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We have reached a decision regarding your submission to International Journal of Artificial Intelligence Research, "PREDETERMINED TIME STUDY APPLICATION AS A MEASUREMENT TIME STUDY CALCULATION TOOL".

Our decision is to: Accept Submission

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PREDETERMINED TIME STUDY APPLICATION AS A MEASUREMENT TIME STUDY CALCULATION TOOL

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ABSTRACT

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Evaluation of the results of the development of a standard time calculation system which has been applied for approximately 1 semester (6 months) is done by using Webqual instruments where there are 3 parts of testing, namely usability quality, information quality and interaction quality. This assessment instrument emphasizes the assessment of information systems based on the perspective of the last user. As for the results of the validity of the Pearson Correlation score and by observing the score of Corrected Item - Total Correlation which is above 0.6 or equal to 0.6 and the reliability test results has obtained the score of chronbach's alpha above 0.60. And the results of the hypothesis for the variable usability quality is 0.700, which means that Usability Quality (X1) has a close relationship or influence on Overall Impression (Y), the results of the variable Quality Information hypothesis (X2) correlation coefficient 0.715 which means that the assessment has a relationship or close influence on Overall Impression (Y), and the results of the hypothesis variable Interaction Quality (X3) correlation coefficient 0.813 which means that the assessment has a close relationship or influence on Overall Impression (Y).

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I. Introduction

The Predetermined Time System is an indirect measurement of working time with movement time data based on the elements of its work. A movement element arises from the idea of the Therbligs concept proposed by Frank and Lilian Gilberth. Time data of this movement consists of: [1]

- a) Work Factor (WF) System. Work factor is one of the systems among the data systems which are developed as time movement data. In the work factor, a work is divided into motion elements of Reach, Move, Grasp, Preposition, Assembly, Disassemble, Use, Release, and Mental Process, in accordance with the work in concerned.
- b) Maynard Operation Sequence Time (MOST System) or known as the displacement of objects. In the MOST method, object is moved in two ways:
 1. Taken and moved freely.
 2. Taken and moved by sliding over the surface of other objects. For each type of activity, a different sequence of movements can occur. Therefore, the MOST method is used to separate the sequence of activities.
- c) MTM System Time Measurement (MTM) methods is one of indirect work measurement method which can be used in determining work time. The speciality of MTM compared to other work time measurements is that it can determine the completion time of a work before

the work is done, because in the calculation of MTM work time tables are used based on elements of standardized work.

However, in the process of identifying work movements in the movement time data need to be simplified because the identification process is less effective and efficient to be done manually and difficult to do by people who are still unfamiliar with the movement time data method. Therefore, it is necessary to develop applications that may help ordinary people to measure working time with predetermined work systems. In the previous research, the system used was only the MTM system, whereas in this study, we will see two systems, namely the MOST system and the MTM system. The problem that became the topic in this study was to design a working time measurement system with the MOST and MTM methods that are computerized in the identification process and can determine the total time in work measurement.

The making of MTM applications is done to help students read tables and shorten calculation times. Application is used in work system design work and ergonomics practicum. To see how useful this application is, usability analysis of MTM software products is done. MTM application itself has been tested at Bina Darma University, especially in Industrial Engineering study program for approximately 1 semester (6 months) so that an evaluation of application products is needed.

II. Literature Review

2.1 Evaluation

According to Arikunto [2] evaluation as a process of determining the results which have achieved by several activities planned to support the achievement of goals. According to Husni [3] evaluation is a process to provide information about the results of an assessment of the problems found. Meanwhile, according to Arifin [4] Stating evaluation is a process which is not a product. The results obtained from the evaluation activities are quality, something, both concerning value or meaning, while activities to arrive at giving value and meaning are evaluations.

2.2 Quality

Kotler [5] defines Quality as the overall characteristics and properties of goods and services that affect the ability to meet the expressed and implied needs. While Cateora and Graham [6], argued that Quality is divided into two dimensions: quality from a market perspective and quality of performance. Both are important concepts, however consumers' views on product quality are more related to quality from a market perspective than the quality of results.

2.3 Webqual

Webqual is a method or technique for measuring website quality based on the perception of the last user. This method is a development of SERVQUAL which is widely used before in measuring service quality. Webqual has been developed since 1998 and has experienced several interactions in the preparation of dimensions and questions.

The first version of the Webqual (Webqual 1.0) instrument was developed as part of the results of the workshop organized by involving students who were asked to consider the quality of the school website. Webqual instruments are filtered through an iterative repair process using a trial questionnaire before being distributed to a larger population. Twenty-three questions in the Webqual instrument are tested with applications in the scope of the school website in the UK. Analysis of collected data encourages deletion of one question item. Based on the reliability analysis, there were 23 questions which were then grouped into four main dimensions, namely ease of use, experience, information, communication and integration [7]. The quality identified in Webqual 1.0 forms the starting point for assessing the quality of information from a website in Webqual 2.0. However, in the implementation of Webqual, on B2C (Business to Consumer) websites it is clear that the perspective of quality interaction is not well represented in Webqual 1.0. Related to the quality of service, especially ServQual, is used to improve the quality aspects of information from Webqual with the quality of interaction. Service quality is generally defined by how well the service delivered, whether it is appropriate with customer expectations or not. Webqual 2.0 development requires some significant changes to the Webqual 1.0 instrument. In order to expand the model for interaction quality, Barnes and Vidgen [7] analyzed ServQual instruments and made detailed comparisons between ServQual and Webqual 1.0. This review

successfully identifies redundant questions and then the overlapping areas are deleted, the result is that most of the key questions in ServQual are not suitable with Webqual 2.0, the number of instruments with 24 questions remains questionable[7].

Webqual 1.0 may be strong in terms of information quality, but less powerful in terms of service interaction. Likewise for Webqual 2.0 which emphasizes interaction quality eliminates some quality information from Webqual 1.0. Both versions contain various qualities related to the website as a software artifact. In a review conducted by Barnes and Vidgen [7] found that all quality can be categorized into three different areas, which are website quality, information quality, and service interaction quality. The new version of Webqual 3.0 has been tested in the online auction domain[7].

Analysis of the results of Webqual 3.0 leads to the identification of three dimensions of website quality, namely usability, quality of service interaction. Usefulness is a quality related to website design, e.g appearance, ease of use, navigation and display which delivered to users. The quality of service interaction is the quality that experienced by users when they learn more in a website, manifested by trust and empathy, such as transaction and information security issues, product delivery, personalization, and communication with website owners [7]. Usability has replaced the quality of websites in Webqual version 4.0 because it maintains an emphasis on users and their perception of website design. The term usability also reflects better the two-dimensional abstraction of other Webquals, which include service and information interactions. Usefulness relates to pragmatic about how users view and interact with websites: is it easy to navigate? Does the design match the type of website?

According to Webqual theory, there are three dimensions that represent the quality of a website, that is usability, information quality and service interaction. Each dimension consists of several questions as presented in Table 1.

Table 1 Quality Variables

Quality	Description
Usability	
1	I find the site easy to learn to operate
2	My interaction with the site is clear and understandable
3	I find the site easy to navigate
4	I find the site easy to use
5	The site has an attractive appearance
6	The design is appropriate to the type of site
7	The site conveys a sense of competency
8	The site creates a positive experience for me
Information Quality	
9	Provides accurate information
10	Provides trusted information
11	Provides timely information
12	Provides relevant information
13	Provides understandable information
14	Provides information at the right level of detail
15	Presents the information in an appropriate format
Interaction Quality	
16	Has a good reputation

Quality	Description
17	It feels safe to complete transactions
18	My personal information is secure
19	Creates a sense of personalization
20	Conveys a sense of community
21	Makes it easy to communicate with the organization
22	I feel satisfied that goods/services will be delivered as promised
Overall impression	
23	My overall view of this Web-site

Source: Anwariningsih [8]

III. Research Methods

The research design in this study is descriptive method. Descriptive method is one of the types of research method. Descriptive research methods aim to collect actual information in detail that describe existing symptoms, identify problem or examine applicable conditions and practice, make comparisons or evaluations and determine what others do in dealing with the same problems and learn from their experiences to determine plans and decisions in the future.

Thus this descriptive research method is used to systematically describe the facts or characteristics of a particular population or a particular field, which in this case, the field is actual and accurate. Descriptive methods does not only describe (analytical), but also combine. Not only do classification, but also organization. Descriptive research methods are essentially looking for theory, not testing a theory. This method focuses on observation and natural atmosphere.

In this study, the system evaluation uses a webqual method which aims to provide information and as an evaluation material of how the performance of the features in the application adjusts to the objects analyzed as a quality service using the webqual 4.0 method to obtain assessment results based on website users. Out of the 3 (three) dimensions of assessment that exist in the method of webqual 4.0 that is, usability quality, information quality and interaction quality. And can be described below:

1. Usability, usability is the first variable in a webqual analysis method which has an important role to assess whether the quality of features in an existing application may still be improved and see how far and how easy it is to use the application.
2. Information, assessing whether the current application can be useful to the user and information presented must really have a useful value.
3. Interaction, the quality of service interaction experienced by users when they learn to use applications, is realized by trust and empathy, such as transaction and information security issues, product delivery, personalization, and communication with website owners [9].

IV. Results and Discussions

The percentages of the type of Respondents are users of the Application, as follows:

Tabel 2. Type of Respondent

Type of Respondent / Application user	Amount
Student	63
Lecturer	4

Amount	67
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4.1 The validity and reliability test of measuring instruments

Validity test is done to test the research instrument so that it can provide results in accordance with its purpose, by calculating the correlation between the score of the item and the total score. By using the program SPSS for Windows version 21.0, in which the assessment procedure is correlation test with a mark (**) or (*) on the value of the correlation results significantly showed a (valid) for further testing, while the variable item which are not marked as above are no longer included in the calculation[10]. The results of the test where all the variables tested have been included can be seen in the table below:

Table 3 Research Variable Validity Test Results					
<i>Pearson Correlation</i>					
<i>Usability Quality</i>		<i>Information Quality</i>		<i>Interaction Quality</i>	
X1.1.	1	X2.1.	1	X3.1.	1
X1.2.	873**	X2.2.	842**	X3.2.	897**
X1.3.	797**	X2.3.	852**	X3.3.	844**
X1.4.	855**	X2.4.	921**	X3.4.	849**
X1.5.	856**	X2.5.	875**	X3.5.	834**
X1.6.	816**	X2.6.	847**	X3.6.	781**
X1.7.	820**	X2.7.	844**	X3.7.	838**
X1.8.	641**				
N = 67					

****.** Correlation is significant at the 0.01 level (2-tailed).

*****. Correlation is significant at the 0.05 level (2-tailed).

From the table above, it is recognized that all variables are valid so that they can be used for the next analysis phase. The results of primary data processing using SPSS can be seen in the following table:[12]

Table 4 Results of Research Variable Reliability Test		
Variabel	Cronbach's Alfa	Conclusion
Usability Quality (X1)	0,957	Reliable
Information Quality (X2)	0,968	reliable
Interaction Quality (X3)	0,958	reliable

Based on the results of the reliability test shows that all variables are: Usability Quality (X1), Information Quality (X2) and Interaction Quality (X3) which obtained are greater than 0.60. In this case the test criteria are instruments that have a high level of reliability, if the coefficient value is obtained > 0.60 Ghozali, (2002: 133), then this can be interpreted that all variables are reliable.

4.2 Effects of Usability Quality Variable (X1) on Overall Impression (Y)

The results of simple regression calculations on Usability Quaity (X1) on overall impressions are as follows:

Table 5 Summary Model (b) Usability Quality Variable (X1)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.700 ^a	.490	.483	.83060	1.906

a. Predictors: (Constant), Rata Usability

b. Dependent Variable: OverAll

The table above explains the R value or correlation coefficient of 0.700 which means that Usability Quality (X1) assessment has a close relationship or influence on Overall Impression so that the assessment of the variables used in this study greatly influences the Overall Impression assessment. The value of R Square or the coefficient of determination is or 49.0% Overall Impression can explain variations in changes in Usability Quality variables.

Next the results of the calculation of the regression equation and test hypotheses will be seen:

Table 6. Coefficients (a) Variable Usability Quality (X1)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.485	.580		2.562	.013
	Rata Usability	.785	.099	.700	7.909	.000

a. Dependent Variable: OverAll

The calculation results in the table obtained the regression equation as follows:

$$Y = 1,485 + 0.785 X$$

A value of 1,485 or a constant indicates that if the Average Usability Quality (X1) is equal to zero then the Overall Impression (Y) is equal to 1,485. The regression coefficient value for Average Usability Quality (RU) is 0.785. This value explains that if the Usability Quality (RU) Average value rises by one score unit then the Overall Impression (Y1) value increases by 0.785. Likewise if the Usability Quality (RU) Average value drops by one score unit, the Overall Impression (Y1) value drops by 0.785.

Furthermore, it will be seen the value of sig.t which aims to test the existing hypothesis. The sig value for the Average Usability Quality (RU) obtained is 0,000 which is smaller than the alpha value = 0.05 which means that the assessment of the Average Usability Quality (RU) variable has a significant effect on Overall Impression (Y1) is true or valid .

4.3 Effects of Information Quality (X2) Variable Value on Overall Impression

The results of simple regression calculations on Information Quality (X2) on Overall Impression are as follows:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.715 ^a	.512	.504	.81306	1.942

a. Predictors: (Constant), Rata Information

b. Dependent Variable: OverAll

The table above explains the R value or correlation coefficient of 0.715 which means that Information Quality (X2) has a close relationship or influence on Overall Impression (Y) so that the assessment of the variables used in this study greatly influences the Overall Impression (Y) assessment. The value of R Square or the coefficient of determination is or 51.2% Overall Impression (Y) can explain variations in changes in Information Quality (X2) variables.

Next the results of the calculation of the regression equation and test hypotheses will be seen:

Table 8 Coefficients (a) Variable Information Quality (X2)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.257	.583		2.155	.035
	Rata Information	.821	.099	.715	8.253	.000

a. Dependent Variable: OverAll

The calculation results in the table obtained the regression equation as follows:

$$Y = 1.257 + 0.821 X$$

A value of 1.257 or a constant indicates that if the Information Quality (RIF) score is equal to zero then the Overall Impression (Y1) is equal to 1,257. The regression coefficient value for Information Quality (X2) score is 0.821. This value explains that if the Average Quality Quality (RIF) value increases by one score unit then the Overall Impression (Y1) value increases by 0.821. Likewise if the Information Quality (X2) score falls by one score unit, the Overall Impression (Y1) value drops by 0.821.

The value of Sig. which aims to test the existing hypothesis will be seen. The Sig for Average Information Quality (X2) obtained is 0,000 which is smaller than the alpha value = 0.05 which means that the assessment of the Information Quality Average (RIF) variable has a significant effect on Overall Impression (Y1) is true or valid.

4.4 Effects of Interaction Quality Variable Assessment on Overall Impression.

The results of simple regression calculations on Interaction Quality (X3) on Overall Impression (Y) are as follows:

Table 9 Summary Model (b) Variable Interaction Quality (X3)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.813 ^a	.662	.657	.67670	1.927

a. Predictors: (Constant), Rata Interaction

b. Dependent Variable: OverAll

The table above explains the R value or correlation coefficient of 0.813 which means that the assessment of Interaction Quality (X3) has a close relationship or influence on Overall Impression (Y) so that the assessment of the variables used in this study greatly influences the Overall Impression (Y) assessment. The value of R Square or the coefficient of determination is or 66.2% Overall Impression (Y) can explain the variation in changes in the variable Interaction Quality (X3).

Next the results of the calculation of the regression equation and test hypotheses will be seen:

Table 10 Coefficients (a) Variable Interaction Quality (X3)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.599	.486		1.233	.222
	Rata Interaction	.926	.082	.813	11.277	.000

a. Dependent Variable: OverAll

The calculation results in the table obtained the regression equation as follows:

$$Y = 0.599 + 0.926 X$$

A value of 0.599 or a constant indicates that if the Average Interaction Quality (RIT) is equal to zero then the Overall Impression (Y1) is equal to 0.599. The regression coefficient value for Average Interaction Quality (RIT) is 0.926. This value explains that if the value of Average Interaction Quality (RIT) rises by one unit of score then the Overall Impression (Y1) value increases by 0.926. Likewise if the Average Interaction Quality (RIT) value drops by one score

unit then the Overall Impression (Y1) value drops by 0.926.

Next, the sig value, which aims to test the existing hypothesis will be seen. The sig value for Interaction Quality (RIT) obtained is 0,000 which is smaller than the alpha value = 0.05 which means that the assessment of the Interaction Quality (RIT) Average variable has a significant effect on Overall Impression (Y1) is true or valid .

5. Result

The results of the validity test obtained Pearson Corellation values above 0.6 or equal to 0.6 and the reliability test results can get the value of chronbach's alpha above 0.60 so that the questionnaire is considered valid and reliable. The results of the hypothesis for the usability quality variable is 0.700 which means that Usability Quality (X1) has a close relationship or influence on Overall Impression (Y), while for Information Quality (X2) the correlation coefficient is 0.715 which means that the assessment has a relationship or influence which is close to Overall Impression (Y), and the results of the hypothesis variable Interaction Quality (X3) has a correlation coefficient of 0.813 which means that the assessment has a close relationship or influence on Overall Impression (Y). Overall, the questions in each variable used are directly related and affect the facilities and features in the predetermined time system calculation application that has been developed.

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