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The Innovation Breakthrough in Digital and Disruptive Era

Implementation of System Usability Scale in Islamic Cultural History Interactive Learning Media Application at Madrasah Ibtidaiyah Negeri Kumbe Merauke

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Abstract. The objective of this research is to create an interactive multimedia application for teaching Islamic Cultural History at Madrasah Ibtidaiyah Negeri Kumbe Merauke. This application aims to address the students' needs resulting from a lack of comprehension during the learning process. While traditional methods like printed books have been used, they fail to provide the varied and direct interaction required for effective learning. The development process follows the waterfall method, and data is collected through interviews, questionnaires, and observation. The system design employs flowchart design, use case diagram, sequence diagram, and activity diagram. For testing, both the Blackbox method and Usability scale are used. The results of the Blackbox testing demonstrate that the functionality and appearance of the Islamic Cultural History learning application are good and meet expectations. Additionally, the usability scale assessment yields a final score of 71.81, which falls within the Good category (grade scale C). Conclusively, the data suggests that the Islamic Cultural History learning application is acceptable and beneficial for enhancing the learning process for students.

Keyword: Multimedia Application, Islamic Cultural History, Blackbox Testing, System Usability Scale.

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1 Introduction

The development of information technology in the world develops from human discovery and creativity from time to time, developing in various fields of life that help human work in the field of education and daily work can be done using technological assistance or even able to replace human work, one of which is in the field of multimedia[1]. Increasingly developing in this digital era, technology users cannot escape the role of these media in displaying animation, both on television media, the big screen, to simple use. Including for teaching and learning activities in schools, multimedia technology has been widely applied[2]. The use of technology as media in the learning process is an effort to explore the potential of learning resources to make a positive contribution to learning[3].

The subject of Islamic cultural history (SKI) is a general subject in Madrasah Ibtidaiyah elementary school[4]. According to the preliminary study conducted, this subject is seen as only studying the past, especially in the learning process the teacher always dominantly uses the learning method by lecturing without any examples of pictures or videos, which makes students less able to clearly capture the material presented.

The subject of Islamic Cultural History has become an obligation for students in grades 3, 4, 5 and 6 of MIN Kumbé Merauke to study this subject in order to be a reflection to take lessons and also knowledge about the events of the Islamic history series led by the prophet Muhammad SAW. Many students do not understand the material presented, the assumption arises because teachers always use learning methods such as lectures in class without any other learning media. For this reason, one of the learning strategies is the use of learning media through multimedia applications[5] to update learning systems capable of containing and visualizing these subjects[6].

Based on the problems described above and from related research[7], [8] then a study was made that could make the learning application, with the subject of Islamic Culture History for learning at Madrasah Ibtidaiyah Negeri Kumbé Merauke in order to help students to better understand and provide information on knowledge of Islamic Culture History.

2 Methodology

In this part, we provide a description of various research methodologies, research designs, and the executed research phases :

2.1 System Analysis

The proposed system analysis has several advantages and differences from the current system. The advantages are that this learning system displays illustrations, audio, and video images that make the teaching and learning process more effective. This application also has a question feature that can be done

to train students' understanding. The difference is that this proposed learning system is an android-based learning application that can be used anywhere and anytime. The proposed system flowchart can be seen in the figure below :

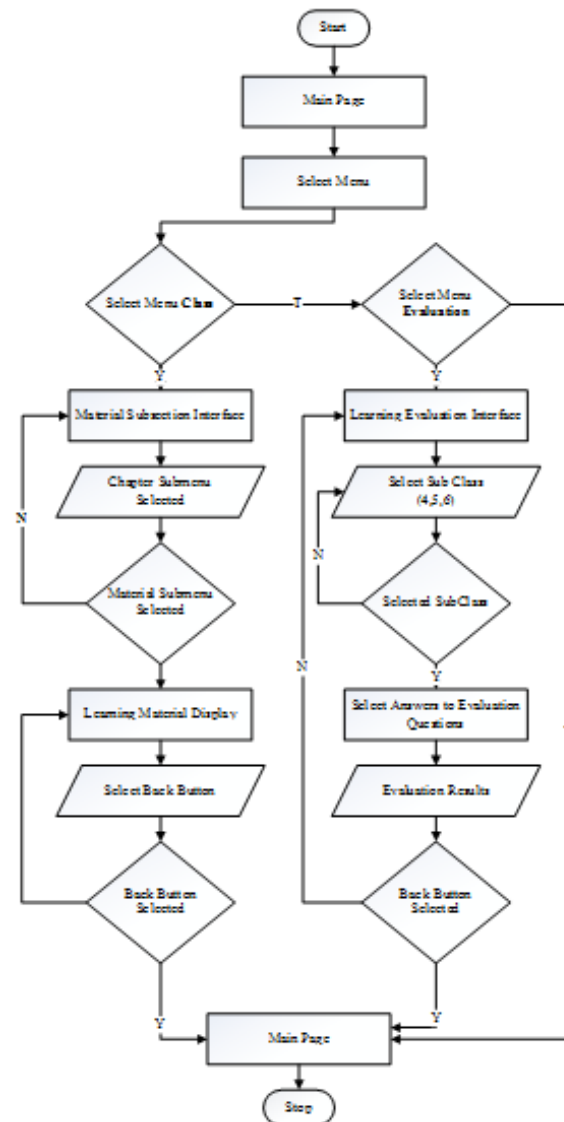


Fig. 1. Proposed System Flowchart

2.2 System Requirements Analysis

This system has several functional requirements as facilities provided to the system such as:

1. The system can display material in the form of text, and can be scrolled.
2. The system can display images, which are described in the material.
3. The system can display learning videos.
4. The system can display the music sound volume settings.
5. The system can present evaluations such as quizzes to users..

2.3 System Design

This stage is described using information system modeling with UML tools [9], namely Use Case Diagrams, Sequence Diagrams and Activity Diagrams which aim to facilitate program creation [10].

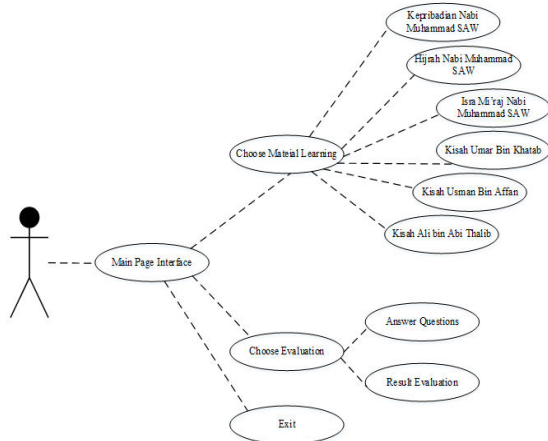


Fig. 2. Use Case Diagram System.

A sequence diagram serves the purpose of illustrating the interactions between objects within a use case. It accomplishes this by representing the lifespan of objects and the messages they exchange with each other. [11].

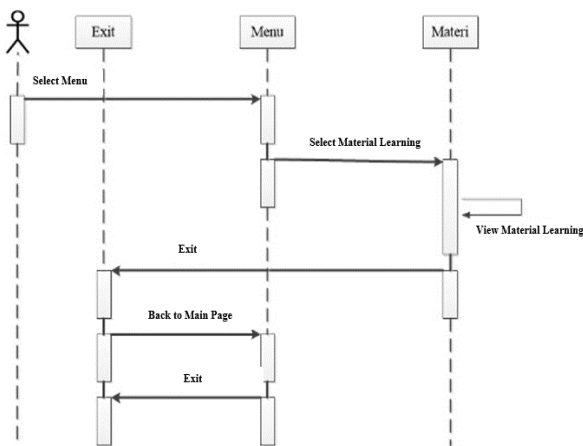


Fig. 3. Sequence Diagram System.

The user selects the menu that will be displayed on the menu page that has been selected according to the user's wishes. Users can interact with the selected menu page, there is an exit button if the user wants to exit the application display. Activity diagram as shown below:

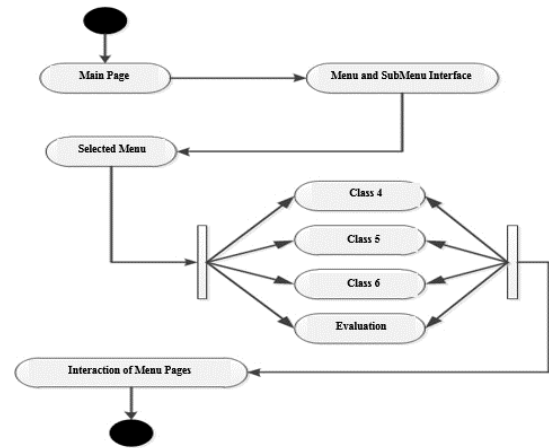


Fig. 4. Activity Diagram System.

3 Results and Discussion

The outcomes of this study yield an Android-based Interactive Multimedia Learning Application centered around Islamic Cultural History. This application is specifically crafted as a valuable resource for students at Madrasah Ibtidaiyah Negeri Kumbe Merauke, enhancing the overall teaching and learning experience..

3.1 Interface System

In the initial display, the title of the application will be displayed, the class button to select the class, the evaluation button to do the questions, the profile button to display the researcher's profile, the music button to turn off and turn on the music, and the exit button.



Fig. 5. Main Page Interface.

Next, on the display of the contents of this material will display the music button, back button, home button, and display material that can be read by students below, namely material about “Ketabahan Nabi Muhammad SAW Dan Para Sahabat Dalam Berdakwah”.



Fig. 6. Learning Material Interface.

In this animated video display, it will display animated videos that can be watched by students. When selecting one of the animated video menus, the application will display the video along with a narrative explanation of the video material.



Fig. 7. Learning Video Interface.

The evaluation display will display evaluation questions in the form of a list of questions that are appropriate from the material that has been given or studied previously according to the grade level of each selected student.

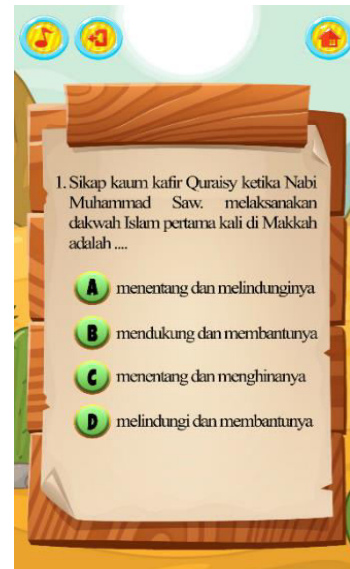


Fig. 8. Learning Evaluation Interface.

The results of this evaluation will display the final score of the evaluation that has been done by the students. In the evaluation process there will be a choice of answers given, correct or incorrect answers until the final score is obtained.



Fig. 9. Evaluation Result Interface.

3.2 Blackbox Testing

Blackbox testing aims to test the previously built learning application and ensure each function runs as expected [12]. Testing using the blackbox method focuses on the appearance and functionality or needs of android-based software[13]. The following is a table of blackbox test results:

Table 1. Result of Blackbox Testing

Scenario	Result	Description
The App can display the class menu	✓	The App navigation works and can display all menus

The App can display learning materials	✓	The App functions to display all learning materials
The App can display video menu	✓	The App functions to display the video menu to be selected
The App can present learning videos	✓	The App functions to play and present the selected learning video
The App can display learning evaluation questions	✓	The App functions to display a list of evaluation questions
The App can display correct and wrong answers	✓	The App functions to display the results of correct and incorrect answers
The App can display evaluation results	✓	The App functions to display learning evaluation results

3.3 System Usability Scale

System Usability Scale testing is carried out to measure the level of application usability[14] for this study. This test was conducted to 18 respondents by asking questions related to the system that has been created. The answers and weights given are SS (strongly agree: 5), S (Agree: 4), KS (disagree less: 3), TS (disagree: 2), STS (strongly disagree). The table below displays the list of questions, corresponding answers, and the number of respondents who provided each answer :

Table 2. List Of Questions And Number Respondents

No	Pertanyaan	SS	S	KS	TS	STS
Q1.	Is the material provided by this application easy to understand?	7	11	0	0	0
Q2.	Is the use of menus or application features difficult to use?	0	0	0	6	12
Q3.	Does this application suit your needs?	6	12	0	0	0
Q4.	Is the application difficult to learn?	0	0	0	9	9
Q5.	Is the application useful for users?	9	9	0	0	0
Q6.	Is the appearance of the application less interesting to use?	0	0	0	0	18
Q7.	Is the text displayed easy to read?	11	6	0	0	0
Q8.	Is the animation display in the application less interesting?	0	0	0	10	8

Total	33	38	0	25	47
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After conducting testing with a questionnaire involving 18 respondents, the SUS (System Usability Scale) score for each individual is determined. To calculate the overall average score, all the individual scores are added together and then divided by the number of respondents..

Table 2. Score Obtained From Respondents

No	Respondent	Respondents's Score							
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1	FA	4	1	5	1	5	1	5	1
2	BA	4	1	4	1	5	1	5	1
3	AB	5	1	4	2	4	1	5	2
4	NF	4	2	4	2	4	1	5	2
5	RF	4	2	4	2	5	1	5	1
6	RE	5	1	5	2	4	1	4	1
7	PF	5	1	5	1	5	1	4	1
8	NP	4	2	4	1	4	1	5	2
9	NH	4	1	4	1	5	1	5	2
10	RH	4	2	4	1	5	1	5	2
11	AI	5	1	5	1	5	1	5	2
12	AM	5	1	5	1	4	1	4	1
13	WD	4	1	4	2	5	1	4	1
14	VD	4	1	4	2	4	1	4	1
15	AS	5	2	5	2	4	1	4	2
16	FP	4	2	4	2	4	1	5	2
17	DW	5	1	4	2	4	1	4	2
18	JPD	5	1	4	1	5	1	5	2

The usability scale system involves a scoring method where for every odd-numbered question, the user's score for that question is reduced by 1. Conversely, for even-numbered questions, the final score is calculated as 5 minus the user's score for that question. Once the scores for all questions are determined, they are added together and then multiplied by 2.5.

Table 3. Answer and Score Weight

Calculated Score								Total	Value
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8		
3	4	4	4	4	4	4	4	31	77,50
3	4	3	4	4	4	4	4	30	75,00
4	4	3	3	3	4	4	3	28	70,00
3	3	3	3	3	4	4	3	26	65,00
3	3	3	3	4	4	4	4	28	70,00
4	4	4	3	3	4	4	4	30	75,00
4	4	4	4	4	4	3	4	31	77,50
3	3	3	4	3	4	3	3	26	65,00
3	4	3	4	4	4	4	3	29	72,50
3	3	3	4	4	4	4	3	28	70,00
4	4	4	4	4	4	4	3	31	77,50
4	4	4	4	3	4	3	4	30	75,00
3	4	3	3	4	4	3	4	28	70,00
3	4	3	4	3	4	3	4	28	70,00
4	3	4	4	3	4	3	3	28	70,00
3	3	3	4	3	4	4	3	27	67,50
4	4	3	4	3	4	3	3	28	70,00

4	4	3	4	4	4	4	3	30	75,00
Average Score (Final Result)									71,81

The results of testing the usability scale system on the Islamic Cultural History learning application get the average respondent has a value of 65 - 77.50. By calculating from the number of respondents as many as 18 people, the usability scale system value obtained is 71,81.

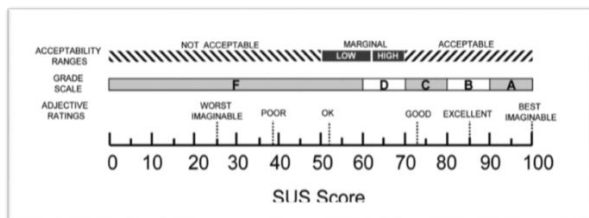


Fig. 10. Ukuran System Usability Scale.

The figure above indicates the scale of the system usability test[15], which involved obtaining a questionnaire score of 71,81. This score falls into the GOOD category with a grade scale C. Based on these usability results, it can be inferred that the Islamic Cultural History learning application is deemed acceptable and positively contributes to the student learning process.

4 Conclusion

The execution and outcomes of this research indicate that the Android-based application is functional and compatible with smartphones. This application primarily serves as an educational tool, aiming to enhance knowledge, especially regarding the teachings of Islamic Cultural History. The usability scale system testing was conducted to assess the applicability of the application, resulting in a usability score of 71.81, which falls within the good category (grade scale C). Consequently, the Islamic Cultural History learning application is considered a viable and acceptable learning medium for students.

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