



USER EXPERIENCE EVALUATION USING HEURISTIC APPROACH ON GOOGLE CLASSROOM APPLICATION

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ABSTRACT

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Google Classroom is one of the online learning applications that is widely used in the education environment, from school to college. Although its use is quite wide, in practice there are still various obstacles related to the comfort and ease of using the application. Therefore, this research aims to evaluate the user experience on the Google Classroom application using the heuristic evaluation approach. The method used is a heuristic evaluation based on the ten principles of Nielsen's usability. The evaluation process is carried out by observing the use of the application, identifying interface problems, and grouping problem findings into relevant heuristic aspects. The evaluation results show that Google Classroom in general is quite good in terms of ease of use, but there are still some problems, such as lack of clarity of information on some menus, display inconsistency, and limited system feedback to user actions. Based on these findings, this study provides several recommendations for improving the interface to improve the quality of user experience, especially in terms of ease of navigation, system clarity, and user comfort. It is hoped that the results of this research can be considered in the development and improvement of the Google Classroom application in the future

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1. Introduction

Almost all elements of human life undergo changes due to the development of information and communication technology, including education. The way we collect, use, and share information has changed significantly in the digital age [1]. Currently, good learning synergizes between learning and technology. This is done so that education can run according to the conditions of the times. The application of technology in education has been combined in every activity. starting from learning media, database storage, learning resource reference, etc [2].

Online media has revolutionized the way we access and spread information. With the ease of internet access, various types of content such as text, photos, videos, and audio can be reached by a wider audience without the physical limitations that used to be faced by print media [3].

With such a thing, lectures still take place online which can be accessed anywhere and at the time that has been determined together [4]. One of the most widely used online learning applications globally is Google Classroom. Google Classroom is designed to improve the classroom experience with the connectivity provided by Google [5].

The utilization of Google Classroom can be through multiplatform which can be through a computer or laptop and smartphone, through the Google Classroom application it is assumed that learning goals will be easier to complete and full of meaning. Google Classroom has facilities like a real classroom, teachers can provide materials, in the form of powerpoint, or learning videos, students can study the material anytime and anywhere without any time limit. From the explanation above, using Google Classroom, it really helps teachers and lecturers to teach according to what is expected [6].

However, the success of an application is not only determined by the completeness of its features or technical capabilities, but also by a good user experience [7]. User Experience is very important to make it easier for users to use an application, get a response from the interaction between users and the application, and know the user's needs [8]. Unintuitive or user-friendly interface can be an obstacle in the online learning process [7].

Usability is a measure of the quality of user experience when interacting with a product or system, which can be in the form of a web page, software, mobile technology or any device [9]. The Heuristic Method is a usability evaluation method introduced by Jakob Nielsen and Rolf Molich which is done by looking at an interface and giving an opinion regarding the interface [10]. Heuristic evaluation is a systematic interface review by observing an interface and finding good and bad things in it, usually done by the evaluator using guidelines that have been set both individually and in groups [9].

This research focuses on evaluating the user experience of the Google Classroom application using the Heuristic Evaluation method with reference to the ten heuristic principles of Jakob Nielsen..

2. Method

2.1. Heuristic Evaluation

Heuristic Evaluation is an evaluation method that uses usability experts as evaluators to find problems in the system. Each problem finding is analyzed according to the severity (severity rating) to determine the priority of the problem improvement recommendation.

Heuristic evaluation is chosen because heuristic evaluation can be done quickly, easily and at a low cost, compared to other usability evaluations. Heuristic evaluation only uses a small number of heuristic testers, which conducts heuristic evaluation in a short time, so that the costs incurred can be minimized.

The main purpose of heuristic evaluation is to identify problems related to interface design. This method was developed by Jakob Nielsen based on several years of teaching and consulting experience in the field of usability.

Heuristic evaluation is one of the most widely used types of usability evaluation. The popularity of heuristic evaluation is because this evaluation is fast, easy and cheap in implementation. Basically, heuristic evaluation is not easy to do because it is very difficult for an individual to be able to find all usability problems in an interface design.

The ten aspects that are assessed in the Heuristic Evaluation method according to Jacob Nielsen and which the author included in his questionnaire are as follows:

Tabel 1. Heuristic Evaluation

No	Variable	Code
1	Visibility of System Status	X1
2	Match Between System and the Real World	X2
3	User Control and Freedom	X3
4	Consistency and Standards	X4
5	Error Prevention	X5
6	Recognition rather than Recall	X6
7	Flexibility and Efficiency of Use	X7
8	Estetika dan desain yang minimalis	X8
9	Help Users Recognize, Diagnose and Recover from Errors	X9
10	Help and Documentation	X10

2.2 Severity Rating

This Severity Rating can be used to allocate most of the resources to fix the most serious problems and can also provide a rough estimate of the need for countermeasures. Calculation in Heuristic Evaluation using Severity Rating equation which is:

1. Equation One

$$\sum Hx = (0*x) + (1*x) + (2*x) + (3*x)$$

With $\sum Hx$ = total rating score from sub aspect usability in each aspect of usability (H1...H2 H10)

x = Usability point, worth 1/0

Next to generate Severity Rating value from each aspect of Usability.

2. Equation Two

$$sv = \frac{\sum Hx}{n}$$

sv = Severity rating results in one aspect of usability

n = The number of usability sub aspects in each usability aspect

Tabel 2. Severity Rating Value Scale

Savery Rating	Information
0	No problems or shortcomings were found in the system.
1	Cosmetic problem category, the problem does not really affect the user. Repairs are not really needed.
2	Minor usability problem category, small usability problem, this improvement is given a low priority.
3	Major usability problem category, main usability problem, important repair is done, therefore it is given high priority.
4	Catastrophe usability category, found fatal error. This repair problem must be done.

3. Results and Discussion

3.1. Validity Test

Validity test using r table with significance 0.05. The questionnaire item is declared valid if r count > r table. with the value of n 33 then get df =28 then get r table of 0,361. It means that if the correlation value is greater than the specified limit then the item is considered valid. If the correlation is determined to be less than the specified amount then the item is considered invalid. The results of the validity test of the ten variables below:

Tabel 3. Vaidity Test Result

Dimensi	Signifikansi	Responden	Rtabel	Result
X1	<.001	33	0.810	Valid
X2	<.001	33	0.737	Valid
X3	<.001	33	0.759	Valid
X4	<.001	33	0.800	Valid
X5	<.001	33	0.753	Valid
X6	<.001	33	0.675	Valid
X7	<.001	33	0.742	Valid
X8	<.001	33	0.822	Valid
X9	<.001	33	0.772	Valid
X10	<.001	33	0.860	Valid

3.2. Reliability Test

Uji This reliability test is carried out by looking at the score of Cronbach's Alpha formula, the value describes the indicator used in the research using the SPSS 16.0 application. This reliability decision-making method is taken using the 0.6 limit. Reliability less than 0.6 is considered poor while 0.7 is acceptable and 0.8 is good. Reliability test results below:

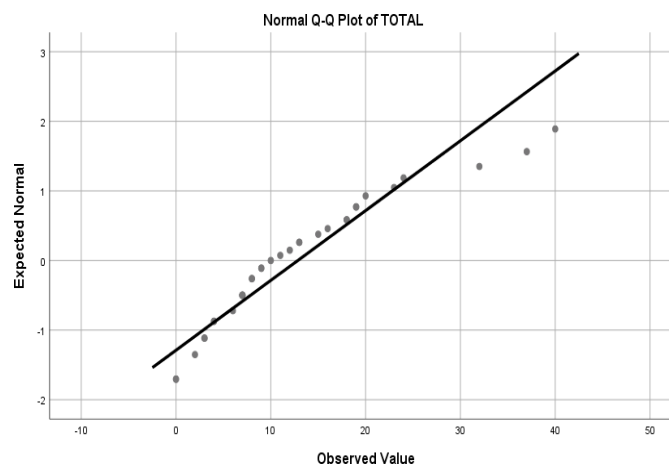
Tabel 4. Reliability Test Result

Variable	Total questionnaire	Cronbachs Alpha	Result
Questionnaire (X1-X10)	10	0.925	Reliabel

3.3. Clasic Assumption Test

1. Normality Test Result

Based on the output results in Figure 1, it can be seen that the data spreads around the diagonal line and the spread follows the direction of the diagonal line, then the total data of the respondent's score is declared to be normally distributed. For that, the researcher makes a conclusion that data processing is declared Normal.

**Fig. 1.** Graph P-P Normality Test

2. Multikolenaritas Test Results

In the multicollarity test, there is no multicollarity test if the tolerance value is >0.1 and the VIF value is <10 , which can be seen in the following table:

Tabel 5. Multikolenaritas Test Result

Variable	Tolerance	VIF	Result
X1	0.283	3.532	There is no multicollinearity
X2	0.404	2.478	There is no multicollinearity
X3	0.364	2.746	There is no multicollinearity
X4	0.338	2.961	There is no multicollinearity
X5	0.363	2.755	There is no multicollinearity
X6	0.527	1.898	There is no multicollinearity
X7	0.428	2.335	There is no multicollinearity
X8	0.281	3.561	There is no multicollinearity
X9	0.298	3.350	There is no multicollinearity
X10	0.230	4.352	There is no multicollinearity

3. Heteroskedasticity Test Results

This Heteroskedasticity test becomes the difference in the residual variance of a period observation in other observations where if the result is sig < 0.05 then Heteroskedasticity occurs and if the sig value is > 0.05 then there is no Heteroskedasticity can be seen in figure 4.23 as follows:

Tabel 6. Heteroskedasticity Test Result

No	Model	Sig	Result
1	<i>Visibility of System Status</i>	0.069	There is no heteroskedasticity
2	<i>Match Between System and the Real World</i>	0.880	There is no heteroskedasticity
3	<i>User Control and Freedom</i>	0.014	There is no heteroskedasticity
4	<i>Consistency and Standards</i>	0.021	There is no heteroskedasticity
5	<i>Error Prevention</i>	0.209	There is no heteroskedasticity
6	<i>Recognition rather than Recall</i>	0.085	There is no heteroskedasticity
7	<i>Flexibility and Efficiency of Use</i>	0.077	There is no heteroskedasticity
8	<i>Aesthetic and Minimalist Design</i>	0.786	There is no heteroskedasticity
9	<i>Help Users Recognize, Diagnose and Recover from Errors</i>	0.520	There is no heteroskedasticity
10	<i>Help and Documentation</i>	0.000	There is heteroskedasticity

3.4. Hypothesis Testing Results

1. Test T (Multiple)

The t test aims to determine whether or not there is a partial influence given by the free variable (X) based on the results of the analysis carried out by the researcher as shown in the following table:

Tabel 7. T Test Result

Model	Sig	t table	Result
<i>1. Visibility of System Status</i>	0.000	24557435.56	Influential
<i>2. Match Between System and the Real World</i>	0.000	31792960.56	Influential
<i>3. User Control and Freedom</i>	0.000	30289077.10	Influential
<i>4. Consistency and Standards</i>	0.000	29963815.04	Influential
<i>5. Error Prevention</i>	0.000	33543314.62	Influential
<i>6. Recognition rather than Recall</i>	0.000	38415445.14	Influential
<i>7. Flexibility and Efficiency of Use</i>	0.000	31293832.12	Influential
<i>8. Aesthetic and Minimalist Design</i>	0.000	31293832.12	Influential

9. Help Users Recognize, Diagnose and Recover from Errors	0.000	27230991.16	Influential
10. Help and Documentation	0.000	27341060.79	Influential
	0.000	28179539.50	Influential

2. F Test

The f test aims to determine whether or not there is an influence given by the free variable (X). The F value in the ANOVA table does not appear because the residual value is 0.000, so the Residual Mean Square is zero and causes the F value to be incalculable. This happens because the TOTAL variable is the result of direct formation from P01 to P10. This condition is also reinforced by the R Square value of 1,000 and Std. An error of 0.000 on the Model Summary table, which shows that the regression model is a perfect fit, the results of the F hitting and FTable, the results obtained are as follows:

Tabel 8. Annova F Test Result

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3180.242	10	318.024		^b
	Residual	.000	22	.000		
	Total	3180.242	32			

a. Dependent Variable: TOTAL

b. Predictors: (Constant), P10, P06, P07, P02, P05, P03, P09, P04, P01, P08

Tabel 9. Annova T Test Result

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000 ^a	1.000	1.000	.000

a. Predictors: (Constant), P10, P06, P07, P02, P05, P03, P09, P04, P01, P08

3.4. Data Analysis

Based on the results that have been obtained from the processing of the questionnaire from the 10 variables Heuristic Evaluation shows the user's perception of Sisfo as follows:

Tabel 10. Perception of Using Sisfo

Variabel Heuristic	Kode	Mean	Saverity Rating	Ket
1. Visibility of System Status	P01	0.91	3.69	Need Repair
2. Match Between System and the Real World	P02	1.15	2.85	Need Repair
3. User Control and Freedom	P03	1.27	2.73	Need Repair
4. Consistency and Standards	P04	1.33	2.67	Need Repair
5. Error Prevention	P05	1.55	2.45	Need Repair
6. Recognition rather than Recall	P06	1.45	2.55	Need Repair
7. Flexibility and Efficiency of Use	P07	1.06	2.94	Need Repair
8. Aesthetic and Minimalist Design	P08	1.30	2.70	Need Repair
9. Help Users Recognize, Diagnose and Recover from Errors	P09	1.48	2.52	Need Repair
10. Help and Documentation	P10	1.33	2.67	Need Repair

Based on the results of the severity rating calculation in each variable, it can be seen that most of the usability aspects are in the medium to high problem category. This indicates that the system is not fully optimized and still needs improvement efforts on some interface components.

4. Conclusion

The research results show that even though the system can be used by users, there are still various usability problems based on the ten principles of Heuristic Evaluation. The severity of the problem in the medium to high category indicates that the system needs improvement, especially in the aspects that have the highest severity value, in order to provide a better user experience.

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