

Development of android learning media for lubrication system competency in the concentration of light vehicle engineering skills at ma'arif nu 1 ajibarang vocational high school

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Abstract

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This research aims to develop Android learning media on lubrication system competency. The purpose of this research is to create appropriate learning applications according to experts, determine the effectiveness and efficiency of the media, and determine the response of teachers and students to the media created. This research used the ADDIE development model. This research used a pre-experimental design in the form of a one group pretest-posttest design which was carried out at the Concentration of Light Vehicle Engineering Expertise at SMK Ma'arif NU 1 Ajibarang. The research results showed that Android learning media received a score from media experts of 85.16% in very worthy category and material experts received a score of 88.97% in very worthy category. There is significant differences between the result of pretest and posttest in experiment class (sig. 2-tailed 0,000 < 0,05) and also in control class (sig. 2-tailed 0,000 < 0,05). Android media can improve student learning outcomes in experimental classes with an average percentage increase of 62.15% in quite effective category. Meanwhile, the control class that did not use Android media obtained an average percentage increase of 25.62% in the Ineffective category. There was no time efficiency in this research. The media received a teacher response of 95.45% in very good category and a student response of 77.41% in the "Good" category.



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1. INTRODUCTION

Science and Technology is developing very quickly in various sectors, especially in the industrial sector. In the future, competition in the industrial world will be increasingly competitive and unpredictable. To face that competition, human resources must be improved. Every citizen must improve their

skills if they want to compete in industrial world (Nabila et al., 2023).

High quality human resources were people who can adapt to any existing development (Mardhiyah et al., 2021). Educational institutions have a big role in improving human resources quality. Vocational High School is one of the formal educational

institutions to create skilled graduates who can compete in the industrial world (Kemendikbud, 2018).

However, according to the Central Bureau of Statistics the highest contributor to the unemployment rate comes from vocational school graduates (Badan Pusat Statistik, 2024). This is contrast to the vocational high school purpose which should create graduates who can compete in industrial world actually the highest unemployment rate countributor. According Fitriyanti & Chusairi (2022: 2) the main reason is there is a mismatch between vocational high school graduates competencies and industrial world needs.

The quality of graduates is influenced by the quality of learning at school (Gemnafle & Batlolona, 2021). The use of learning media is expected to improve the quality of learning (Heryani et al., 2022). Learning media can help both sides (teacher and students) to carry out learning in class (Iskandar et al., 2023).

The author's observations at Ma'arif NU 1 Ajibarang Vocational High School found that there is no specific lubrication system learning media. Sometimes, teacher use Powerpoint presentation to displays learning topics. But usually using conventional learning methods. It can make class atmosphere feels boring.

The masive android users in class can be used to carry out the different way to learning. For example, using android learning media. According Novaliendry et al., (2021) the advantage of android learning media is can be used in wide area. The is no time or space limit, making learning more exciting (Yulianto et al., 2025).

The purpose of this research is to create appropriate android learning applications according to experts, determine the effectiveness and efficiency of the media, and determine the response of teachers and students to the media created.

2. RESEARCH METHODS

This study used ADDIE model that has five steps development methods, including the step of analyze, design, development,

implementation, and evaluation (Musyono et al., 2024). According to Branch (2009), ADDIE models can be used to guiding framework for complex situations. This model are straightforward the fundamental stages of developing learning media.

The android learning media is tested for suitability by media and material experts. The test contains with 4 rating scale that have gradation from very positive to very negative. The media expert's test is viewed from the aspects of (1) graphics; (2) language; and (3) presentation, then the material expert's test is viewed from aspects of (1) appropriateness of content; (2) language; (3) serving; and (4) graphics (Departemen Pendidikan Nasional, 2008; Faza et al., 2024). The test result calculate the feasibility percentage by using the folowing formula:

$$\text{Result: } \frac{\text{Score Obtained}}{\text{Maksimum Score}} \times 100\%$$

The conclusion are based on the category of Riduwan which is quoted in Saski & Tri (2021).

Table 1. Eligibility Criteria

Presentage	Category
0% - 20%	Very Not Worthy
21% - 40%	Not Worthy
41% - 60%	Quite Worthy
61% - 80%	Worthy
81% - 100%	Very Worthy

The implementation of android learning media in field test used pre-experimental design, and the experimental model used was one group pretest posttest design on two class (Cohen et al., 2018; Iskandar, 2019).

Table 2. One Group Pretest Posttest Design

Pretest	Treatment	Posttest
O ₁	X	O ₂
O ₃	-	O ₄

Information:

O₁ = Pretest Experiment Class

O₂ = Posttest Experiment Class

O₃ = Pretest Control Class

O₄ = Posttest Control Class

X = Treatment

Students in experiment class learning using android media, meanwhile student in control class using conventional methods. Students in class XI TKR D at Ma'arif NU 1 Ajibarang served as experiment class subjek and students in class XI TKR A at Ma'arif NU 1 Ajibarang served as control class subjek. Data from pretest and posttest experiment and control class are used to determine effectiveness learning media using N-Gain. The time used in both class compared to determine the time efficiency (Sukarelawan et al., 2024)

Table 3. Effectiveness Criteria

Percentage	Interpretation
<40%	Not Effective
40% - 55%	Less Effective
56% - 75%	Quite Effective
>75%	Effective

The assesment responses for users (teachers and students) contains 4 rating scale that have gradation from very positive to very negative. The assesment for teachers responsess is viewed from (1) eligibility of content; (2) language; and (3) presentation, then the assesment for students responsess is viewed from (1) graphics; and (2) presentation (Departemen Pendidikan Nasional, 2008; Khoiruddin & Iskandar, 2024). To calculate the responsess from user is using this formula:

$$\text{Result: } \frac{\text{Score Obtained}}{\text{Maksimum Score}} \times 100\%$$

The conclusion are based on the category of Arikunto which is quoted in Choiroh et al., (2023).

Table 4. Responses Criteria

Presentage	Category
0% - 20%	Very Not Good
21% - 40%	Not Good
41% - 60%	Pretty Good
61% - 80%	Good
81% - 100%	Very Good

3. RESULTS AND DISCUSSION

This study used Powerpoint 2013 integrated with iSpring Suite 10 to create

instructional material for this lubrication system android learning media. Then, using Web2Apk Builder to build android application system. The application that has been developed has five main menus: understanding the concept, system component, how system working, maintenance, and evaluation quiz. After building the apps, author's carried out the apps into feasibility test on media and material expert.

Table 5. Result of Media Experts Test

No.	Media Experts	Score
1.	Febrian Arif Budiman, S.Pd., M.Pd.	59
2.	Angga Septiyanto, S.Pd., MT.	50
Obtained Score		109
Maximum Score		128
Result:		
$\frac{109}{128} \times 100\% = 85,16\%$		

Table 6. Result of Material Expert Test

No.	Material Experts	Score
1.	Dr. M. Burhan Rubai Wijaya, M.Pd.	55
2.	Sugiro, ST.	66
Obtained Score		121
Maximum Score		136
Result:		
$\frac{121}{136} \times 100\% = 88.97\%$		

Based on the experts test on table 5 and table 6, the media can be concluded that it is very worthy to use. Before using the apps in field test, author's made revisions according to the expert advice. This is the apps display after receiving expert advice.



Figure 1. Display of the Opening Apps

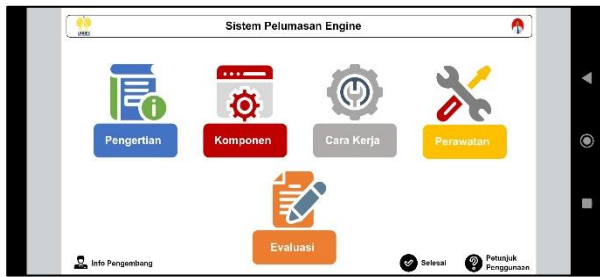


Figure 2. Display of the Main Menu



Figure 3. Display of the Materials Content



Figure 4. Display of the Materials Content



Figure 5. Display of the Menu Shortcut



Figure 6. Display of the Evaluation Quiz

Before carrying out the field test, the author first carried out a validity and reliability test for test instrument. The test instrument consist of 20 multiple choice and 10 description questions. The test instrument was tested on 25

students from XII TKR C Ma'arif NU 1 Ajibarang Vocational High School. The result is there is 15 valid multiple choice question, reliability test with KR-21 obtained reliability coefficient 0,700. For the description questions, there is 8 valid questions, the questions to be used is 5 question with indicators represented. Reliability test with cronbach's alpha for 5 description questions obtained reliability coefficient 0.698. Both for multiple choice and description question obtained reliability coefficient more than 0,05 so it can be used for assessing the students learning outcomes (Khumaedi, 2012).

The average score of the pretest and posttest for 30 students in class XI TKR D (experiment class) and 30 students in class XI TKR A (control class) are displayed on Figure 7. Average pretest score for experiment class is 54.1 and control class is 54.9. For the posttest, experiment class got an average score 82.1 and control class got 66.9.

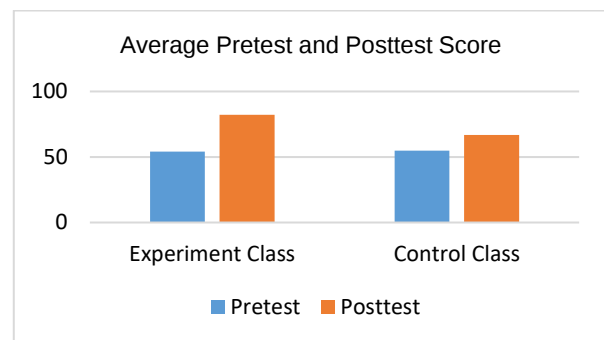


Figure 7. Average Pretest and Posttest Score

The result of the normality test using SPSS with Shapiro Wilk significance obtained (1) pretest eksperiment class: 0.398; (2) posttest experiment class: 0.068; (3) pretest control class: 0.799; and (4) posttest control class: 0.079. All of them is more than 0.05 so it can be concluded all data is normal (Sukarelawa et al., 2024).

Table 7. Normality Test

Class	Sig. SW	Accepted	Conclusion
Pre Ex	0.398	>0.05	Normal
Post Ex	0.068		Normal
Pre Ctrl	0.799		Normal
Post Ctrl	0.079		Normal

The result of paired sample t-test on experiment class and control class using SPSS

obtained sig. 2 tailed 0,000. The result is less than 0,05 so it can be concluded that there is significant difference between the result of posttest experiment class and control class (Sukarelawa et al., 2024: 18).

Table 8. Paired Sample T-test

Experiment Class		
Sig.2 tailed	Accepted	Conclusion
0,000	< 0,05	Significant
Control Class		
Sig.2 tailed	Accepted	Conclusion
0,000	< 0,05	Significant

Both class get significant difference between the result of pretest and posttest. Researcher using N-gain to determine learning effectiveness between experiment class and controll class. N-Gain used to find out the increasing score from both class.

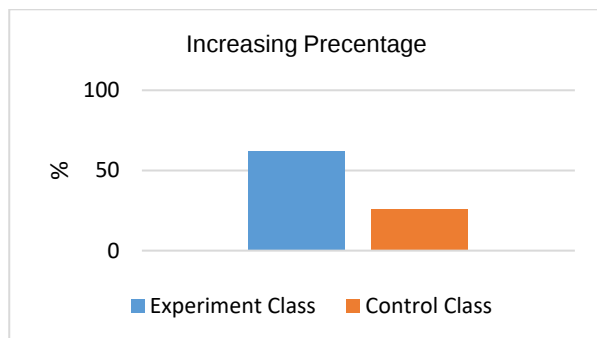


Figure 8. Increasing Percentage

According from figure 8, experiment class obtained n-gain percentage score 62.15% with "Quite Effective" category and control class obtained 25.62% with "Ineffective" category. From that we can conclude that android learning media is more effective to increasing learning outcome in lubrication system topics.

Both class use 2x8 lesson time (1 lesson time = 45 minutes). The author has a target to finishing the topics in the experiment class in 1x8 lesson time, but the process of installing application took longer than expected. The author must finishing the topics in the second meeting. So there is no time efficiency using this android learning media.

The author takes user responses about the android learning media from teachers and 30 students who already used the learning media.

Table 9. Teachers Responses

No.	Teachers	Score
1.	Malikhatun, S.T	42
2.	Rohid Sofiyanto, S.T	42
Obtained Score		84
Maximum Score		88
Result:		
$\frac{84}{88} \times 100\% = 95,45\%$		

Table 10. Students Responses

Obtained Score	836
Maximum Score	1080
Result:	
$\frac{836}{1080} \times 100\% = 77.41\%$	

From the table 10 and 11, teachers responses obtained score 95.45% with "Very Good" category and students responses obtained score 77.41% with "Good" category. From that we can concluded that the android learning media got a postive responses from users. The success of this media development is in line with the fact that Android learning media can be packaged in an interesting and interactive way, such as through videos and images, thus making learning more enjoyable and easier to understand (Malik et al., 2024; Septiyanto et al., 2024).

4. CONCLUSION

The research results show that android learning media of lubrication system received a score from media experts of 85.16% in the "Very Worthy" category and material experts received a score of 88.97% in the "Very Worthy" category. There is significant differences between the result of pretest and posttest on experiment class and control class (sig. 2-tailed 0,000 < 0,05). Android media can improve student learning outcomes in experimental classes with an average percentage increase of 62.15% in the "Quite Effective" category. Meanwhile, the control class that did not use Android media

obtained an average percentage increase of 25.62% in the "Ineffective" category. There is no time efficiency in this research. The media received a teacher response of 95.45% in the "Very Good" category and a student response of 77.41% in the "Good" category.

5. DECLARATION/STATEMENT

5.1. Acknowledgment

We would like to thanks to all parties who helped or provided information about development android learning media for lubrication system materials.

5.2. Author Contribution

Akbar Surya Pradana contributed to do the research. Bunyamin contributed as supervisor. Adhetya Kurniawan and Ahmad Mustamil Khoiron contributed as advisor.

5.3. Conflict of Interest

Authors declare no conflict of interest.

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