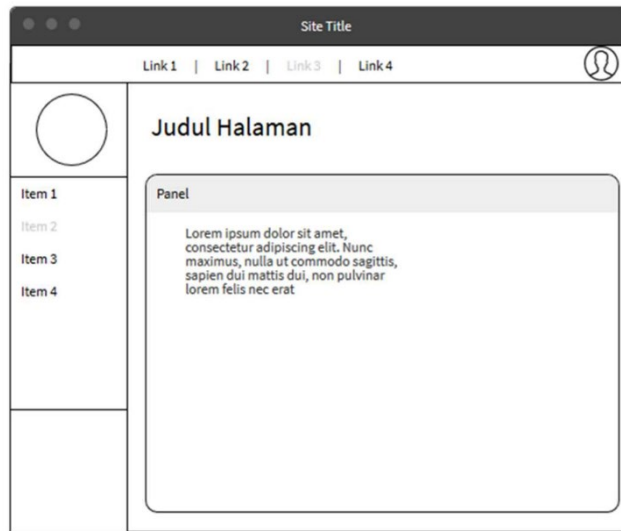


Figure 4. SILEGION interface design mock-up

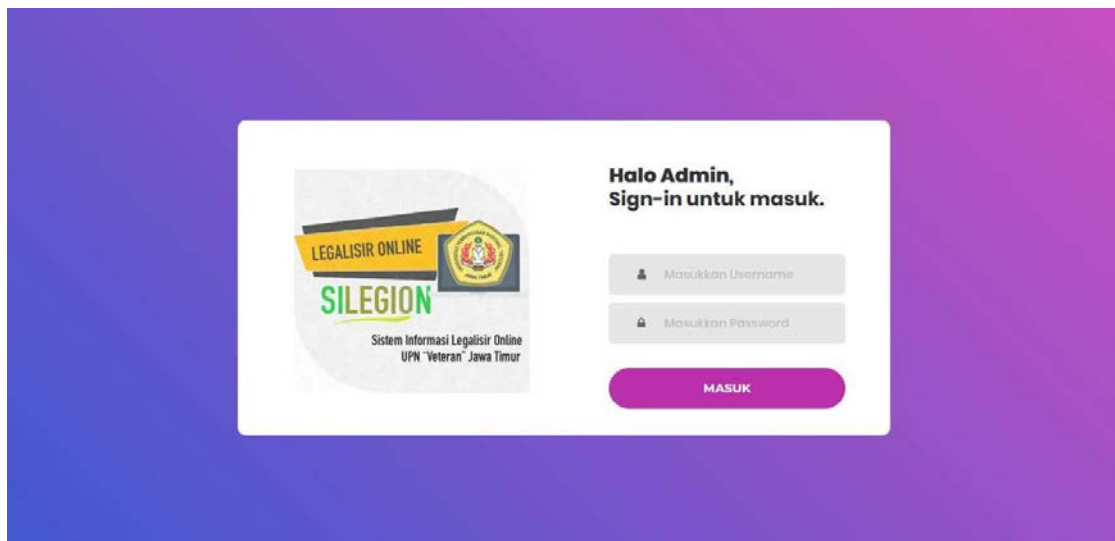
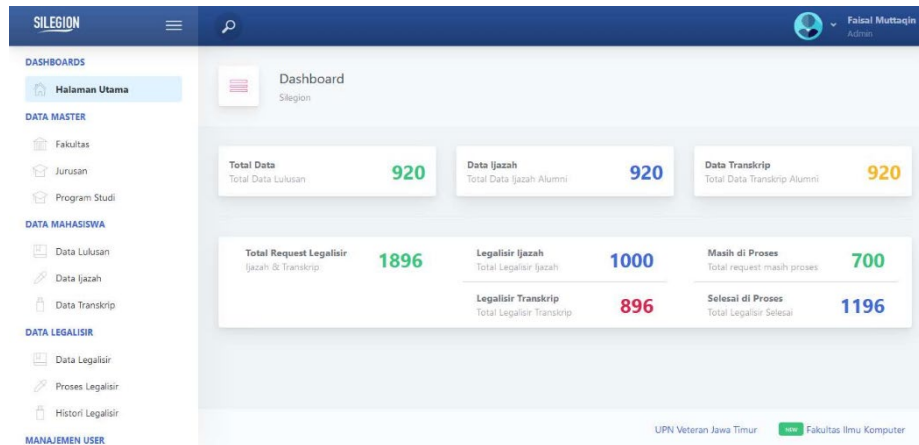


Figure 5. SILEGION interface design of login page



**Figure 6. SILEGION interface design**

**Usability test results**

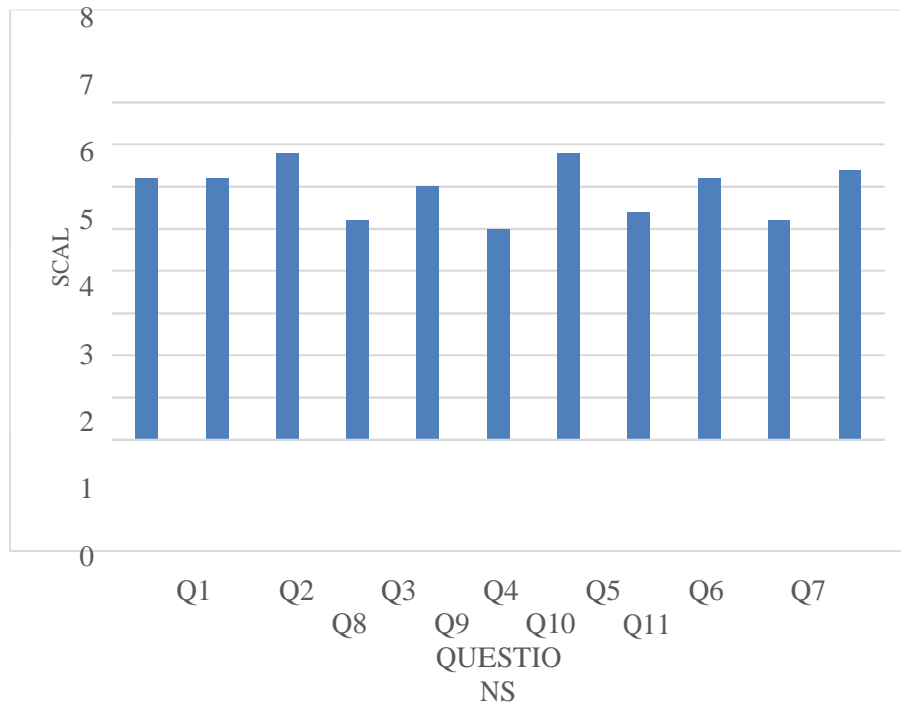
Usability testing is done by involving 5 participants from faculty administrative employee. The results of usability testing using USE Questionnaire are shown in Table 1. In this work, only two components were used, including ease of use and ease of learning. According to Table 1, P1, P2, P3, P4, P5 are participants involved in testing the system.

**Table 1. Results of usability testing using USE Questionnaire**

N	EASE OF USE	P	P	P	P	P	AV	index(
1	It is easy to use.	7	7	6	5	6	6.	88.6
2	It is simple to use.	7	6	7	6	5	6.	88.6
3	It is user friendly.	7	7	7	7	6	6.	97.1
4	It requires the fewest steps possible to accomplish what I want to do	5	6	5	6	4	5.	74.3
5	It is flexible.	6	6	7	5	6	6	85.7
6	Using it is effortless.	6	6	5	4	4	5	71.4
7	I can use it without written instructions.	7	7	7	6	7	6.	97.1
8	I don't notice any inconsistencies as I use	6	6	5	5	5	5.	77.1
9	Both occasional and regular users would like it.	7	6	7	5	6	6.	88.6
1	I can recover from mistakes quickly and easily.	6	5	6	4	5	5.	74.3
1	I can use it successfully every time.	7	6	7	6	6	6.	91.4
	Total							84.9
	<b>EASE OF LEARNING</b>							
1	I learned to use it quickly.	7	6	6	7	7	6.	94.3
2	I easily remember how to use it.	7	6	6	6	7	6.	91.4
3	It is easy to learn to use it.	6	6	6	7	6	6.	88.6
4	I quickly became skillful with it.	7	7	6	6	7	6.	94.3
	Total							92.1
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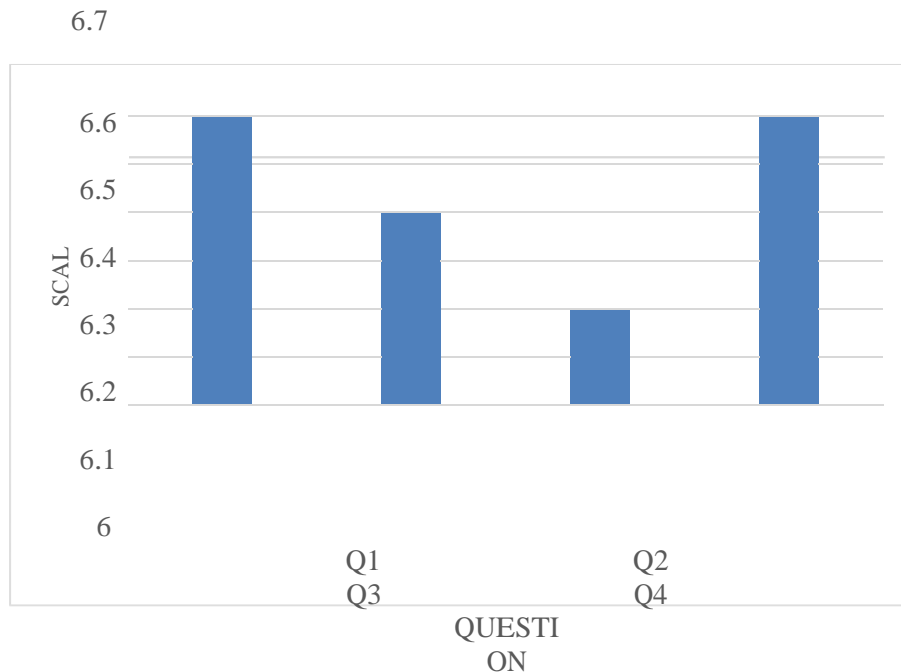
EASE OF USE (ALL PARTICIPANT)



**Figure 7. Results of all participants in all questions the components of ease of use**

Figure 7 shows the final results of all participants in all questions the components of ease of use. It can be seen that of all ease of use questions (11 questions) get an average index value of 84.9% or if the Likert scale means "moderate agree". So from the graph it can be concluded that the interface design made easy to use by the user.

EASE OF LEARNING (all participant)



**Figure 8. Results of all participants in all questions the components of ease of learning**

Figure 8 shows the final results of all participants in all questions the components of ease of learning. It can be seen that all ease of learning questions (4 questions) get the average index value is. 92.1% or if the Likert scale means "strongly agree". So from the results of the graph it can be concluded that the interface design created is easily understood and learned by the user.

The conclusion of testing the usability of the system interface is that the interface design created has a good usability level based on the assessment of participants / users. This usability test focuses on the component of ease of use and ease of learning.

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