Usability measurement of media interactive learning for primary school students

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Abstract. Currently interactive media is quite widely used to support learning activities in school. The advantage of using interactive learning media is the creation of SCL (Student Centered Learning) so it can to foster an attitude of independence and curiosity of students in order to more understand of a material. Therefore as a determinant of the successful use of interactive learning media, an appropriate system of testing is needed and in accordance with the desired objectives. The author test the Water Saving application with usability using a questionnaire. The result of this interactive learning media test have met the aspects of learnability, flexibility, attitude and affectiveness with the usability test result of 90% in student and 80% in teachers.

1. Introduction

The use of teaching aids as an alternative learning media has reached its momentum. Learning media as a companion learning books both in the form of pictures to interactive applications have now started to popularly used by educations practitioners. According to Nielsen, the analysis to measure the ease of users in accessing the application interface is to use usability measurements, where the application interface is said to be usable if it can perform functions efficiently and effectively and provide satisfaction for its users [1].

Figure 1. User interface water saving learning media.

The author will test the effectiveness of the usability of interactive learning media on Water Safing applications using questionnaires. This study aims to test the effectiveness, whether the interactive learning application of water saving material used by students in Al Muslim primary school is appropriate and in accordance with the expected goals. Water Saving learning media is an interactive learning application on Science subjects for primary school students. Water Saving Application used offline in school computer laboratory.

2. Research method

2.1. Usability

Usability is a condition where users are helped in obtaining ease of the function of a system effectively to achieve the expected goals. According to Jacob Nielsen on [2] mentioned that usability is a measure of the quality of user experience when interacting with a product or system whether software applications, mobile technology, websites, and other systems operated by users [2].

Usability aspect according to Nielson on Yacob can be measured based on the following components.

- Learnability, how users can complete the tasks encountered in the application interface
- Flexibility, how does the form of variation presented by the application for users to exchange information
- Effectiveness, support system that is presented in an application for users to achieve success
- Attitude, how the level of user satisfaction with the system encountered when using the applications.

2.2. Use Questionnaire

According to Jacob Nielsen on [3], usability is an attribute that explains and measures how easy the user interface is in an applications. Usability also refers to methods that can improve the ease of use of the application interface in the design process. Usability is measured by four criteria, there are satisfaction, learnability, memorability, and efficiency. Satisfaction is measuring the level of user satisfaction in using the application interface design. Learnability is measuring the level of ease of doing simple tasks when a user first uses the application interface. Memorability is to see how quickly the user can regain reliability in using the interface design when some time does not use the interface application. Efficiency is measuring speed & effectiveness in carrying out certain tasks in the application interface [4].

3. Result

The first step of the usability test is to give questionnaries to users after completing the Water Saving application trial. Respondents from this trial is 20 people include students and teacher. Data analysis uses a likert scale interval by calculating the presentation of the number of "No" and "Yes" selected by respondents in each statement. Each statement in the questionnaire has been classified according to aspects of usability. The learn ability aspect includes two questions to measure the level of user convenience in learning the application. Aspects of flexibility there are two questions to measure application flexibility. The effectiveness aspect includes two questions measure the effectiveness of the system. Attitude aspect aims to measure user satisfaction in using the water saving application.

Table 1. Average usability students test result.

Learnability	Flexibility	Effectiveness	Attitude
100	95	65	100

The low value of the score on Effectiveness aspect is because the student need help from the teacher when first using Water Saving application. Overall the percentage of usability level of the Water Saving application reaches a value of :

$$\text{Usability (\%)} = \frac{100 + 95 + 65 + 100}{4} \times 100\% = 90\%$$

Usability test result for teachers using different Likert scale intervals (1) Strongly Disagree, (2) Disagree, (3) Doubtful, (4) Agree, and (5) Strongly Agree.

Table 2. Average usability teachers test result.

Code	Observation Element	value
Question 1	Student can choose the button correctly to go to the next page	90
Question 2	Frequency of students to asking teachers is low	60
Question 3	Frequency of assistance and guidance from the teacher is low	60
Question 1	Students can choose the button correctly when heading to the topic materials 1,2, and 3	90
Question 2	Audio in application can help students in learning Water Saving	90
Question 3	Students can choose the button correctly when they want to study on the next topic	80
Question 4	Students can choose the button correctly when they want to evaluate Water Saving topics	90
Question 5	Students can choose the button correctly when they want to return to the previous page	90
Question 6	Frequency of students asking teachers is low	70
Question 7	Frequency of assistance and guidance from the teacher is low	70
Question 8	Student can close the application using the correct button	90
Question 1	Students can choose the button correctly when heading o the exercise page	90
Question 2	Students can follow instructions when reading and answering practice questions	90
Question 3	Students can choose the button correctly when they want to return to the previous page	90
Question 4	Frequency of students asking teachers is low	70
Question 5	Frequency of assistance and guidance from the teacher is low	70
Question 6	Students close the application using the correct button	90
Question 1	Students can choose the button correctly when going to the game page	100
Question 2	Students can follow instructions how to play from the application	100
Question 3	Students have no difficulty when playing puzzels	70
Question 4	Frequency of students asking teachers is low	70
Question 5	Frequency of assistance and guidance from the teacher is low	70
Question 6	Student close the application using the correct button	100

The result of the average calculation of each aspect of usability are obtained from the division of the sum of each aspect measured by statements. The mean calculation result are presented in table 2 with each aspect of usability, learnability 70%, attitude 84%, flexibility 83%, and effectiveness 85%. Overall the percentage of usability level of the Water Saving application reaches a value of :

$$\text{Usability (\%)} = \frac{70 + 84 + 83 + 85}{4} \times 100\% = 80\%$$

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4. Conclusions

This research was conducted to test the interactive learning media Savig Water at primary AL Muslim school. The average calculation result with students as respondents were learnability and attitude reach 100%, the aspect of flexibility reached 95%, while the lowest value on the aspect of effectiveness was 65%. Overall presentation on the usability level of the Water Saving application scored 90%. While the average calculation result with the teacher as respondent is 70% learnability, 84% attitude, 83% flexibility, and 85% effectiveness and the overall presentation of usability level of Water Saving application gets a value of 80%. This application should be able to using a simple icon or symbols on the user interface so it can improve user experience when using the application.

5. References

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