Developing Adobe Flash Media with Android-Based to Improve Students' Learning Outcome in Anti-Lock Brake System

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Article Info	Abstract
	The development of technology in education helped to increase learning quality. Existing developments required the world of education to adapt. Students' characterization in the XXI century was a generation that was closed to digitalization, so the teacher had to understand that learning media at school must carry out advanced technology. Specifically, the research purpose was: to develop media with adobe flash, to dig up the feasibility of learning media in the competency of an anti-lock brake system, and to know the improvement of learning outcomes in an anti-lock brake system. This research applied the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The data analysis consisted of determining the feasibility of learning media and deciding the media effectiveness. The feasibility test showed that the media was very feasible. The developed media was tested by N-Gain and got the effectivity until 76%, or it can be declared effective since t-count 18.13<t-table, and Ha was accepted while H0 was refused. It can be concluded that adobe flash media with android-based can improve students' learning outcomes, especially in the Anti-Lock Brake Sistem at XII TKRO 1.

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INTRODUCTION

Education was leadership given intentionally by adults to children in terms of physical and spiritual growth so that they were useful for themselves and society. Education was the maturation process of students, so, they can develop their talents, potential, and skills in life. Therefore, education should be designed to provide the understanding and improve student learning achievements. According to the Ministry of National Education Law number 20 of 2003, education was a conscious and planned effort to create a learning atmosphere and learning process, so that the students can actively develop their potential to have spiritual strength, self-control, personality, intelligence, good character, and the skills that needed by them, society, and nation.

Education developed along with the progress of the times, such as the changing of educators' mindset from a rigid mindset to a modern one. The success of education depended on society. Unfortunately, some problems were faced, such as the low quality of education. It can be seen from the achievement of students' learning outcomes that were still low. The quality decreased in all education levels starting from elementary, junior high school, senior high school, and university.

Vocational high school (SMK) became the priority of the government to create graduates that are ready to work. SMK was an educational institution that gave students the skill to survive in the work environment. However, the knowledge was also given to prepare if the students wanted to study at the college level. One of the indicators to measure the successful school institution in creating qualified individuals was high learning outcome.

SMKN 1 Singghan was one of the vocational high schools, located in Tuban and had 9 major competencies, and Automotive Light Engineering Technique was the favorite major. During the teaching and learning process, some obstacles caused student learning outcomes tended to be low. Based on the observation result on 2 – 16 June 2021, 36 students of XII TKR 1 in the Maintenance of Light Vehicle Chassis in Applying Anti-Lock Braking System (ABS) was 78.92 with minimum scoring standard (KKM) was 83.

The low learning outcomes in the subject of Light Vehicle Chassis Maintenance in Applying ABS were caused by several things. It included the learning approach applied by the teacher (teachers centered), and there was no real object learning media. Commonly, the teacher used PowerPoint linked to the ABS brake. Unfortunately, this media was difficult to understand the materials. Blended learning was applied in the pandemic situation and influenced students' learning outcomes. The students used mobile phones in blended learning, WhatsApp and google classroom were also used to communicate between students and teachers, while the materials were given in PDF format. On average, the students have an android with the lowest specification was 5.0 lollipop of android version, and the highest was 7.0+ Naugat.

The using of learning media has many benefits, such as being easy to access every time and everywhere, and learning activities can be carried out face-to-face between students and teachers. It made the learning process more effective and efficient without decreasing the learning hours' intensity. This android-based learning media can be created and developed to make interesting media so that students more easily understand the subject. Arsana & Agysta (2016: 72-79) explained that the attractive learning media facilitated and made the materials easier to be understood by the students.

The researcher developed Adobe Flash as a learning media. The strength of Adio Visual Adobe Flash was more animation variety and provided media file formats such as interactive learning media with flash-based. Also, it made attractive animation that can move and interact with the users. Audio Visual Adobe Flash was one of the superior software from the Adobe system. Setiawan (2021) elaborated that Audio Visual Adobe Flash was used to create a picture (vector) or animation. The file result from this software was a .swf type of file extension that can be played on the web with Audio Visual Adobe Flash Player.

The research about Audio Visual Adobe Flash had been done by other researchers. Windiartha (2017) stated that a product formed interactive learning media based Audio Visual Adobe Flash player was effectively to be adopted in the learning process. Hidayah *et al.* (2017) elaborated that the implementation of interactive media-based Audio Visual Adobe Flash can increase students' motivation. This media was implemented in the use of internet/ intranet competency to gain information. Furthermore, it was declared very feasible as a learning media.

Based on the problems above, learning media with android-based was needed in the learning process especially in the competency of the Anti-Lock Brake System at SMKN 1 Singgahan. The development of learning media using Android-based was expected to make students comfortable while learning, create a practical learning atmosphere, fun and easy to understand so that it can improve student learning outcomes.

METHOD

The research method used in this study was research and development (R&D). Development research was a research approach used to produce certain products and to test their effectiveness of these products (Sugiyono, 2016). The research and development model functioned to help in creating a new product. This product (media) was used as students learning guidance in using the Adobe Flash application of the Anti-Lock Brake System.

The research design was adapted from the ADDIE model that consisted of five steps; *Analysis, Design, Development, Implementation, and Evaluation* (Alodwan,2018:43.). The research on education development covered the development process, product validation, product try-out, and evaluation. In other words, ADDIE was class oriented development model. The media development stages with ADDIE model can be seen in picture 1.
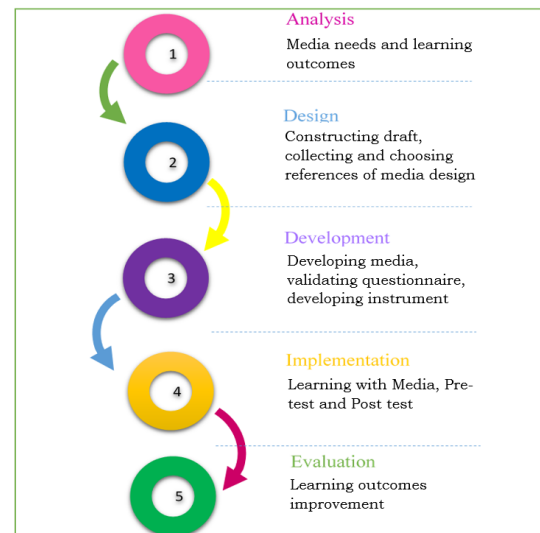

Figure 1. Media Development Procedure of ADDIE Model

RESULTS AND DISCUSSION
A. Research Result
1. Analysis Result

The initial stage of the study was analysis. In this stage, media need analysis was done through observation. The observation aimed to know the learning media that was needed in the learning process of the anti-lock brake system subject. The problems were found during the observation, such as (1) the teacher used learning media that was less interesting to attract students' attention. (2) Learning media could not facilitate students to understand the materials and was not communicative. (3) The students needed learning media that provided features to create a learning independency atmosphere, (4) and the students needed a learning media that was more practical. (5) The subject of research needed a Learning media that can increase students' outcomes. In other words, the subject of *the Anti-lock brake the system* needed digital learning media to increase students' outcomes.

Based on students' characteristics, learning media was needed to solve the existence problem and stimulate students' confidence in the Anti-Lock Brake System subject used Adobe Flash to increase students' outcomes. Because of that, the researcher chose this topic to solve the problems.
2. Designing

The second stage of the ADDIE model was the designing stage. This stage aimed to make it

easy for the researcher to design a structured media. The design stage included the criteria for compiling a media framework, collecting and selecting references, media design, and preparing media response instruments.

a) Arrangement of Media Systematics

The media framework for the Adobe Flash application was compiled based on the media preparation guidelines from the BPMK of the Ministry of Education and Culture. The developed media consisted of systematically arranged learning activities. The initial section consisted of covered, core competencies and basic competencies, learning materials, and learning videos. The contents section contained Android-based Adobe Flash application media, and the last sections provided exercises and learning evaluation.

b) Designing Media

Media design arrangement included beginning, content, and end. The following was a display of the initial design of the Android-based Adobe Flash media:
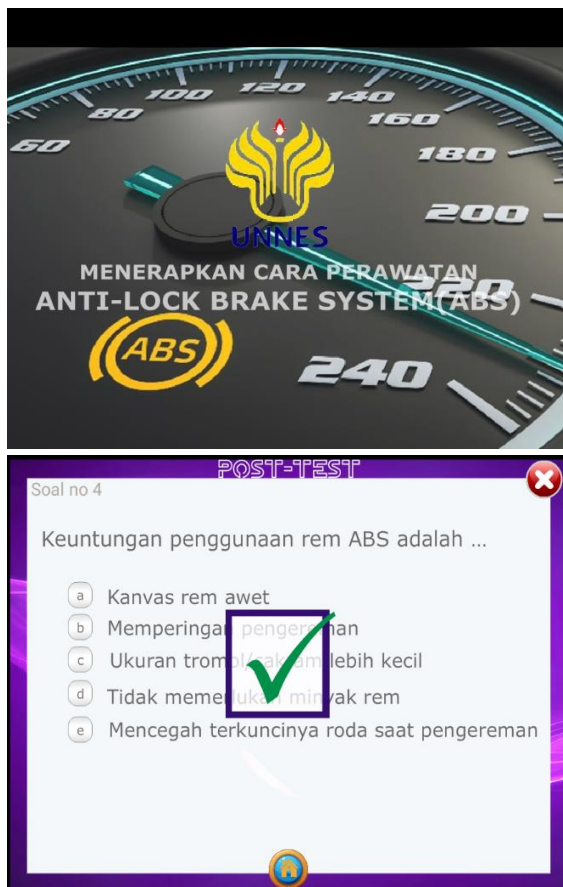

Figure 2. Designing Media

3. Development

This stage aimed to see the feasibility of the android-based adobe Flash learning media that has been designed. As a follow-up some steps were conducted:
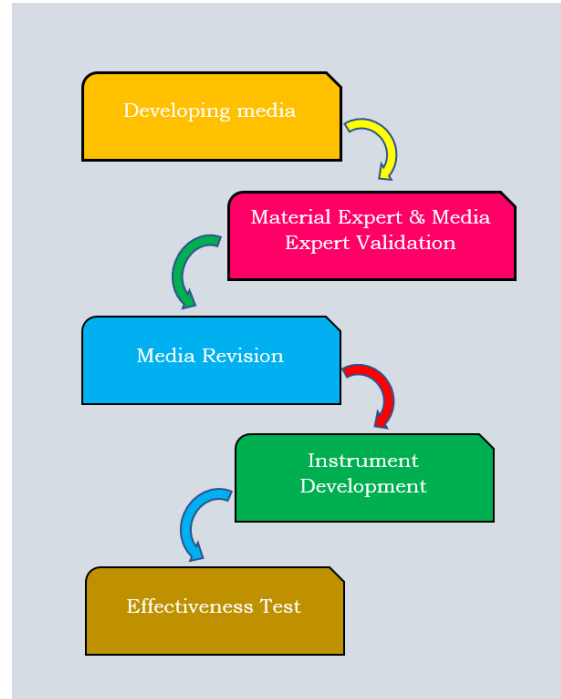

Figure 3. Media Development

4. Implementation

The implementation stage can be carried out if the expert test result (feasibility test) was done by users by filling the feasibility criteria. Implementation meant applying the media application of Android- Based Adobe Flash in the learning process of the Anti-Lock Brake System. The participant consisted of 36 students. A treatment of android-based adobe flash was given to the participants. The questionnaire response from the students became a consideration to test media effectiveness. In this implementation, some instruments were conducted to test media effectiveness and feasibility. The result can be seen as follow:

a) Media and Material Feasibility Test

This media feasibility test referred to the research by Karend (2020), and it was obtained by filling out a media expert validation questionnaire from experts at the Center for Education and Culture Multimedia Development (BPMPK) and Surabaya State University. Based on the gained

data, media expert 1 gave a 4,18 average score or it declared as very feasible. Furthermore, the second expert gave a 4,81 average score with very feasible categories. The average score of the two media experts was 4,49, and it included a very decent category. In conclusion, based on the BPMK media expert's result the Android-based Adobe Flash application media was a very feasible category.

According to the feasibility test result of the material expert, the material that purposes by the researcher gained 4,09, or it can be stated as very feasible categories. This result showed that the media was relevant and feasible as anti-lock brake system media for vocational students in light vehicle Engineering.

b) Students' learning outcomes

Paired sample t-test was applied to gain a significant difference score in the post-test. Based on the significant (sig) score, the calculation achieved 0,00<0,05, or it can be concluded that there was a difference between students' learning outcomes in the initial test and after the treatment. The t-count achieved 18,13 with t-table (df= 35; = 5%) gaining 2,043. Since T-count was less than the T-table, it can be concluded that android-based adobe flash can improve students' learning outcomes.

The n-Gain score showed that the average N-Gain score gained 76,47. The minimum score achieved 39,13%, and the maximum score was 94,44%. Based on the data, it can be depicted that the average score of N-Gain score got 76,47% or it can be stated as the developed media can improve students' learning outcomes.

5. Evaluation

The following step in R&D research was the evaluation stage. In this stage, a remedial system was conducted to get a better result by analyzing the gained data. There were two stages, formative evaluation and summative evaluation (Selegi, 2017). Formative evaluation in this research meant feasibility test and summative evaluation, it related to the effectivity test of media (Selegi, 2017). A formative evaluation was correlated to the effectivity test of media feasibility and summative evaluation (Fitriyanto, 2019). In the evaluation stage, the data were analyzed to dig up the weakness of the media.

The result of the evaluation data was questionnaire feedback and advice from the respondents after four stages of the ADDIE model were applied. The evaluation was meant as an effective test of Android Based Adobe Flash in an Anti-lock brake system. When there was no revision, the media can be stated as very feasible to use. The effectiveness was analyzed by using a t-test with a significant score of 0,00 < 0.5, and N-Gain got 76.

B. Discussion

This research aimed to develop an android-based adobe flash media to improve students' learning outcomes in the subject of the anti-lock brake system. The current study included research & development (R&D) with the ADDIE approach that was developed by Dick and Carry (2005). The approach consisted of Analysis, Design, Development, Implementation, dan evaluation. The strength of ADDIE was an evaluation at each stage, it aimed to minimize the level of errors or product deficiencies in the final stage (Tegeh, 2014).

The first stage was the need for analyses of media through observation. After the data had been analyzed, the second stage was the designing process which consisted of compiling a media framework, collecting and choosing references, designing media, and making a draft to make it easy in creating learning media. The third stage was called the development phase. This stage aimed to see the media feasibility of android-based adobe flash. The compiling process was made in several stages to produce proper media. So, a series of validations were carried out by media experts, material experts, and users. The validation from users was conducted directly to revise the product in the form of Android-based Adobe Flash application media.

The fourth step was implementation, it applied the developed media to the subject of the anti-lock brake system. The participant consisted of 36 students that were given a treatment of android-based adobe flash. The feasibility test of media was based on feedback scoring results from media experts from BPMPK and automotive material experts. The result of media validity consisted of the coherences among content

validity, the presented concept, theory, and construct validity or translating concept theory which made operational product/ shape (Drost & perspectives,2011:105-123).

The next step was the validity test. The researcher found that android-based adobe flash was a final product and very feasible to use for students to improve their learning outcomes. It is based on the validity result referred to Karend (2020) with an average score of validation media 4,49, or it was declared very feasible. While automotive material expert validity gained 4,09 of average score, it can be stated as very feasible. The validation result showed that the developed media was relevant and feasible as media in anti-lock brake system subjects for vocational high school with light vehicle engineering competency (Azwar, 2014).

Akker, et al (1999) explained that R&D reports aimed to promote science and final product practicality. Learning media was a tool in students' environment that can help to stimulate learning activity (Sudjana, 2009). The national department of education (Depdiknas, 2008) elaborated that media can be stated good and interesting if it contained media characteristics. These characteristics included self-instruction, self-contained, stand-alone, adaptive, dan user friendly. User validity was conducted by the teachers and students of light vehicle engineering. The result depicted that 100% of users stated that the media was very effective. In addition, the researcher detailed some indicators such as materials indicators got 90% or can be stated as very effective, language indicators achieved 86% or effective, in competency indicators gained 94% or very effective. Based on overall indicators, the user validity achieved 92% of the average score.

Improving learning effectiveness at school became the main purpose of using learning media, starting from time effectivity, money, facility, and effort to optimize learning goals (Susanti,2020:45–53). The developed media was in line with the purpose of the present study, to increase learning outcomes in the *Anti-lock brake system* for light vehicle engineering students. T-test result of the pre-test and post-test can be seen as follow:

Tabel 1. T-test result of Pre Test and Post Test

	Pre-test	Post-test	N-Gain	Note
Eksperiment	49.86	88.12	0.76	High

Based on the N-Gain score in this research showed the average score of N-Gain got 76, the minimum score gained 39,13% while the maximum N-Gain score achieved 94,44%. It can be concluded that the average score was 76, and the implementation of learning media android-based adobe flash at vocational high school (SMK) can improve students' learning outcomes. In another word, the treatment of giving media can give a positive impact on student's achievement.

The result was in line with Long (2020) about the effect of developed media based on pre-test and post-test, *Paired Sample T-Test*, and Wilcoxon Signed-Rank test that were used to analyze scores. It showed that the developed media improve the learning outcome of bachelor's degree students. Horng (2005: 352) explained that learning strategies that proved effective were (1) students centered learning; (2) tool implementation in learning activities; (3) good management class; (4) learning activity was related to the real life; (5) applying the open statement to improve learning outcome.

The present research enriched knowledge and references (1) the development of learning media with android-based adobe flash that role learning guidance in the basic competency of the anti-lock brake system. (2) Digital media make the students easy to learn independently, (3) the existence of pictures to support steps, learning videos, exercises, and evaluation became the strength of digital media. (4) Also, the students can use it directly on their smartphones.

CONCLUSION

Based on the result and discussion about android-based adobe flash as learning media in Anti-Lock Brake Systems. The conclusion was learning media can help students and teachers in the learning process so that students' learning outcomes can be increased. The analysis result explained that a media can be used in

independent learning, since it has several features such as learning steps and evaluation. Android-based adobe flash is effective as a learning media and can increase students' creativity. The study found before the treatment, students' learning outcome got 49,86%, while after the treatment, the result achieved 88,12%.

ACKNOWLEDGEMENT

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