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Development of Android Applications as an Operating System Media for Learning Electronic Control Competencies in ClassXI students SMKN 2 Pengasih

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ABSTRACT

At this time the learning process by teachers rarely uses technology and learning media. Students have difficulty using learning media. The limitation of tools is an obstacle in accessing learning media. This research is a type of development research. The product development model adopts a software development model consisting of (1) software requirements analysis, (2) design, (3) code writing and (4) testing. Data collection techniques were carried out by observation, interviews and questionnaires. The testing phase is carried out with product validation by experts, testing on first users (teachers) and testing on end users (students). The data analysis technique used is descriptive analysis technique. The results of this study are: (1) the android application model for appropriate learning media on the competence of operating the electronic control system includes preparation, the subject matter of the operation of the electronic control system, and the evaluation model of choice questions; (2) test the functionality of the android application for appropriate learning media on the competence of operating an electronic control system including ease of navigation, application performance and ease of operation; (3) the feasibility of the android application for appropriate learning media on the competence of operating the electronic control system, based on the performance of the application it can run well. Based on the converted average assessment with a score range of 0-100, the score from media experts was obtained with a score of 83.33 in the "very feasible" category, the assessment by material experts with a score of 71.

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1. INTRODUCTION

The use of technology and media in learning can form a learning atmosphere in which students can actively participate. Learning media is a liaison between teachers and students, thanks to the media students are no longer limited by the boundaries of the classroom. Students can study in various places such as through the internet or their mobile phones. This is in accordance with what was conveyed by Sharon E. Smaldino and James D. Russell (2005:9).

The development of mobile device technology has become an alternative device that is cheaper than personal computers such as desktop computers or laptops. The existence of cheap devices can make it easier for students to access learning media. With these inexpensive devices,

students from lower middle class can buy these devices. The use of mobile learning in schools is still small. UNESCO's annual report states that the use of mobile phones in schools is still considered taboo. In schools, the use of cell phones is still prohibited, so if a student uses a cellphone, it will be confiscated (Chimbelu, 2014).

The advantages of mobile learning can be used to overcome the limitations of the PC. The advantages of mobile devices include being easy to carry, being able to connect to the network anytime and anywhere, more flexible in accessing learning resources, close communication, students can be involved and active (Woodill, 2010:24) Ease and low prices are the main advantages.

Developing mobile-based learning media can increase student interest in the learning process. Android application development is supported by Google. Google itself provides software for developing applications, namely the Android SDK (Software Development Kit). This android SDK supports android development using Eclipse and ADT software. Google also provides a complete tutorial for creating android applications. One of the most popular mobile OS is android. Android dominates the market by 76.3%, iOS 13.2%, Windows Home 3.7%, BB OS 2.9%, Linux 0.8, Symbian 0.2% and others 0.0%, the survey was taken in the quarter third 2013 (IDC, 2014). From these data, it can be seen that the Android operating system has the largest number of users. Android is also an open source operating system so it is relatively easy to develop applications. Competence to operate an electronic control system is a competency that must be supported by theoretical and practical abilities. The lack of learning media makes it difficult for students to understand the theory. Lack of understanding in theory also has an impact on practical ability because they still do not understand the theory. The development of learning media is expected to overcome these problems. To reduce costs and ease of use, the mobile loan model was chosen. Mobile learning based on the Android operating system is easier to create and use, therefore the development of this application uses the Android operating system. Competence to operate an electronic control system is a competency that must be supported by theoretical and practical abilities.

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2. METHOD

1. Research methods

   This research method uses the software research method by Pressman (2001:29) which consists of 4 types of activities, namely: Software requirements analysis, Design, Code generation and Testing. With additional support activities such as project tracking and control,

risk management, quality assurance, configuration management, technical review and others carried out throughout the whole process. The development model uses the Waterfall Model with processes ranging from Analysis to Testing that are carried out linearly. In this process, each main activity must be completed thoroughly before moving on to the next activity.

2. Data collection
   Data were collected through interviews. Interviews were conducted to communicate with users and stakeholders. Interviews are intended to get an idea of the needs that are used to determine the application to be made.
3. The data obtained through the collected questionnaires were then analyzed with quantitative statistics. The results of the questionnaire were analyzed using the following criteria (Mardapi, 2004:117).

Table 1.
Category Four Scale

Score	Interpretation
4	Very Worthy
3	Worthy
2	Not feasible
1	Very unworthy

The score obtained is converted into a value on a scale of 4 which is described in Table 2.

Table 2.
Rating Category

Score interval	Category
X > Mi+1,5(SDi)	Very Worthy
Mi < X < Mi + 1.5(SDi)	Worthy
Mi - 1.5(SDi) < X < Mi	Not feasible
X < Mi - 1.5(SDi)	Very unworthy

The ideal mean (Mi) and deviation deviation (SDi) were obtained using the formula as shown in figure 1.

Mi = 1⁄2 (highest score + lowest score)

SDi = 1⁄6 (highest score - lowest score)

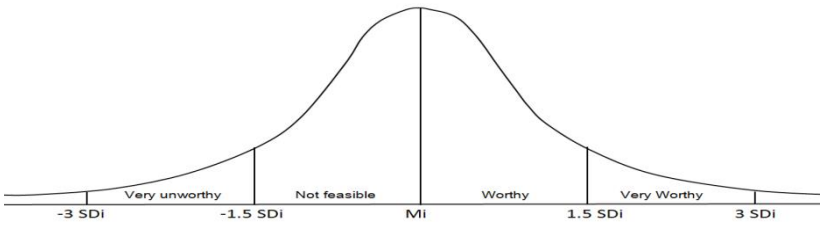

Figure 1. Normal Curve

The feasibility level assessment score in the table above will be used as a reference for test results by material experts, teachers and students. The score results obtained from the questionnaire will show the feasibility of the android application as a learning medium.

3. RESULTS AND DISCUSSIONS

Data analysis was carried out to analyze the data from product trials through validation tests, alpha tests and beta tests. Analysis of the data from the validation test results by experts aims to determine the feasibility of learning media applications according to media experts and material experts. Analysis of the alpha test results data aims to determine the response to the assessment by the first user (teacher). While the beta test results data aims to determine the response to the assessment by end users (students).

1. Data Validation Test Results Needs Analysis

   The data from the validation test results by media experts in the form of scores were converted into standard values with a score range of 0-100 (see Appendix 5). The assessment by media experts is assessed from 32 assessment indicators. The 32 points of the assessment consist of 15 points of aspects of the rules of learning media, 6 points of aspects of management and 11 points of aspects of CAI media. The following categories of assessments that have been converted into standard values can be seen in the table

Table 1.
Category Rating Scale 4 Media Experts

Score Interval	Category
75.00 < x 100.00	Very worth it
50.00 < x 75.00	Worthy
25.00 < x 50.00	Not feasible
0.00 < x 25.00	Very unworthy

   The data on the results of the media expert's assessment of the product based on the aspects of the rules of learning media, management and CAI media that have been converted can be seen in Table 13.

Table 2.
Media Expert Assessment Results Data

No	Validator	Learning media rules	Procedure	CAI media	Total score
1.	Media expert 1	57	24	43	124
2.	Media expert 2	46	18	36	100
Average score		51.50	21.00	39,50	112.00
Raw value conversion		81.11	83.33	86.36	83.33
Category		Very worth it	Very worth it	Very worth it	Very worth it

   From Table 13, it can be explained that the results of the assessment by media experts on the aspects of learning media rules obtained an average score of 51.50. With this score, it can be interpreted that the learning media application is very feasible to use. Judging from the management aspect, the average score is 21.00, with this score it can be interpreted that the application of learning media is very feasible to use. Judging from the CAI media aspect, an average score of 39.50 was obtained, with this score it can be interpreted that the application of the learning media is very feasible to use. Overall, the learning media application obtained a score of 112.00 with this score it can be interpreted that the learning media application is very feasible to use.

2. Data Validation Test Results from Material Experts

   Data from the validation test results by media experts in the form of scores were converted into standard values with a score range of 0-100 (see Appendix 5). Assessment by material experts is assessed from 24 assessment indicator items. The 24 points of the assessment consist of 8 points of aspects of the rules of learning media, 6 points of aspects of

management and 10 points of aspects of material relevance. The following assessment categories that have been converted into standard values can be seen in the following table:

Table 3.
Category Rating Scale 4 Material Expert

Score Interval	Category
75.00 < x 100.00	Very worth it
50.00 < x 75.00	Worthy
25.00 < x 50.00	Not feasible
0.00 < x 25.00	Very unworthy

The data on the results of the material expert's assessment of the product based on the aspects of the rules of learning media, management and relevance of the converted material can be seen in Table 16.

Table 4.
Material Expert Assessment Results Data

No	Validator	Media rules Learning	Governance	Material relevance	Total score
1.	Material expert 1	25	19	30	74
2.	Material expert 2	26	21	30	77
Average score		25,50	20.00	30.00	75,50
Raw value conversion		72.92	77.78	66.67	71.53
Category		Worthy	Very worth it	Worthy	Worthy

The data on the results of the teacher's assessment of the product based on the aspects of the rules of learning media, management, CAI media and the relevance of the converted material can be seen in Table 19.

Table 5.
Teacher Assessment Results Data

No	Respondent	Media rules learning	System like	Media CAI	Relevance Theory	Score total
1.	Teacher 1	41	20	20	33	114
2.	Teacher 2	42	22	18	35	117
3.	Teacher 3	44	19	15	30	108
Average score		42.33	20.33	17.67	32.67	113.00
Raw value conversion		84.25	79.62	84.44	75.56	80.81
Category		Very worth it	Veryworthy	Veryworthy	Veryworthy	Veryworthy

From Table 19, it can be explained that the results of the assessment by the teacher on the aspects of the rules of learning media obtained an average score of 42.33. With this score, it can be interpreted that the learning media application is feasible to use. Judging from the management aspect, the average score is 20.33, with this score it can be interpreted that the application of the learning media is very feasible to use. Judging from the CAI media aspect, an average score of 17.67 was obtained, with this score it can be interpreted that the application of the learning media is very feasible to use. Judging from the aspect of the relevance of the material obtained an average score of 32.67 with this score it can be interpreted that the application of learning media is very feasible to use. Overall learning media applications get a score of 113,

3. End User Test Results Data (Students)
   Beta test results data by students in the form of scores are converted into standard values with a score range of 0-100 (see Appendix 5). Assessment by students is assessed from 23

assessment indicator items. 23 The assessment points consist of 12 points of aspects of the rules of learning media, 5 points of aspects of CAI media and 6 items of material relevance aspects. The following categories of assessments that have been converted into standard values can be seen in the table

Table 6.
Rating Category 4 End User (Student) Scale

Score Interval	Category
75.00 < x 100.00	Very worth it
50.00 < x 75.00	Worthy
25.00 < x 50.00	Not feasible
0.00 < x 25.00	Very unworthy

Data on the results of student assessments of products based on aspects of learning media rules, CAI media and the relevance of the converted material can be seen in Table:

Table 7.
Student Assessment Results Data

No	Respondent	Media rules learning	Media CAI	Relevance Theory	Total score
1.	Student 1	46	18	24	88
2.	Student 2	42	15	18	75
3.	Student 3	37	15	18	70
4.	Student 4	43	18	18	79
5.	Student 5	39	16	18	73
6.	Student 6	45	19	24	88
7.	student 7	39	18	18	75
8.	student 8	40	17	20	77
9.	student 9	47	20	24	91
10.	student 10	37	14	18	69
11.	Student 11	37	17	18	72
12.	student 12	33	13	17	63
13.	student 13	42	17	18	77
14.	Student 14	41	18	18	77
15.	student 15	40	17	18	75
16.	16 student	47	20	24	91
17.	17 student	37	15	18	70
18.	18 student	36	14	18	68
19.	19 student	39	14	18	71
20.	student 20	37	14	18	69
Average score		40,20	16.45	19.25	75,90
Raw value conversion		78.33	76.33	73.61	76.67
Category		Very worth it	Very worth it	Worthy	Very worth it

From Table 22, it can be explained that the results of the assessment by students on the aspects of the rules of learning media obtained an average score of 40.20. With this score, it can be interpreted that the learning media application is feasible to use. Judging from the CAI media aspect, an average score of 16.45 was obtained, with this score it can be interpreted that the application of the learning media is very feasible to use. Judging from the aspect of the relevance of the material obtained an average score of 19.25 with this score it can be interpreted that the application of learning media is feasible to use. Overall, the learning media application obtained a score of 75.90 with this score it can be interpreted that the learning media application is very feasible to use.

The data in Table 22 is then compiled into a frequency distribution table as shown in Table

Table 8.
Frequency Distribution of End User Test Results

Category	Score	Frequency	Percentage (%)
Very worth it	75.00 < x 100.00	11	55
Worthy	50.00 < x 75.00	9	45
Not feasible	25.00 < x 50.00	0	0
Very unworthy	0.00 < x 25.00	0	0
Amount		20	100

From Table 23 it can be seen that 55% of students in the beta test stated that the application of learning media was in the "very feasible" category as learning media. while 45% of students stated that the application of learning media was in the "appropriate" category to be used as learning media. There were no students who stated that the application of learning media was "inappropriate" or "very inappropriate" to use. With these results it can be interpreted that the application of learning media is very feasible to use.

4. CONCLUSION

Based on the research that has been done, it is known that 55% of students in the beta test stated that the application of learning media was in the "very feasible" category as learning media. while 45% of students stated that the application of learning media was in the "right" category to be used as learning media. There were no students who stated that the application of learning media was "inappropriate" or "very inappropriate" for use. These results are in accordance with the research conducted (Purbasari, 2013) which also concluded that the android application is feasible to be used as a learning medium.

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