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Quality Analysis of SMA Negeri 1 Sokaraja Website using Eye Tracking Method

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Abstract

The role of websites in academic management and enhancing the reputation of a company or institution is very important. The quality of website services also has a crucial role in the world of education. Based on the results of interviews with the person in charge of the SMA Negeri 1 Sokaraja website, it was found that there were problems, namely the satisfaction of website users was not yet known and there were several pages that were not responsive, such as in the homepage/home area, which needed to be improved or optimized. This research involves a number of respondents who will give their views on the SMA Negeri 1 Sokaraja website. The analysis results obtained from this research are expected to provide a clear understanding of the extent to which this website meets the quality standards set by the Eye Tracking method. In addition, the analysis results will also provide a detailed evaluation of each aspect of the website's quality. In this research, the Eye Tracking method is used to measure where users look, how long they look, and the order in which they look. There are aspects of usability measurement, namely efficiency, effectiveness and satisfaction. SMA Negeri 1 Sokaraja website users are the respondents of this research. The results of usability testing with the USE Questionier method with a feasibility percentage of 84.17% with a very feasible category which means the website is very feasible for users. The results of usability testing with the eye-tracking method that each task is well received by users, but the effectiveness of delivering information reaches a score of 73.14, this score is classified as quite effective.

Keywords: *Analysis, Eye Tracking, Website Quality, User Satisfaction, Usability, Website.*

1. Introduction

Nowadays, many schools hope to be accepted and recognized by their environment, especially by their students. The development of internet technology, supported by advances in computer technology and telecommunications, has brought great progress and increased flexibility, convenience, speed, and efficiency [1]. In a company, the optimal use of information technology will increase the effectiveness of work in processing data to obtain the necessary information. As a high school, SMA Negeri 1 Sokaraja has adopted the development of Information Technology. This allows the school to compete with other high schools in providing services to students through the internet, especially through the use of websites. This is evidenced by the existence of SMA Negeri 1 Sokaraja website with the website address "https://sman1sokaraja.sch.id/". The quality of a website is determined by various factors, including having features that are useful and fit for purpose, easy to operate, and can be accessed easily from various places and times. If a website is fast, easy to use, and can complete tasks well, users will feel comfortable using it. Effectiveness and efficiency factors affect the performance of a website. If these factors are not considered properly, users will not use the website. Effectiveness and efficiency are used to compare eye-tracking results with questionnaires in the context of SMA Negeri 1 Sokaraja website. The questionnaire method used was the USE Questionnaire. The questionnaire method used is the USE Questionnaire, which evaluates usability, satisfaction, and ease of use. If various interfaces need to be analyzed, these three factors are the easiest parameters to observe and compare.

Based on the results of interviews with the person in charge of the SMA Negeri 1 Sokaraja website, it was found that there were problems, namely the satisfaction of website users was not yet known and sometimes there were several pages that were not responsive, such as in the home area that needed to be improved or optimized. From these problems, it is necessary to test usability on the effectiveness and efficiency factors that can meet user performance and expectations so that users can be comfortable using the website and can perform tasks such as searching for the information and data needed. This is the reason for conducting this research in order to find out why it happened, the author will examine such as an unattractive appearance, and unsatisfied user needs, and difficulties. Ultimately, user satisfaction is a judgment based on their experience. Quality measurement is carried out based on the views of visitors to improve services to students and maximize website utilization.

2. LITERATURE REVIEW

2.1. Analyze

Analysis is the act of examining or investigating an event using data to gain a deeper understanding of the situation. Usually, analysis is done in the context of research or data processing. Website quality analysis is an evaluation process that includes a comprehensive assessment of the various aspects and performance of a website to assess the level of user satisfaction, effectiveness, and conformity to predetermined goals. The purpose of this analysis is to identify the strengths and weaknesses of the website, as well as provide improvement recommendations to improve the user experience and achieve business or organizational goals [1].

2.1.1. Eye Tracking

Eye-tracking is a process that shows the direction of a person's gaze, follows, and records eye movements when looking at something [2]. It is a method used to understand how users pay attention to visuals, where we can track their eye movements and how long they look at something in an area on the website [2]. Before testing, the first step that needs to be done is calibration, which is the process of adjusting between the eyes and the eye-tracking tool. According to an analysis conducted by Laura Faulkner, increasing the number of participants affects the percentage of usability problems found. The analysis found that in the form of participants involving 30 participants, the percentage of usability problems identified can increase to at least 97% [3].

2.1.2. Website Quality

Website quality is the level of excellence and conformity of a website to certain predetermined standards or criteria. It includes various factors that determine the extent to which the website meets or even exceeds user expectations and goals that have been set.

2.2. User Satisfaction

According to the book Service, Quality and Satisfaction, service is defined as a system that provides public needs and is organized by the government or private companies. Another definition states that services are companies that provide something to the public or perform actions for the government. In the book Measuring Customer Satisfaction, it is explained that service is the provision of invisible performance or action from one party to another. The word “satisfaction” comes from Latin which means good enough, adequate, and “facio” means to do or make. User satisfaction refers to the ability of users to feel satisfied in certain things they want and need. Categories of satisfaction that can be measured from the website are satisfaction in the speed of output of the results of a function, the appearance of the website. Thus, satisfaction can be interpreted as an effort to fulfill something or make something adequate [4].

2.3. Website

Website also known as site, website, or portal, is a collection of interconnected web pages. The term web, which is often referred to as the world wide web (www) or W3, is part of the internet which consists of web pages containing computer documents that display text, graphics, and sound. A website is a collection of pages that display various information, such as text, still or moving images, animation, sound, or a combination of all of them, both in static and dynamic form, which are connected to each other through a network of pages (hyperlinks). Web pages are created using HTML (Hypertext Markup Language), a language used to describe the appearance of documents when viewed through a web browser. Each web page represents a unique location on the web. A website consists of two or more web pages that link to each otherconnected to each other [4]. The first page of a website is called the home page, while each individual page is called a web page. In other words, a website is a site that can be accessed and viewed by Internet users around the world. With the increasing number of Internet users over time, this is a potential market that continues to grow [5].

2.4. Usability

Usability is a term used to describe how easily someone uses a tool to achieve their goals. According to Jacob Nielsen, usability is a quality attribute that measures how easy an interface is to use. Usability of a website reflects the general habits of the site's users. Nielsen emphasizes that paying attention to usability is essential for a website to survive. Websites with high usability have a great chance of being visited frequently by internet users. Usually, users want information that is fast and in line with what they expect. If a website fails to provide clear information about what users can do on the site, users tend to leave the website immediately and look for other alternatives [5]. Usability according to ISO 9241-11 is defined as “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”. Usability can be used as a

measure of the quality of user experience when interacting with an interface [6]. A product or service can meet the usability level if it has criteria including: efficient, effective, satisfying. Each of these criteria can be explained as follows:

a. Efficiency is the speed at which user goals can be achieved accurately and completely.
b. Effectiveness is the extent to which the product behaves like a user and the ease with which the user can use it in accordance with what is desired.
c. Satisfaction refers to user perceptions, feelings, and opinions of users, usually obtained through written and oral questions

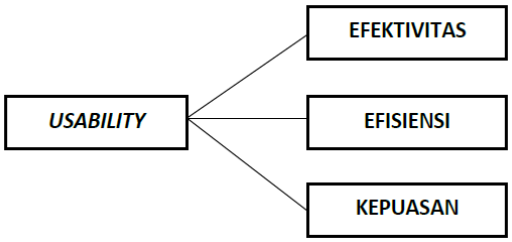

Fig.1: Usability

ISO 9241-11 states that there are three dimensions of usability, namely as follows:

3. Effectiveness
User-defined goals in a product or system can achieve the target by involving accuracy and completeness.
Target by involving accuracy and completeness.

4. Efficiency
To achieve user goals involves accuracy, completeness, and the resources generated or the time taken during use.

5. Satisfaction
User response when using a product or system, including comfort, and ease of use.
Of the three attributes above, it can be measured using the usability matrix method.

6. Effectiveness
The first formula is seen from the user's aspect in completing the task:

$$Efektivitas = \frac{Jumlah\,tugas\,yang\,terselesaikan}{Jumlah\,tugas\,yang\,ada} \times 100\% \quad (1)$$

The second formula looks at the success rate of the scenario when worked on by a specified number of users:

$$Efektivitas = \frac{\sum Pengguna\,yang\,berhasil}{\sum Pengguna\,yang\,ada} \times 100\% \quad (2)$$

7. Efficiency
Calculates efficiency based on time worked:

$$Time\,Based\,Efficiency = \frac{\sum_{j=1}^{R}\sum_{i=1}^{N}\frac{n_{ij}}{t_{ij}}}{NR} \quad (3)$$

Calculating the relative efficiency value of each scenario:

$$Time\,Based\,Efficiency = \frac{\sum_{j=1}^{R}\sum_{i=1}^{N} n_{ij}t_{ij}}{\sum_{j=1}^{R}\sum_{i=1}^{N} n_{ij}t_{ij}} \times 100\% \quad (4)$$

Description:
- N = Number of tasks
-R = Number of respondents
-nij = The result of task (i) completed by the respondent (j), if completed, the value is 1 and if not completed, the value is 0.
- tij = Time spent by respondent (j) to complete task (i).

3. Satisfaction

USE Questionnaire is a tool that can be used in preparing questions that will be made in the form of a questionnaire. USE stands for Usefulness, Satisfiction, Ease of use, Ease of learning [7]. The number of samples taken was 35 respondents, this is in

accordance with the opinion of [7] who say that the minimum number of questionnaire trials is at least 30 respondents. With a minimum number of 30 people, the distribution of values will be closer to the norm curve.

3. Research Methodology

This flowchart is a process or steps for researchers in conducting research. The purpose of the flow chart is to help direct or make planning in solving the problems that have been mentioned to achieve results that are in accordance with the solutions made by researchers.

3.1. Problem Identification

The problem identification stage to find out the problems in this study, researchers conducted interviews with SMA Negeri 1 Sokaraja regarding the problems on their website.

3.1.1. Literature Study

After knowing the problem to be solved, the next step is the literature study stage by obtaining the appropriate theoretical foundations regarding this research which are also taken from several sources such as journals, theses, and websites related to website quality, the Eye Tracking method.

3.1.2. Determination of Research Methods

This research uses the Eyetracking method which focuses on three attributes, namely Effectiveness, Efficiency, and Satisfaction.

3.1.3. Data Collection

To collect data, the researcher designs and makes a Task For Questionnaire At the questionnaire making stage, it contains a list of questions that have previously been compiled based on the specified variables. The questionnaire will later be given to respondents and the task contains commands that are carried out by respondents using eye-tracking. At this stage, researchers will collect data through questionnaires using the USE questionnaire method and testing using the eye-tracking method. Data collection is intended for determining respondents.

Table 1: Task and Scenario

No	Task dan Skenario
1	Try finding the Profile Video of SMA Negeri 1 Sokaraja
2	Search and find the words Facilities, facilities and infrastructure
3	Search button see us

3.2. Questionnaire Validity Test

The validity test is needed as a means to ascertain whether the statements in the questionnaire are valid or not. Validity is an indicator of how reliable and authentic the data obtained is [8]. To test validity, the correlation between variables and their combined scores was calculated. Finding the relationship between each question and the overall score using correlation methodology is one way to evaluate construct validity. The value resulting from the calculation (r_count) is then compared with the expected value (r_table). If the value (r_count) is greater than the value (r_table), then the instrument can be considered valid [9]. Where (r_table) is calculated by the formula. The validity test is used to evaluate the accuracy or correctness of a questionnaire in measuring the items to be tested, the authors concluded this based on input from several experts. Because the questionnaire will be used as a research tool, this process is very important.

3.3. Reliability Test of Questionnaire

Reliability testing is important to ensure that the statements in the questionnaire are truly reliable and consistent in measuring the same symptoms across multiple respondents. It is used to assess how reliable the measuring instrument used is. If the same result is consistently achieved in multiple tests without making any changes to the measurement, then we can state that the measurement is reliable. The dependability coefficient is determined after a series of tests. [9]. The dependability coefficient can be calculated by various methods, including using Cronbach's Alpha. Cronbach's Alpha is a statistical measure of reliability, and instruments with values greater than 0.6 are generally considered credible

3.4. Website Usability Measurement

Usability measurement is carried out by calculating the percentage of answers from respondents using the formula stated in the following table. Usability measurement is done by calculating the percentage of answers from a number of respondents. The data obtained is then converted using the eligibility category table in Table 3.3. Usability measurement is done by calculating the presentation of answers from all respondents. The usability measurement that is assessed consists of 4 aspects, namely usefulness, ease of use, ease of learning, and satisfaction [10], [11].

$$\text{P}ersentase\ Kelayakan\,(\%) = \frac{Skor\ yang\ diobservasi}{Skor\ yang\ diharapkan} \times 100\% \quad (5)$$

3.5. Heatmap

Heatmaps visually depict the data by showing the direction of the respondent's eye movement. A red area indicates that the respondent's eyes were fixed on that point for a relatively long time. Yellow indicates that the eyes moved away from the point more briefly and quickly than red, while green indicates the point that the respondent looked at the least. This heatmap is related to user satisfaction. User satisfaction relates to a positive response to the use of the system by the user [12], [13], [14]. The following is a heatmap of the SMA Negeri 1 Sokaraja website.
Testing Task 1: Finding the Profile Video of SMA Negeri 1 Sokaraja
The first test carried out by respondents is working on task 1, namely finding the Profile Video of SMA Negeri 1 Sokaraja, all respondents can complete task 1 smoothl.

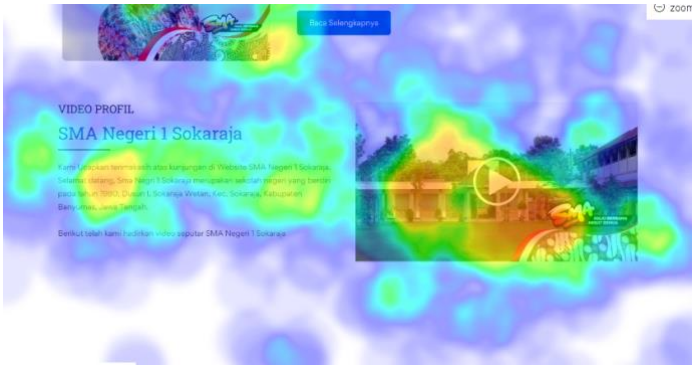

Fig. 2: Heatmap finding the profile Video

The results of the heatmap in Figure 4.1.3, respondents are quite evenly distributed in the profile video area. The respondent's focus when finding the profile video menu, namely in the profile video section marked in red, is an area that indicates that the respondent's eyes are fixed on the point for a relatively long time. The respondent's view can be seen that the location of the view that must be seen is on the right side.
Testing Task 2: Search and find the writing of facilities, facilities and infrastructure
The second test carried out by respondents is working on task 2, namely finding facilities and infrastructure Facilities and Infrastructure.

Fig. 3: Heatmap Search and finding the writing of facilities, facilities and infrastructure

The results of the heatmap in Figure 3, respondents are fairly evenly distributed in the areas of facilities, facilities and infrastructure. However, the yellow and green heatmap is quite strong in the writing of facilities, facilities and infrastructure, which means that it is rarely seen by respondents with a relative short time and quickly The view of the respondent can be seen that the location of the view that must be seen is on the right side.
Testing Task 3: Looking for the see us button
The third test carried out by respondents is working on task 3, namely finding the see us button.

Fig. 4: Heatmap of respondents working on Task 3

The results of the heatmap in Figure 4 show that the respondent's focus when visiting the news is in the middle area of the school news page. However, the red heatmap is quite strong in the middle of the image, while the see us button is green and yellow which means that it is rarely seen and in a relatively short / fast time. The respondent's view can be seen that the location of the view that must be seen is on the right. From the results carried out on the overall heatmap of each respondent, users can complete the task with the following success rates

4. Data Processing

The questionnaire created contains 30 questions that are in accordance with the USE questionnaire method then the questionnaire is distributed to participants, namely the general public who have used the SMA Negeri 1 Sokaraja website. Questionnaire data collection is done online using google form. The 35 respondents were dominated by students with a percentage of 82.9% and female gender with a percentage of 74.3%. Then measuring usability to determine the feasibility of the website, the Usability score is 84.17% If these results are related to the score interpretation in Table 6. The feasibility percentage value of 84.17% is in the interval 81 to 100% which indicates that the results of measuring the usability of the SMA Negeri 1 Sokaraja website have a value of “very feasible”.
The next test is the validity and reliability test using SPPS 29.0 software. The results when the validity test is declared valid because r_count is greater than r_table can be seen from Table 4 validity test results. The reliability test gets the Cronbach's alpha value exceeding 0.60 so it is said to be reliable contained in Table 5 of the reliability test results.t.

5. Conclusion

5.1 Data Collection

In the data collection stage, researchers will collect data through questionnaires using the USE questionnaire method and testing using the eye-tracking method. The USE questionnaire consists of questions that measure usefulness, ease of use, ease of learning, and satisfaction using a Likert scale (1-5) to measure the attitudes, opinions, and perceptions of a person or group of people towards a website.The questionnaire created contains 30 questions that are in accordance with the USE questionnaire method, then the questionnaire is distributed to participants, namely the general public who have used the SMA Negeri 1 Sokaraja website. Questionnaire data collection is done online using google form. The 35 respondents were dominated by students with a percentage of 82.9% and female gender with a percentage of 74.3%. Then measuring usability to determine the feasibility of the website, the Usability score is 84.17% If these results are related to the score interpretation in Table 6. The feasibility percentage value of 84.17% is in the interval 81 to 100% which indicates that the results of measuring the usability of the SMA Negeri 1 Sokaraja website have a value of “very feasible”. The next test is the validity and reliability test using SPPS 29.0 software. The results when the validity test is declared valid because r_count is greater than r_table can be seen from Table 4 validity test results. The reliability test gets the Cronbach's alpha value exceeding 0.60 so it is said to be reliable in Table 5 of the reliability test results.

5.2 Eye Tracking Testing

Eyetracking testing uses the realeye.io platform to test the SMA Negeri 1 Sokaraja website through several test scenarios, where the eye tracker will record activities during the test. There were 35 participants who participated in the test. There are 3 tasks carried out in this test, namely finding the profile video of SMA Negeri 1 Sokaraja, finding the writing of facilities, facilities and infrastructure, finding the see us button. In the first task, namely finding the profile video of SMA Negeri 1 Sokaraja in the home menu section presents a profile video about SMA Negeri 1 Sokaraja. From the results of eyetracking testing using realeye, it is found that respondents are focused on the profile video of SMA Negeri 1 Sokaraja which is visible through the heatmap in Figure 4.11. Then to find the writing of facilities and infrastructure facilities seen by the heatmap, respondents rarely look but relatively briefly and quickly. Then for the view button we are also focused on the image on the main display. This is indicated by the presence of red color dots on the main display image. Based on the above results that the information provided can be conveyed properly, which is then calculated related to the effectiveness of 60.95 which is included in the ratio level quite effective. Based on the results of these calculations, the time-based or averagetime it takes respondents to complete each task given is 0.510 sec/goals.

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This is a text of acknowledgements. Do not forget people who have assisted you on your work. Do not exaggerate with thanks. If your work has been paid by a Grant, mention the Grant name and number here.

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