

Improving Online Course Based on the Result of Usability Testing Methods

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ABSTRACT

Covid-19 pandemic has spread throughout the world. As a result, many activities change because people are required to maintain distance. One of the impacts of the pandemic in the education environment is the change in learning tools. Teaching and learning are required to be conducted through E-Learning. However, some problems occur to the E-Learning platform, for instance, students having difficulty accessing online lectures for the first time, frequent errors when accessing online lectures, no response when errors occur, and several other problems. The purpose of this study is to provide recommendations for improvements to the online learning platform based on reusability testing. The method used in this research is usability testing by conducting a direct survey of 100 active students of Widyatama University. In this test, there are five aspects, namely learnability, efficiency, memorability, errors, and satisfaction. The efficiency aspect gets a score of 3.17 which is classified as a good category. The memorability aspect gets a score of 3.82 in the good category. The aspects of errors obtain a score of 3.35 which is in the adequate category. The satisfaction aspect gets a score of 3.47 is in a good category. Overall, the online learning website gets a score of 3.53 which is classified into a good category. It can be concluded that based on the value of all aspects, the smallest value is the efficiency and error aspects. Therefore, improvements should be taken by enhancing the Standard Operating Procedures (SOP) for clear and updated information services.

Keywords

Usability testing, e-learning, standard operating procedures

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Introduction

In 2019, the Covid-19 outbreak occurred in Wuhan, China and then in 2020 it spread throughout the world, including Indonesia. Until 2021, Covid-19 is still widespread throughout Indonesia, the government has also made a policy of closing roads in and out of the region and implementing large-scale social restrictions (PSBB) so that every Indonesian citizen does not interact with the spread of disease considering the sectors affected according to the United Nations (PBB) is one of them in the world of education (Purwanto et al., 2020). The existence of Covid-19 has caused distance learning to be carried out as a policy for the world of Education to reduce the risk of spreading the virus.

Distance learning carried out by students cannot be separated from the internet. The internet itself is used for communication networks and information delivery so that the internet can help the online learning process. Online learning is used in education such as colleges, schools, institutes, and other non-formal education which provides information about learning. The online learning method used can be a website or an

application. Websites and applications are a medium for disseminating information widely and thoroughly. This online learning method is very useful during the current Covid-19 pandemic, which does not allow people outside to interact.

Basically, online learning methods provide many benefits to users, one of which is in college. According to Tuti et al. (2020), here are some of the benefits of online learning such as reducing restrictions on lecturers who teach, so that students do not continuously need assistance from lecturers, providing opportunities for universities to carry out learning without considering buildings for students and time that is always scheduled, and access to online learning is very easy to obtain and provided freely and for free on the internet. By using the university's online course website, users can get information and download materials provided by the instructor. With the online course website, it makes it easy for users to access it anytime and anywhere.

This university online course website-based service is very helpful for students who carry out all learning activities, but there are user interface problems in the research of this online course

website. Based on a preliminary survey with open-ended questions, complaints about online tuition included that students were overwhelmed when they first entered the website. The ease of use of the Widyatama University online course website for users is one of the problems in this study. The online course website needs to be evaluated to measure the use of the website for users. The usability or ease of use of the website can be assessed or evaluated using usability testing methods.

According to Ririn et al. (2015), usability testing is a technique used to evaluate products by testing them directly on the user; usability testing is a method for assessing how easy the user-interface is to use. Usability testing can be measured using five important components, namely learnability, efficiency, memorability, errors, and satisfaction. The purpose of this study was to evaluate the ease of use of the online college website with usability testing. The results of this study are to improve indicators that are still in the low category, so this research is useful to be able to provide input in the process of developing online college websites going forward.

Literature Review

Usability

Usability definition is a method for evaluating a product, especially a website by testing it directly to its users. According to Jacob Nielsen in line with ISO 9241: 11, usability testing in research uses five aspects of usability, namely:

- Learnability defined as how easily the user get what they want.
- Efficiency is defined as the speed of the website as well as the difficulties that users experience while using the website.
- Memorability defined as the ability of users considering the features and menu contained on the website when in a long period of time not to access the website.
- Errors are defined as how many errors a user makes when using the website and can be easily corrected by the user.
- Satisfaction is defined as user satisfaction with the website.

Human Computer Interaction (HCI)

Human Computer Interaction (HCI) is a science to determine the quality of a relationship between humans and technology, especially computers (Nunes et al., 2010). HCI aims to determine the effectiveness and efficiency of a computer system for the user.

Usability Testing

Usability testing is a method for evaluating a product, especially a website, by testing it directly to its users with the aim of finding out about the usability test problem (Wedayanti et al., 2019). Usability testing evaluates software such as applications or websites how easily an interface can be used by users with the system. Usability testing is very important for the sustainability of the website because with usability testing it can be seen from which aspects must be improved and the level of user satisfaction of the website can be seen based on five aspects, namely learnability, efficiency, memorability, errors, and satisfaction.

Methodology

This research was conducted using the usability testing method to determine the level of ease of use on the Widyatama University online course website. Data were collected by determining the variable usability test, namely learnability, efficiency, memorability, errors and satisfaction and compiling a questionnaire with the above variables. This survey in the form of a questionnaire will get the value of the respondents on a predetermined scale. Making a questionnaire using the google form application with a question indicator containing the five aspects of usability testing. According to Nielsen (2012), the number of respondents to test usability is at least 20 people. The respondents used are 100 Widyatama University students who are still active in lectures. The data obtained will be processed using the usability testing method and an analysis is carried out if a usability test variable does not meet the assessment interval, a recommendation for improvement will be made on that variable.

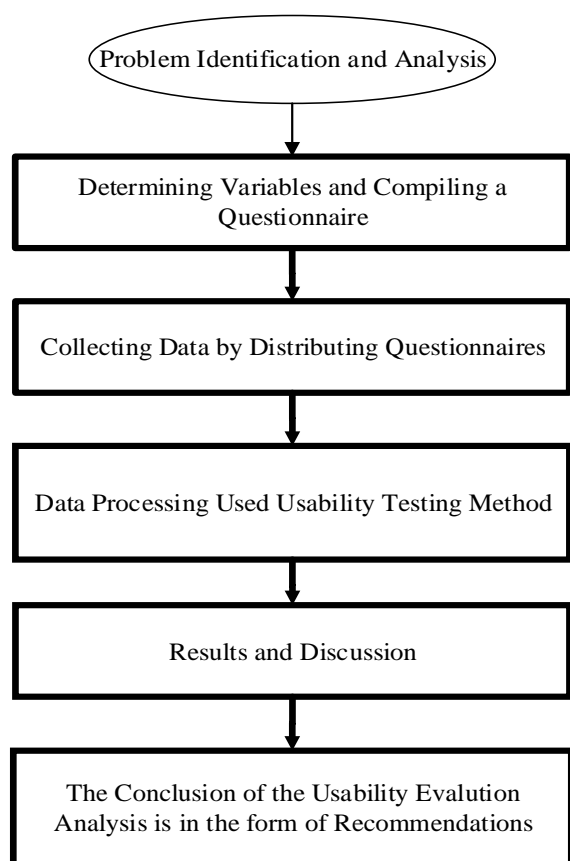


Figure 1. Flowchart research methods

to Sugiyono (1999), the Likert scale is used to develop instruments in measuring the attitudes, perceptions and opinions of a person or group of people on the potential and problems of an object, the design of a product, the process of making products and products that have been developed or created. The scale used in the questionnaire is as follows:

Table 1. Questionnaire measurement scale

Indicator	SA	A	N	D	SD
Score	5	4	3	2	1

Information:

SA = Strongly Agree

A = Agree

N = Neutral

D = Disagree

SD = Strongly Disagree

The variable is based on the aspect of usability testing is used to make the indicator questions in the questionnaire. The question indicators are as follows:

Data collection was conducted after filling the questionnaire with Likert Scale ratings. According

Table 2. Variable indicator

No.	Indicators	SA	A	N	D	SD
Q1	Learnability					
Q11	Are users given the convenience of trying to enter the learning room in online course?					
Q12	Can online course users easily get information about the list of courses taken?					
Q13	The display pages in online courses are easy to read and easy to understand?					
Q14	Is the menu in the online course easy to understand?					
Q15	Is the information in the online course clear?					
Q2	Efficiency					
Q21	Does it tell about file size when downloading modules or other learning materials?					
Q22	The platform contained in the online course can be accessed quickly and does not require a long loading time?					
Q23	When you want to download, are you given information to reconfirm?					
Q24	When clicking the menu, does the interface move quickly?					
Q3	Memorability					
Q31	Is the address of the online college website easy for users to remember?					
Q32	Can users remember the appearance of the online course website easily?					
Q33	Is the feature placement on the online course display memorable?					
Q34	In the long period of not accessing online course, will it be easy to remember when to access them again?					

Q4 Errors

- Q41 Was it reconfirmed before accessing something on the online course?
- Q42 Do you get a response when an error occurs?
- Q43 Is there an instruction menu on how to use the website to prevent errors in the operation of the website?
- Q44 Can you contact the operator when there are problems in operating the website?

Q5 Satisfaction

- Q51 is the performance of online course good enough?
- Q52 Are you comfortable with the color composition and font size on the online lecture website?
- Q53 Is the information presented always up-to-date?
- Q54 Is the design of the online course display attractive?
- Q55 Is the information you need easily available?

Processing using data that has been combined based on the aspect of the variable usability test where the average results of the indicators are the results of usability for each aspect. In obtaining the length of the interval to determine the assessment criteria for each variable, the calculation is carried out using the following formula:

$$\text{Length of the class } (I) = \frac{(\text{Highest Score} - \text{Lowest Score})}{\text{Number of Criteria } (v)}$$

$$I = \frac{(5-1)}{5} = 0,8$$

After calculating the length of the interval, the following assessment criteria intervals are obtained:

Table 3. Assessment criteria interval

Quadrant	Interval Class	Assessment Criteria
I	1,00 - 1,80	Very Less
II	1,81 - 2,60	Less
III	2,61 - 3,40	Fairly Good

Table 4. Calculation of learnability aspects

No.	Respondents	Learnability					Total	Average
		Q11	Q12	Q13	Q14	Q15		
1	R1	5	4	4	4	4	21	4,20
2	R2	4	4	5	4	3	20	4,00
3	R3	3	2	3	3	3	14	2,80
4	R4	3	4	4	4	4	19	3,80
5	R5	4	4	4	4	4	20	4,00
...
100	R100	4	4	4	4	3	19	3,80
Total per Indicator		390	373	394	384	368	1909	381,80
Average Indicator		3,9	3,73	3,94	3,84	3,68	19,09	3,82

IV	3,41 - 4,20	Good
V	4,21 - 5,00	Very Good

Results and Analysis

The data that has been obtained from the respondents will then be calculated using the mean formula, which is as follows:

$$m = \frac{\sum xi}{n}$$

Information:

m = mean

$\sum xi$ = amount of data

n = lots of data

Learnability

The questionnaire that has been distributed for the assessment of the learnability aspect with as many as 100 respondents is Widyatama University students with the following calculations:

The data obtained in the learnability aspect shows the average value of this variable, namely 3.82 and at the interval of the assessment criteria that this aspect is included in quadrant IV with the category of Good assessment.

Efficiency

The questionnaire that has been distributed for the assessment of the efficiency aspects with as many as 100 respondents is Widyatama University students with the following calculations:

Table 5. Calculation of efficiency aspects

No.	Respondents	Efficiency				Total	Average
		Q21	Q22	Q23	Q24		
1	R1	2	3	2	3	10	2,50
2	R2	3	3	3	3	12	3,00
3	R3	3	3	3	3	12	3,00
4	R4	3	3	3	4	13	3,25
5	R5	4	3	3	3	13	3,25
...
100	R100	2	4	2	4	12	3,00
Total per Indicator		306	328	295	339	1268	317,00
Average Indicator		3,06	3,28	2,95	3,39	12,68	3,17

The data obtained in the efficiency aspect shows the average value of this variable, namely 3.17 and at the interval of the assessment criteria that this aspect is included in quadrant IV with the category of Fairly Good assessment.

The questionnaire that has been distributed for the assessment of the memorability aspects with as many as 100 respondents is Widyatama University students with the following calculations:

Memorability

Table 6. Calculation of memorability aspects

No.	Respondents	Memorability				Total	Average
		Q31	Q32	Q33	Q34		
1	R1	4	4	4	4	16	4,00
2	R2	5	4	4	4	17	4,25
3	R3	4	4	3	3	14	3,50
4	R4	4	4	4	4	16	4,00
5	R5	4	4	4	4	16	4,00
...
100	R100	2	4	4	3	13	3,25
Total per Indicator		395	392	371	371	1529	382,25
Average Indicator		3,95	3,92	3,71	3,71	15,29	3,82

The data obtained in the learnability aspect shows the average value of this variable, namely 3.82 and at the interval of the assessment criteria that this aspect is included in quadrant IV with the category of Good assessment.

Errors

The questionnaire that has been distributed for the assessment of the errors aspects with as many as 100 respondents is Widyatama University students with the following calculations:

Table 7. Calculation of errors aspects

No.	Respondents	Errors	Total	Average
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		Q41	Q42	Q43	Q44		
1	R1	4	4	4	3	15	3,75
2	R2	3	3	5	3	14	3,50
3	R3	3	3	4	4	14	3,50
4	R4	3	3	3	4	13	3,25
5	R5	4	2	2	3	11	2,75
...
100	R100	4	1	1	3	9	2,25
Total per Indicator		334	330	328	346	1338	334,50
Average Indicator		3,34	3,3	3,28	3,46	13,38	3,35

The data obtained in the errors aspect shows the average value of this variable, namely 3.35 and at the interval of the assessment criteria that this aspect is included in quadrant IV with the category of Fairly Good assessment.

The questionnaire that has been distributed for the assessment of the satisfaction aspects with as many as 100 respondents is Widyatama University students with the following calculations:

Satisfaction

Table 8. Calculation of satisfaction aspects

No.	Respondents	Satisfaction					Total	Average
		Q51	Q52	Q53	Q54	Q55		
1	R1	4	3	4	3	4	18	3,60
2	R2	3	3	3	4	3	16	3,20
3	R3	2	3	3	3	3	14	2,80
4	R4	3	4	4	4	3	18	3,60
5	R5	3	3	4	3	3	16	3,20
...
100	R100	4	4	3	1	4	16	3,20
Total per Indicator		347	363	351	325	351	1737	347,40
Average Indicator		3,47	3,63	3,51	3,25	3,51	17,37	3,47

The data obtained in the satisfaction aspect shows the average value of this variable, namely 3.47 and at the interval of the assessment criteria that this aspect is included in quadrant IV with the category of Good assessment.

improving the Widyatama University online course website using the usability testing method on five aspects of the usability testing method, namely learnability, efficiency, memorability, errors, and satisfaction with a Likert rating scale, the results will be adjusted to the predetermined assessment criteria. This calculation produces an average per variable with the following results:

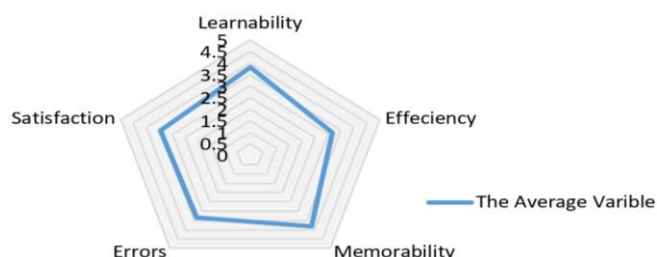


Figure 2. Mapping graph of Widyatama university online course website usage level

Discussion

Calculation of data that has been carried out in this study to determine recommendations for

Table 9. The results of data processing

No.	Variable	Average	Category
1	Learnability	3,82	Good
2	Efficiency	3,17	Fairly Good
3	Memorability	3,82	Good
4	Errors	3,35	Fairly Good
5	Satisfaction	3,47	Good
Average		3,53	Good

The learnability variable is assessed in the good category because the learning is well presented and this website is easy to learn so that no significant improvement is needed. The memorability variable shows the value in the good category because this website is easy for users to remember and other indicators that help users use this website. Another variable that also shows in a good category is the Satisfaction variable where the user feels comfortable with the information, design and services provided by the Widyatama University online course website. These three variables certainly do not need a recommendation for improvement because the results of the questionnaire show that this assessment criterion is also in line with the opinion of (Putu Krinayani, 2016) where the results of the questionnaire analysis show that the UNDIKSHA website layout is able to meet the usability criteria of a

website. So that, in this study, the recommendations are based on the results of the questionnaire which has a low percentage and expert tests.

Whereas, the efficiency variable is in the fairly good category, it shows that the use of this website still needs improvement, the thing that becomes improvement refers to the indicators provided, namely the notification of the file size to be downloaded in the form of modules or material and information when downloading Platform that can be accessed quickly by the user without loading, as well as fast interface switching and the addition of processing time and alarms for notification of assignments and quizzes. The following is a suggestion for improvements to the Widyatama University online course website that improves the efficiency variable.

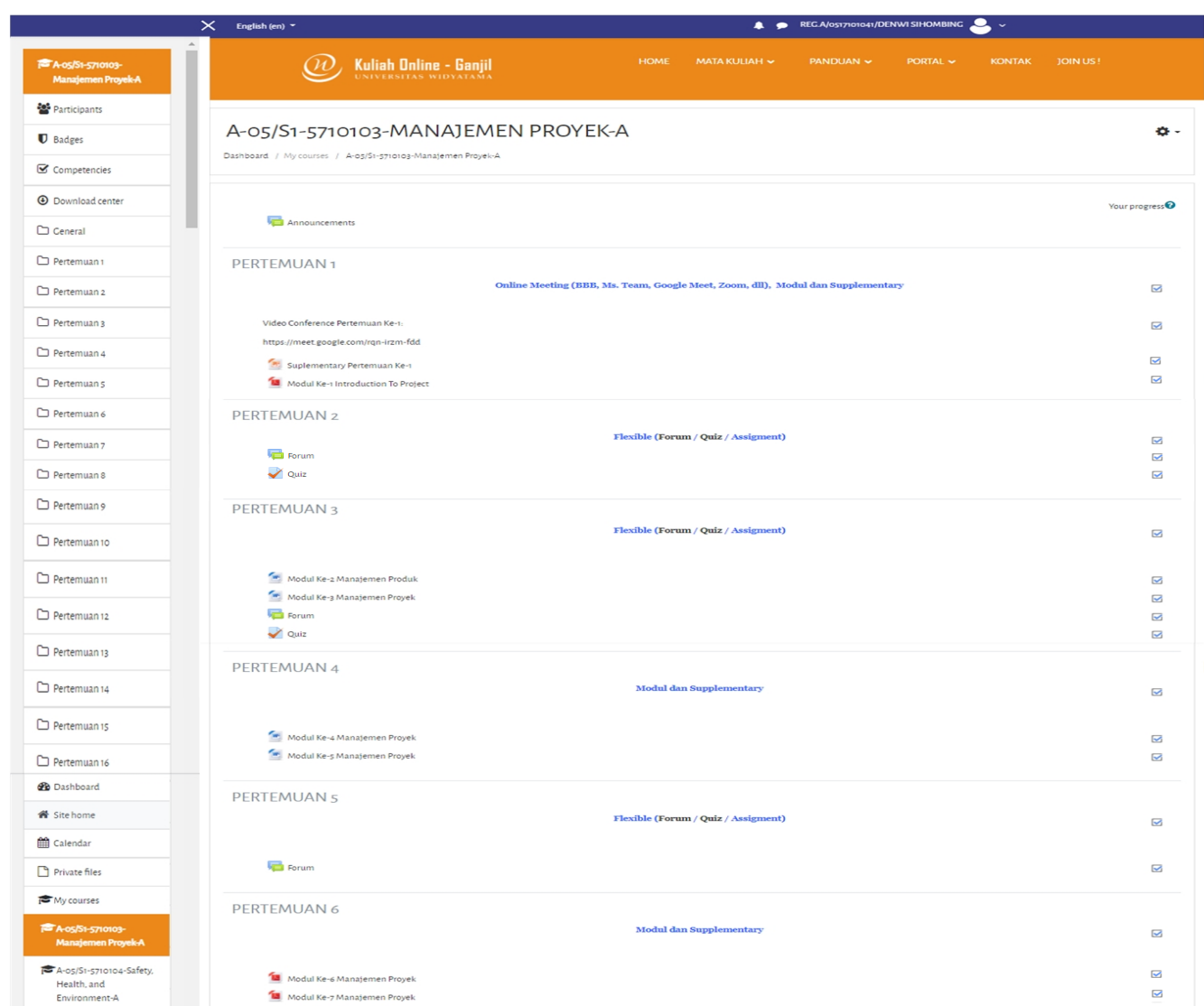


Figure 3. Website before repair

The screenshot displays the 'Kuliah Online - Ganjil' website interface. The top navigation bar includes links for HOME, MATA KULIAH, PANDUAN, PORTAL, KONTAK, and JOIN US!. The sidebar on the left lists various course components like Participants, Badges, Competencies, Download center, and a list of meetings (Pertemuan 1 to 16). The main content area is titled 'A-05/S1-5710103-MANAJEMEN PROYEK-A' and shows a dashboard with announcements and meeting details. A notification pop-up is visible on the right, asking 'NYALAKAN NOTIFIKASI WAKTU' (Turn on time notification) with YES and NO buttons.

Course Details:

- Course Title:** A-05/S1-5710103-MANAJEMEN PROYEK-A
- Announcements:**
 - PERTEMUAN 1:** Online Meeting (BBB, Ms. Team, Google Meet, Zoom, dll), Modul dan Supplementary. Includes a video conference link: <https://meet.google.com/irqn-hzrm-fdd>.
 - PERTEMUAN 2:** Flexible (Forum / Quiz / Assignment). Includes Forum and Quiz.
 - PERTEMUAN 3:** Flexible (Forum / Quiz / Assignment). Includes Modul Ke-2 Manajemen Produk, Modul Ke-3 Manajemen Proyek, Forum, and Quiz.
 - PERTEMUAN 4:** Modul dan Supplementary. Includes Modul Ke-4 Manajemen Proyek and Modul Ke-5 Manajemen Proyek.
 - PERTEMUAN 5:** Flexible (Forum / Quiz / Assignment). Includes Forum.
 - PERTEMUAN 6:** Modul dan Supplementary. Includes Modul Ke-6 Manajemen Proyek and Modul Ke-7 Manajemen Proyek.

Figure 4. Website after repair

Conclusion

And the Errors variable also shows that this variable is still in the good enough category so it needs improvements for online access where errors often occur so that repairs are needed such as a response when an error occurs and instructions for users in using the website so as to reduce the occurrence of errors in the operation of this website as well. In line with the recommendations based on the results of the questionnaire (Putu Krinayani, 2016) where the variable has a low percentage of the errors variable, improvements are made to the presentation of consistent submenus and icons, information on links, differences in fonts between titles and sentence descriptions, documentation complete, there is a help menu to make it easier for users to find solutions if there are errors in accessing the website. And based on the results of the questionnaire, it is necessary to emphasize the improvement of the SOP (Standard Operating Procedure) for clear and up-to-date information services.

Based on research that has been carried out by conducting a survey to 100 active students of Widyatama University, the results of measuring the online course website using the usability method approach with five aspects, namely learnability, efficiency, memorability, errors, and satisfaction can be seen the value of each variable and the value of Overall on the Widyatama University online course website, namely:

1. The learnability variable on the Widyatama University online course website gets an average result of 3.82, which means that the learnability variable falls into the good category.
2. The variable efficiency on the Widyatama University online course website gets an average result of 3.17, which means that the variable efficiency is in the fairly good category.
3. The memorability variable on the Widyatama University online course website gets an average result of 3.82 which means that the memorability variable is in the good category.
4. The variable errors on the Widyatama University online course website get an average of 3.35, which means the variable errors are in the pretty good category.
5. The satisfaction variable on the Widyatama University online course website gets an average result of 3.47, which means that the variable satisfaction is in the Good category.
6. The overall value of the usability variable on the Widyatama University online course website gets an average result of 3.53, which means that the online course website is good, so it can be concluded that the user on the website is comfortable in accessing the website.

Based on the results of all aspects that have been analyzed, there is a variable with the smallest value, namely the variable efficiency which is categorized as quite good, it is suggested that the Widyatama University online course website can be increased again in variable efficiency so that the efficiency value on the website can be increased. For further research, this reusability measurement can use other methods to compare with the current method such as the WEBUSE method.



Figure 5. Website before repair

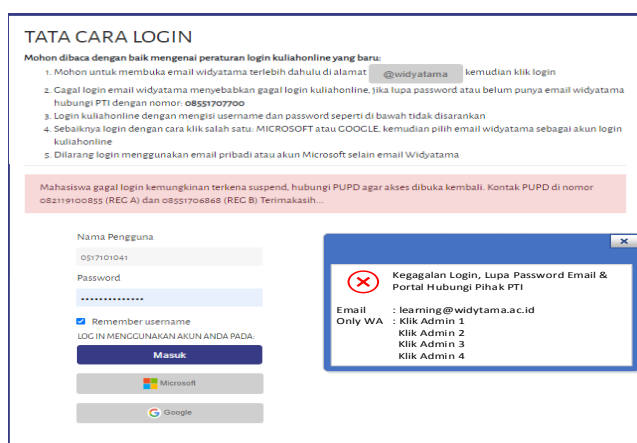


Figure 6. Website after repair

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