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# WEBSITE REDESIGN USING LEAN UX METHODS AND HEURISTIC EVALUATION (CASE STUDY: SMA NEGERI 3 GORONTALO)

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**ABSTRACT**

Lean UX has grown into a product and service development method commonly used by start-ups around the world. Lean UX is becoming very popular because the product development process can be done with little financial capital, human resources, and time. In addition, heuristic evaluation is one of the testing techniques with a high level of effectiveness. The ten heuristic aspects have been able to overcome most of the errors before a product is launched. In this study, the two methods were combined to obtain optimal product results. This research was conducted on the website of SMA Negeri 3 Gorontalo, which after observing and interviewing, it was found that the current website does not pay much attention to aspects of the user interface and user experience. The results of testing by professionals using the heuristic evaluation method and severity ratings, get an average result of 0.83 where these results are included in the cosmetic problem, which means that the problem does not have to be fixed unless the project time is still available. Furthermore, testing of design recommendations was carried out on students and teachers, and the results of the SEQ assessment were 6.97 out of a scale of 7, from this assessment, it could be concluded that the design recommendations were acceptable to users.

**Keywords:** heuristic evaluation, leanUX, website, user interface, user experience.

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## INTRODUCTION

In this modern era, the use of technology is increasingly being used, one of which is information technology. The website is one of the information technologies that is widely used by many groups, ranging from government agencies, private companies, and individuals. In the world of education, the use of websites has also increased rapidly, especially in school education units, the use of websites is not only for searching for information on the internet, but has also implemented website technology as a school publication medium in improving the quality and quality of schools, and can increase the attractiveness of society in viewing the image of the school. However, there are several common problems with school websites, one of which is an unprofessional design [1]. Harrell said that some school websites go overboard with mismatched fonts, emoticons, and colors, but he thinks a good school website should be efficient, professional, and easy to read. In line with Pradita's statement, a good website must adapt the user interface design and user experience to the target audience [2]. According to Budiman, a good website must consider and pay attention to the satisfaction of its users [3]. But sometimes a website doesn't pay much attention to interface design so that it doesn't make users feel comfortable and easy to use the website and this makes interface design one of the most important things for a website [4].

SMA Negeri 3 Gorontalo, as one of the driving schools in Gorontalo Province, has used the website as a means of disseminating school information. However, from the observations, it was found that the existing web had not been optimized in terms of user interface and user experience and the website was also in the form of a template which was provided free of charge by the webgratis.com website. This can be seen from the presence of several pages that are unused and left blank, of course, this is not good from a user experience point of view. In terms of appearance, it does not follow the fundamentals of UI / UX design, this can be seen in the school profile dropdown menu, there are 9 menu choices, which are contrary to Hick's law and Miller's law, where both emphasize avoiding giving too many and complicated choices to users [5] and it is best to present choices or information in 4 to 7 groups only [6]. In addition, the color combinations on the SMA Negeri 3 Gorontalo website look very contrasting and sharp, even though according to Sasongko, the use of color composition on the website must pay attention to proper harmonization and contrast between colors in accordance with the rules of Human Computer Interaction [7]. Based on the problems above, a solution is offered to redesign the website for SMA Negeri 3 Gorontalo. The methods to be used in this study are Lean UX and Heuristic Evaluation.

## METHOD

This study uses two methods, namely Lean UX as the design method, and the heuristic evaluation method for testing by evaluators. In principle, the Lean UX method includes design analysis to testing, but the testing is carried out directly by the user so that the test results or problems obtained are still general in nature, therefore the heuristic evaluation is present as a complement because the test is carried out by the evaluator himself so that the problems obtained will be detailed.

The Lean UX method approach involves users directly in the development process by creating an MVP (Minimum Viable Product) for testing so that it can provide feedback regarding the interface design and improve it according to the results received [8]. Lean UX also focuses on reducing unnecessary processes that result from the development cycle and improving the user experience at each iteration without requiring a lot of time for documentation [8].

Heuristic evaluation in general is a test by involving experts in the process [9]. There are 10 test instruments in the Heuristic Evaluation, namely:

a) **Visibility of system status**, a testing instrument to find out whether the software can always provide information to the user regarding the ongoing process.

b) **Matching between the system and the real world**, this test instrument is to find out whether the software uses common language and is common to users including the use of words, phrases and concepts.

c) **User control and freedom**, a testing instrument to find out whether users can run the software comfortably and freely, such as undo and redo.

d) **Consistency and standards**, a testing instrument to find out whether the software has no ambiguous meaning in the use of words and icons.

e) **Error prevention**, a testing instrument to find out how the software handles or handles when an error occurs or an error is made by the user.

f) **Recognition rather than recall**, a testing instrument to find out whether the software can minimize the use of memory (remembering) by the user in terms of the meaning of pictures, descriptions or when making choices.

g) **Flexibility and efficiency of use**, a testing instrument to find out whether the software can make work faster and whether the process has shortcuts.

h) **Aesthetic and minimalist design**, a testing instrument to find out whether the software has menus, information and sections that are less relevant to the user's wishes.

i) **Help users recognize**, diagnose, and recover from errors, this test instrument is to find out whether the software can display a message if an error occurs and has information on how to solve it.

j) **Help and documentation**, a testing instrument to find out whether the software can be run without having to read the instructions for use.

Severity rating is used to assess the priority level of usability problems found, problems with high levels of usability will be prioritized for repair [10]. The severity rating for usability problems is determined on a scale of 0 to 4. The weight for the severity rating can be seen in Table-1.

**Table-1.** Severity rating.

| Severity Ratings | Explanation |
|---|---|
| 0 | no problems were found in the testing |
| 1 | in the cosmetic problem category, the problem does not have to be fixed unless the project time is still available |
| 2 | in the category of minor usability problems, repairs are given low priority |
| 3 | in the category of major usability problems, improvements are important, so they should be given high priority |
| 4 | The usability catastrophe category, a crucial problem, must be repaired before the product is launched |

Two iterations will be carried out in the research, the first iteration will be after heuristic evaluation testing in the experiment run process, and the second iteration will be carried out after the usability test in the feedback and research process. The research flowchart can be seen in Figure-1.

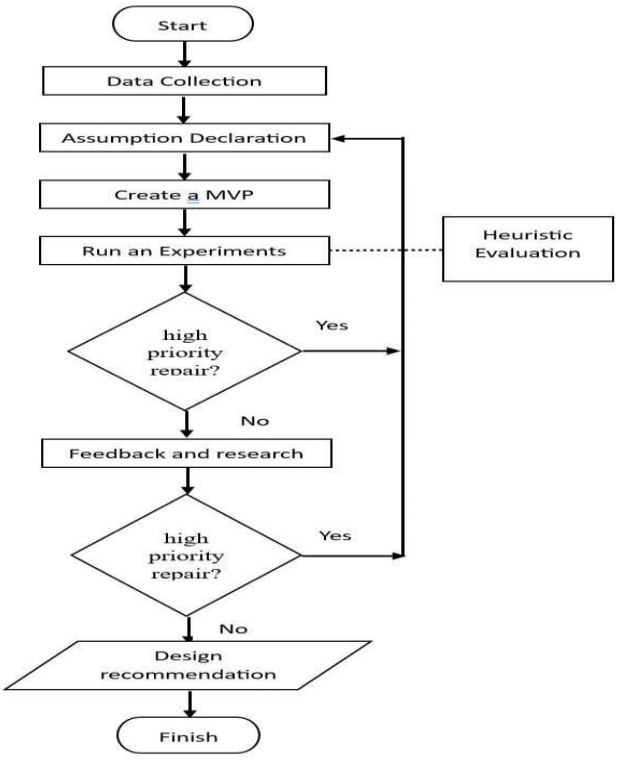


**Figure-1.** Research flowchart.

The flowchart in Figure-1 is explained as follows.

At the data collection stage, the methods used were observation and interviews. This data collection aims to determine the needs and expected goals of the SMA Negeri 3 Gorontalo website. This data collection is done to get specific data about users, because the design of a user experience is not always suitable for everyone. A user experience design that is suitable for one person may not be suitable for another person. Therefore, the best thing that can be done is to make a design who has specific goals and behaviors [11].

The declaration of assumptions is based on the results of observations and interviews with users and the problem statement is obtained as follows:

a) The appearance of the SMA Negeri 3 Gorontalo website has an unattractive design and is not user friendly, the color selection is too sharp, and there are blank pages.

b) The “download file” feature on the SMA Negeri 3 Gorontalo website is not neatly arranged, making it difficult for users to download files.

c) The website of SMA Negeri 3 Gorontalo does not feature class schedules, teacher information, and extracurricular information at the school.

MVP (Minimum Viable Product) is a product that meets the basic needs of the user. Creating MVP is the process of making a product with the minimum possible features with the aim of getting an overview of the user experience for the product you want to make [12]. One of the most effective tools in MVP creation is prototyping, which is almost similar to the original product [13].

Prototype testing is carried out to get errors that are missed or unintentional during the prototyping process. In this study, the test was carried out by evaluators using the heuristic evaluation method. The evaluators consist of three people, where these evaluators are people who are currently working professionally in the UI/UX field. The evaluator inspects the design recommendations individually. To reduce bias in evaluation results, communication between evaluators is not allowed before the evaluation process is complete [14].

The feedback and research stage aims to collect feedback or input and analyze it and validate existing assumptions through the results of prototype testing to users. The results of the prototype will be tested using SEQ (Single Ease Question) which will be given to users, namely students and teachers. SEQ itself is a usability testing method of a system or product that focuses on taking a few samples [15-16]. SEQ is a measurement that is carried out after the user completes a given scenario or task [17]. SEQ consists of only one question, namely "of all tasks, how easy or difficult is this task?" and the user can answer by choosing a number between 1 to 7, where 1 is very difficult and 7 is very easy, where the value that must be achieved so that the design results can be accepted by the user is 5.5.

The SEQ assessment score can be seen in Figure-2.

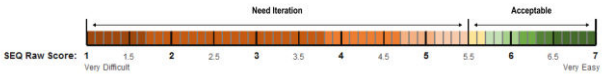


**Figure-2.** Single ease question [18].

Finally, the results of the prototypes that have gone through testing and the next iteration are ready to be recommended.

## RESULTS AND DISCUSSIONS

Following are the results of the research.

### A. Declaration of Assumptions

The declaration of assumptions is based on the results of observations and interviews with users and the problem statement is obtained as follows:

a) The appearance of the SMA Negeri 3 Gorontalo website has an unattractive design and is not user friendly, the color selection is too sharp, and there are blank pages.

b) The “download file” feature on the website is not neatly arranged, making it difficult for users to download files.

c) The website does not feature class schedules, teacher information, and extracurricular information available at the school.

### B. Create an MVP

Creating an MVP, in this case in the form of a prototype, is done using the figma application. The prototype design that is made follows the needs of the user and is collected at the assumption declaration stage.

Figure-3 is what will appear when accessing the prototype of the SMA Negeri 3 Gorontalo website. There is a slogan "Smantig Idol School" which is the slogan of SMA Negeri 3 Gorontalo, then there is a button that is "Hubungi Kami" and a link "Berita Terbaru" each of which will take the user to each of these pages. At the bottom there is an article section which contains a preview for each article.

Figure-4 shows the “Ekstarkurikuler” page. This page is made simple but is able to provide information on what extracurriculars are available at SMA Negeri 3 Gorontalo along with a brief description of each extracurricular.

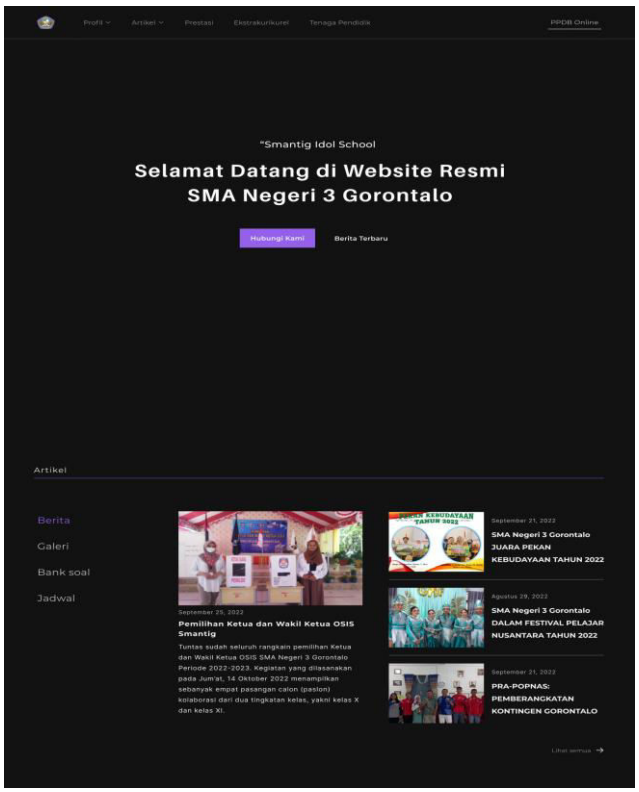


**Figure-3.** Home page recommendation.

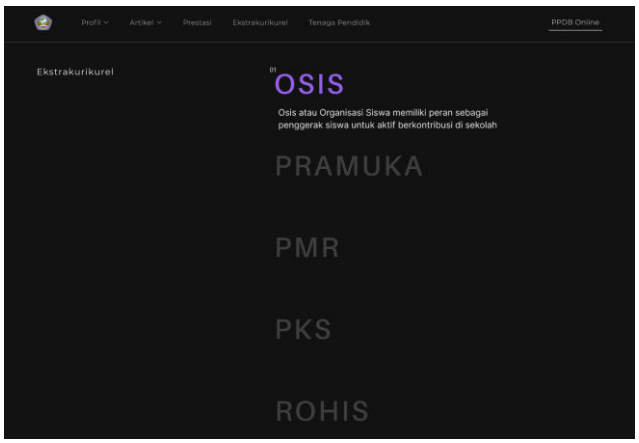


**Figure-4.** "Ekstrakurikuler" page recommendation.

Figure-5 is a page for downloading the previous year's exam questions. In this design recommendation, the page display is made simpler and each document is divided based on the existing class level, and the year of the question is given.

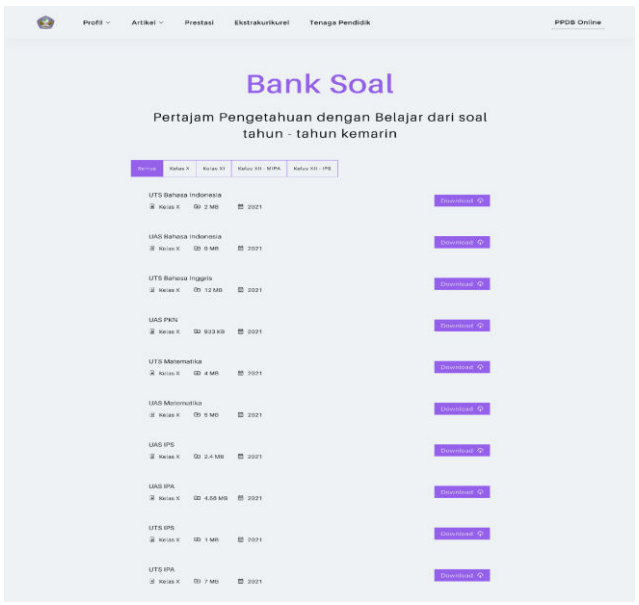


**Figure-5.** "Bank Soal" page recommendation.

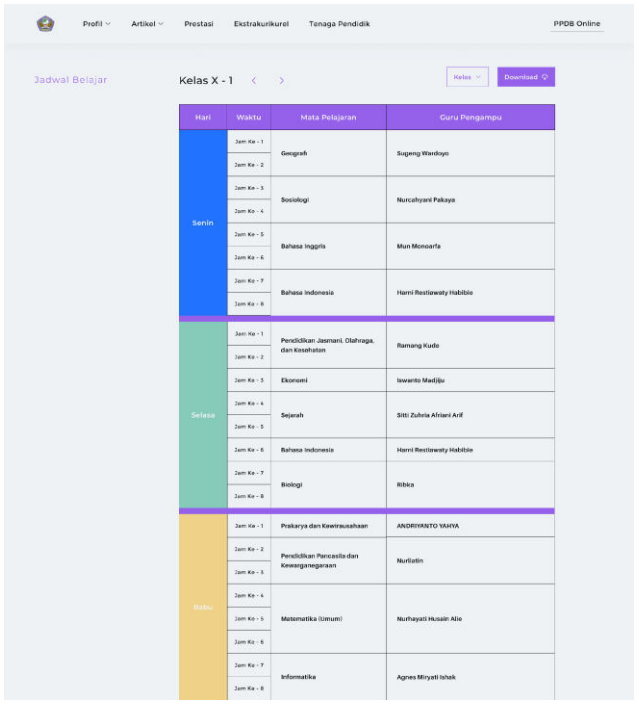


**Figure-6.** "Jadwal Belajar" page recommendation.

In Figure-6, the lesson schedule is divided by class and each schedule can be downloaded. In the schedule table section, information on the day, time, subject and name of the teacher is given.

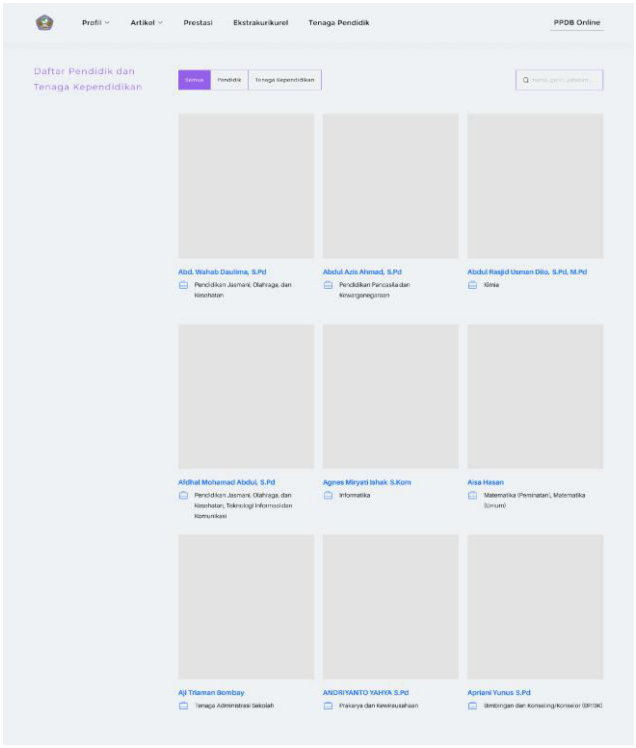


**Figure-7.** "Daftar Pendidik" page recommendation.

Figure-7 shows the "Daftar Pendidik" page that displays the list of teachers in SMA Negeri 3 Gorontalo. The sections on this page are divided into 3 namely "semua", "pendidik" in this case teachers, and "Tenaga Kependidikan" in this case are administrative staff.

The recommendation for "Berita" pages is shown in Figure-8. On the left side of the page there are several design components such as a search bar, news categorization by topic, and news categorization by year. On the right there is a list of news.

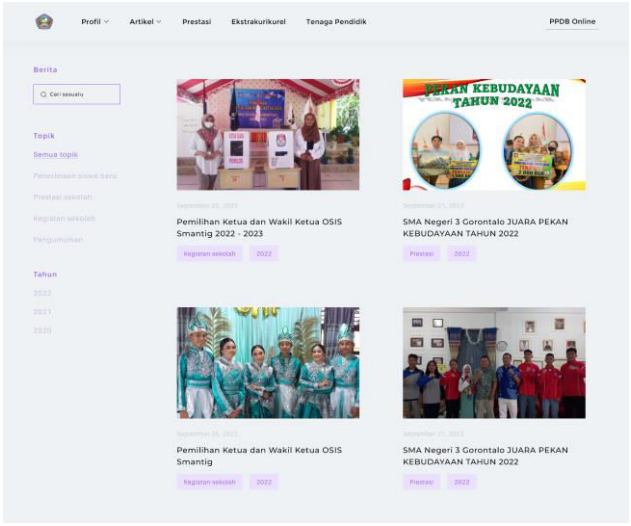


**Figure-8.** "Berita" page recommendation.

The Gallery page in Figure-9 is divided into two sections, namely the Photo Gallery and the Video Gallery.

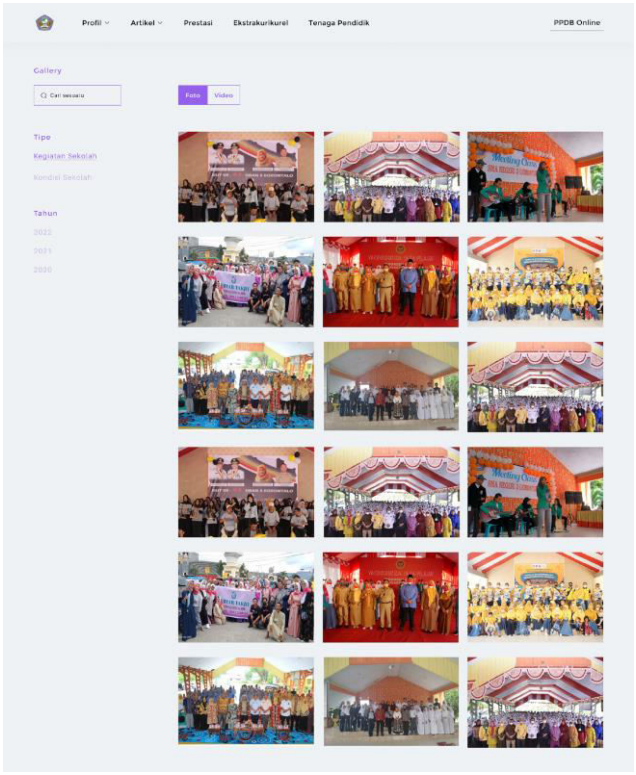


**Figure-9.** "Gallery" page recommendation.

### C. Run an Experiment

To ensure that the prototype results are feasible to be tested on users, it is necessary to carry out internal experiments first, in this study using heuristic evaluation. Testing is carried out by three evaluators where they are given a scenario that they will do, then each evaluator will fill out an assessment form for each heuristic evaluation principle. There are three evaluators, namely two evaluators are UI/UX designer and one evaluator is an experience designer and researcher. The test scenarios given to evaluators are still related to user needs and user persona at the assumption declaration stage. The test scenarios can be seen in Table-2.

**Table-2.** Testing scenario.

| No | Scenario |
|---|---|
| 1 | Positioning as a student looking for teacher information at school |
| 2 | Positioning as a student looking for extracurricular information |
| 3 | Positioning as teacher/student to download files of previous year's questions to study |

Testing is carried out by the evaluator by directly trying the prototype of the design recommendations that have been made. The results of the tests can be seen in Table-3 (E1 means evaluator 1 and so on).

**Table-3.** Evaluator test result.

| Aspect | Severity Rating | | |
|---|---|---|---|
| | E1 | E2 | E3 |
| Visibility of system status | 0 | 3 | 0 |
| Match between system and the real world | 0 | 1 | 0 |
| User control and freedom | 3 | 3 | 0 |
| Consistency and standards | 0 | 4 | 1 |
| Error prevention | 0 | 0 | 3 |
| Recognition rather than recall | 1 | 2 | 0 |
| Flexibility and efficiency of use. | 0 | 0 | 0 |
| Aesthetic and minimalist design | 2 | 2 | 0 |
| Help users recognize, diagnose, and recover from errors | 0 | 0 | 0 |
| Help and documentation | 0 | 0 | 0 |
| Average | 0,6 | 1,5 | 0,4 |
| Total Average | 0,83 | | |

From Table-3, it can be seen that the results of the evaluation carried out by the evaluator get an average value of 0.83. These results are included in the cosmetic problem, which means that the problem does not have to be fixed unless the project time is still available.

Table-4 is an input for improvements provided by the evaluator. The input becomes a reference for further improvement

**Table-4.** Feedback from the evaluators.

| No | Feedback |
|---|---|
| 1 | have to improve navigation bar |
| 2 | Adding Breadcrumbs to pages where the hierarchy is deep enough |
| 3 | Improved Spacing and Padding of each design element |
| 4 | Improvements to the menu of teachers and the list of teachers |
| 5 | Improvements to designs that are too plain |
| 6 | Extracurricular section changes |
| 7 | Added error page or 404 page |

**D. Feedback and Research**

The results of the design improvements from the evaluator's input were then carried out by usability testing on users. This usability test stage uses the single-ease question method to get feedback from users. There are eight respondents consisting of five students and three teachers. Each group has a different purpose of use, therefore two different test scenarios are made for each group. For the student group, the test scenario is to get information about the teacher, extracurricular activities, gallery, download lesson schedule, and download the previous year's exam questions. On the other hand, the teacher group will test the page for downloading lesson schedules, downloading previous year's exam questions, and news page.

The results of usability testing of the two test groups can be seen in Table-5 and Table-6. The average result of usability testing has reached a value of 6.58 which has passed the minimum limit that must be achieved, namely 5.5.

**Table-5.** Student group usability test results.

| No | Tasks | R1 | R2 | R3 | R4 | R5 |
|---|---|---|---|---|---|---|
| 1 | Access to teacher information | 6 | 6 | 6 | 7 | 6 |
| 2 | Access to extracurricular activities | 4 | 7 | 6 | 6 | 6 |
| 3 | Access to Gallery | 7 | 7 | 7 | 6 | 7 |
| 4 | downloading lesson schedule | 4 | 7 | 7 | 6 | 6 |
| 5 | downloading previous year's exam questions | 7 | 7 | 7 | 7 | 7 |
| | Average | 5,6 | 6,8 | 6,6 | 6,4 | 6,6 |

**Table-6.** Teacher group usability test results.

| No | Tasks | R1 | R2 | R3 |
|---|---|---|---|---|
| 1 | downloading lesson schedule | 7 | 7 | 7 |
| 2 | downloading previous year's exam questions | 7 | 6 | 7 |
| 3 | Access to news page | 7 | 7 | 7 |
| | Average | 7 | 6,67 | 7 |

There are several inputs from the user for further design improvements. Table-7 describes a list of improvements from user input.

**Table-7.** Improvements list from user feedback.

| No | List of improvements |
|---|---|
| 1 | Add extracurricular list |
| 2 | Add the question preview feature in the question bank |
| 3 | Add a school photo on the main page background |
| 4 | Improved class hours on the study schedule page |
| 5 | Increase the total views on the news page |

The results of improvements from user input are then carried out by a second usability test to validate the design improvements that have been made. The results of the second usability testing gcan be seen in Table-8 and Table-9. It can be seen from the results of the second stage of usability testing that there is an increase from the

previous stage. From Table-8 and Table-9 can be seen that the average result obtained was 6.97, which increased from the average result of the previous test, which was 6.58. By obtaining an average value of 6.97, the minimum value that must be achieved in usability testing with the single ease question method, namely 5.5, has been successfully exceeded.

**Table-8.** Student group usability testing validation.

| No | Tasks | R1 | R2 | R3 | R4 | R5 |
|---|---|---|---|---|---|---|
| 1 | Access to teacher information | 7 | 7 | 7 | 7 | 7 |
| 2 | Access to extracurricular activities | 7 | 7 | 7 | 7 | 7 |
| 3 | Access to Gallery | 7 | 7 | 7 | 7 | 7 |
| 4 | downloading lesson schedule | 7 | 6 | 7 | 7 | 7 |
| 5 | downloading previous year's exam questions | 7 | 7 | 7 | 7 | 7 |
| | Average | 7 | 6,8 | 7 | 7 | 7 |

**Table 9.** Teacher group usability testing validation.

| No | Tasks | R1 | R2 | R3 |
|---|---|---|---|---|
| 1 | downloading lesson schedule | 7 | 7 | 7 |
| 2 | downloading previous year's exam questions | 7 | 7 | 7 |
| 3 | Access to news page | 7 | 7 | 7 |
| | Average | 7 | 7 | 7 |

## CONCLUSIONS

This research resulted in a website prototype design for SMA Negeri 3 Gorontalo website, which has paid attention to the user interface and user experience. The prototype received input from professionals in the field of UI/UX and received an acceptable predicate when testing usability to users.

The results of the evaluation by the evaluator using the heuristic evaluation method and the assessment of severity ratings obtained an average value of 0.83. This average value is included in the cosmetic problem, which means that the problem does not have to be fixed unless the time to work on the project is still available.

The usability testing using the single ease question method, where this test method is carried out twice. The first test obtained an average result of 6.58 and the second test obtained an average value of 6.97. Both of these values are acceptable based on usability standards.

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