

DEVELOPMENT OF ANDROID-BASED MOBILE LEARNING MEDIA USING ANDROID STUDIO ON NATURAL SCIENCE SUBJECT IN ELEMENTARY SCHOOL

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Abstrak

This research aim to develop Android-based mobile learning media using android studio on electrical energy material for 6th grade Elementary School. This research method is Research and Development (R&D) using 4D which consists of four stages, namely defining, planning, developing, and distributing stages. This research was conducted at State Elementary School (SDN) 2 Wates Timur and SDN 1 Tambahrejo by 10 students for the small-scale test and 30 students for the large-scale test in each school. The feasibility of android-based mobile learning media was tested using a product validation questionnaire by media experts, material experts and using a questionnaire response from educators and students. The results indicate that the percentage of media eligibility based on the validation of media experts and material experts is 82% in the very feasible category and 81% in the very feasible category. The responses of educators and students respectively obtained a percentage of 89% and 87.5% with a very feasible category. In conclusion, android-based mobile learning media using android studio on electrical energy material for 6th grade Elementary School is very feasible. Suggestions for further research to be able to develop appropriate similar media on other materials or subjects.

Keywords; Media Mobile Learning, Android, Science

Abstrak

Tujuan penelitian ini adalah untuk mengembangkan media mobile learning berbasis android menggunakan android studio pada materi energi listrik kelas VI SD. Metode penelitian ini adalah Research and Development (R&D) dengan menggunakan 4D yang terdiri dari empat tahap, yaitu pendefinisian, perencanaan, pengembangan, dan tahap penyebaran. Penelitian ini dilakukan di SDN 2 Wates Timur dan SDN 1 Tambahrejo oleh 10 peserta didik untuk uji skala terbatas dan 30 peserta didik untuk uji skala luas pada setiap sekolah. Kelayakan produk media mobile learning berbasis android menggunakan android studio pada materi energi listrik kelas VI SD diuji menggunakan angket validasi produk oleh ahli media, ahli materi serta menggunakan angket respon pendidik dan peserta didik. Hasil penelitian ini menunjukkan persentase kelayakan media berdasarkan validasi ahli media dan ahli materi secara berturut sebesar 82% dengan kategori sangat layak dan 81% dengan kategori sangat layak. Respon pendidik dan peserta didik secara berturut memperoleh persentase sebesar 89% dan 87,5% dengan kategori sangat layak. Kesimpulan dari penelitian ini terkait pengembangan media mobile learning berbasis android menggunakan android studio pada materi energi listrik kelas VI SD adalah sangat layak untuk dijadikan media pembelajaran. Saran untuk penelitian selanjutnya agar dapat mengembangkan media sejenis yang layak pada materi-materi lainnya.

Kata Kunci; Media Mobile Learning, Android, Sains

INTRODUCTION

The transformation of information and communication technology simplifies users to exchange information over long distances. It also affects the education world to improve the learning quality by opening wide access to knowledge. The technology used in education can provide a broad, fast, effective, and efficient reach of information dissemination to various corners of the world. This utilization can be seen through multimedia-based learning, namely, computer-based learning and Web-based learning (Yuberti, 2015).

Technology utilization in education can be applied in learning media. Learning media consisting several media to assist the learning process and material, such as science subjects. Science is a pivotal subject because it is a applied discipline in people's lives (Samatowa, 2018). Science learning does not merely rely on concepts, facts, and principles, but also on the discovery process. Therefore, in science learning, it is required to use affluent learning media with the needs of the subject matter and the circumstances of the students. This situation requires educators and students to take advantage of learning technology development, such as Android-based mobile learning media.

Mobile learning is part of electronic learning or known as e-learning. It is an alternative for transforming learning media. Its characteristics are practical and mobile (Amirullah & Hardinata, 2017). It is a term that refers to handheld, mobile IT, and can take the form of a PDA (Personal Digital Assistant), cellular phone, laptop, tablet or PC, and so on (Zulham & Sulisworo, 2017). Hence, mobile learning can be disseminated freely. Wilson and Bolliger stated that the purpose of developing mobile learning is to make students easier to learn anywhere and anytime (Ibrahim & Ishartiwi, 2017). Moreover, Android is a new generation of mobile platforms, it is a platform that presents people the development according to their expectations (Mhs et al., 2017). It can directly communicate with various database servers, many data applications such as Facebook, Twitter, Instagram, and other social media cause users share photos, music, and other data more practically (Setiawan et al., 2018, Nurhalimah et al., 2017). It is an alternative learning supplement that can establish opportunities for students to learn on their own anywhere and anytime. (Purbasari, 2013, Purnama et al., 2017, Ibrahim & Ishartiwi, 2017, Samala et al., 2019)

Technological developments with the presence of Android-based mobile learning media can escalate the learning desire of students. Learning using mobile learning can help distance learning and can visualize abstract material to guide students understanding in learning (Martha, Z. D., Adi, E. P., & Soepriyanto, 2018). However, android technology utilization in learning has not been maximized as it should be. Based on the results of the pre-survey at SDN (State Elementary School) 2 Wates Timur and SDN 1 Tambahrejo, it can be seen that most of the sixth-grade students had an Android smartphone. Students use smartphones to access videos from YouTube, play online games, and access their social media. The use of smartphones in learning is done to open PDF or ebook theme lessons. This indicates the lack of maximizing the Android technology in learning, thus, it is necessary to expand Android-based mobile learning media on the topic of electrical energy in science subject sixth grade.

The development of Android-based mobile learning media is carried out using Android Studio, which is a Java-integrated development complete with advanced features for developing, debugging, and packaging Android applications. It is the official development segmentation for the Android operating system on Google (Mulyati & Wardono, 2019).

Several researchers have conducted mobile learning theme research before Dhita Fitriani and Nurwidodo (2019) develop android-based mobile learning on the circulatory system in elementary schools which attained positive results where mobile learning was feasible and effective to be used as a learning medium in elementary schools because it was easy and practical. Research conducted

by (Ratnasari et al., 2020) apply APPYPIE Program for the Physics subject, this study also received a positive response both in terms of feasibility and practicality because it helped students learn complex physics material.

From some of these previous studies, Android-based mobile learning on electrical energy material has not been conducted yet. Thus, researchers developed Android-based mobile learning using Android studio on electrical energy material for grade VI students in elementary schools by taking advantage of previous studies, namely presenting simple, modest, practical, and mobile material. The novelty of this research is that the material does not only contain text, but also contains pictures, animations, videos, and interesting evaluation questions to work on, as well as games that make it easier for students to learn the material.

RESEARCH METHODS

This is a Research and Development paper using a 4D model through 4 stages, namely, defining, designing, developing, and distributing conducted at SDN 2 Wates Timur and SDN 1 Tambahrejo. The research was conducted by 10 students for the small-scale test and 30 students for the large-scale test in each school. The data was collected using a media and material expert validation questionnaire, as well as a questionnaire from educators and students.

RESULTS AND DISCUSSION

The results of android-based mobile learning media development using android studio on electrical energy material for the sixth grader carried out according to the steps of the 4D model are as follows:

1. Define

Define is the first stage in the development procedure using a 4D model. It is an activity to determine the requirements in developing android-based mobile learning media products. The definition step is carried out in 4 stages, namely:

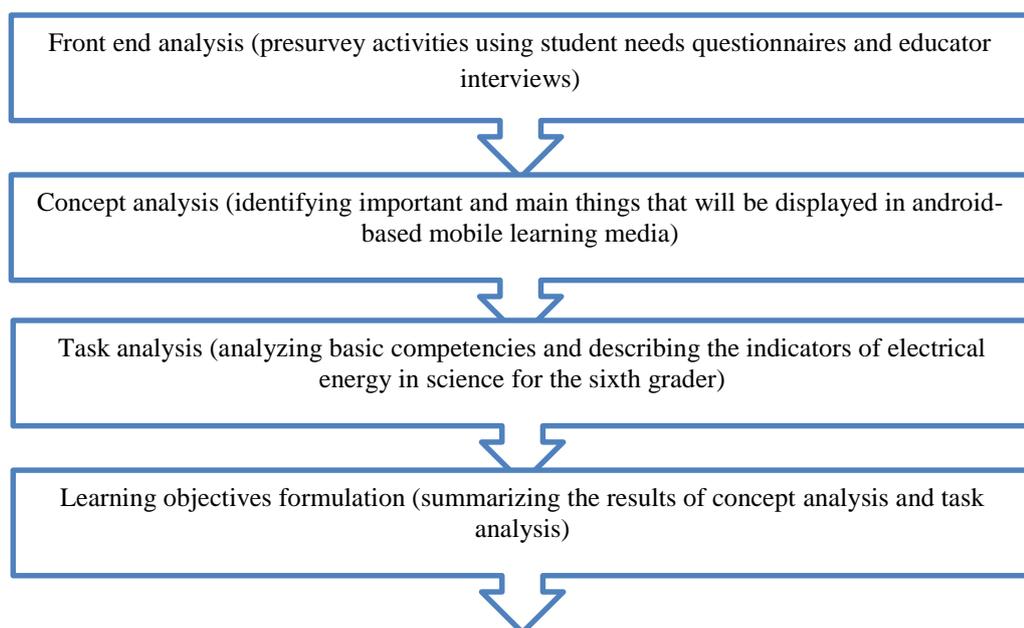


Figure 1. Stages of definition

2. Design

The second stage carried out in the 4D model is design. It is carried out to design an Android-based mobile learning media product which consists several steps, namely:



Figure 2. Android-based mobile learning media design stage

3. Development

At this stage, the researchers construct activities by making Android-based mobile learning media products, which had previously been designed using Android Studio. The steps taken in this stage are as follows:

Feasibility test

The feasibility test was presented by media experts and material experts using a product feasibility questionnaire. The product feasibility test by media experts was carried out 2 times, and the feasibility test by material experts was carried out 1 time. The following are the results of the feasibility test by media experts

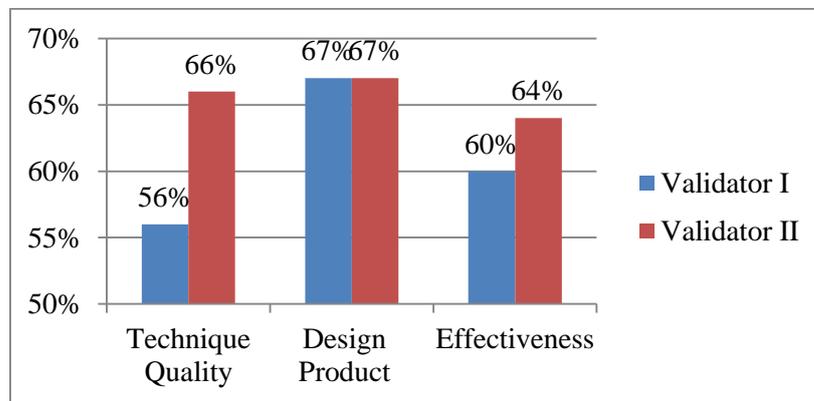


Figure 3. Feasibility test media expert stage I

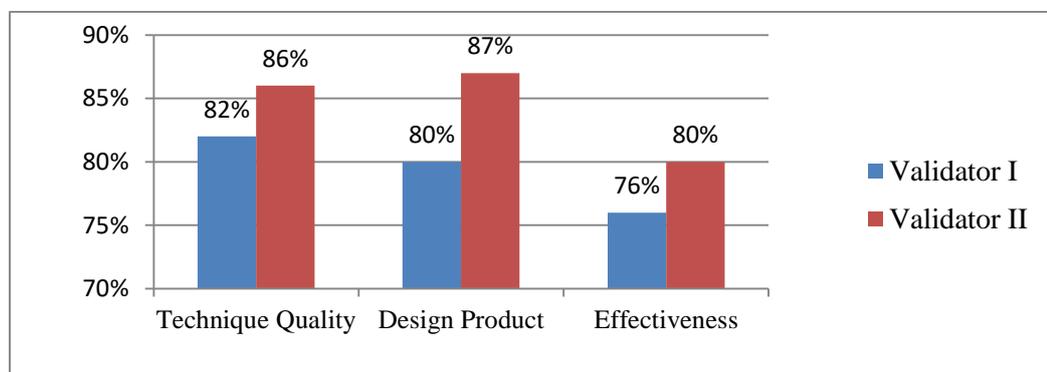


Figure 4. stage I Feasibility test media expert

Based on the results of stage 2 validation, it is known that validators I and II assess the technical quality aspect with a percentage of 84% which means very feasible, while the product design aspect was 83% with very feasible criteria, and the effectiveness aspect was 78 % with very feasible criteria. The total percentage of eligibility by validators I and II was 82% very feasible criteria.

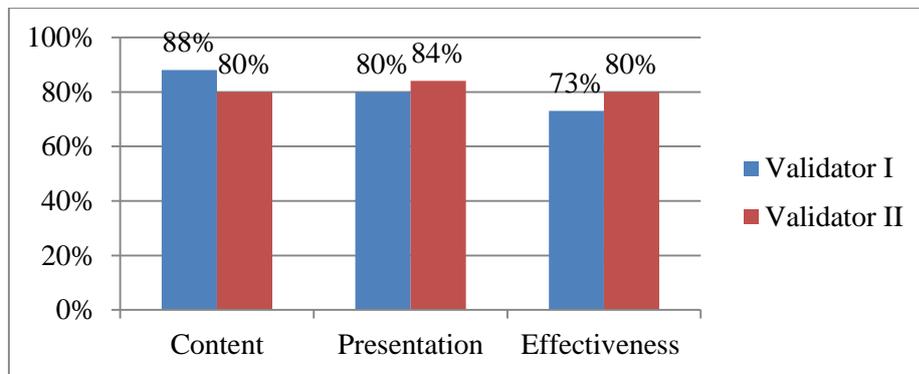


Figure 5. Stage II Feasibility Test of Material Expert

Grafik The graph above shows the percentage of feasibility based on aspects of content, presentation, and effectiveness with the percentage of feasibility is very feasible, which means that Android-based mobile learning media is feasible to be tested.

Product revision

Based on the validation by media and material experts, it is known that android-based mobile learning media products using Android Studio are feasible to be tested. However, there are several suggestions from validators before the product can be tested such as text color improvements and font size as follow.

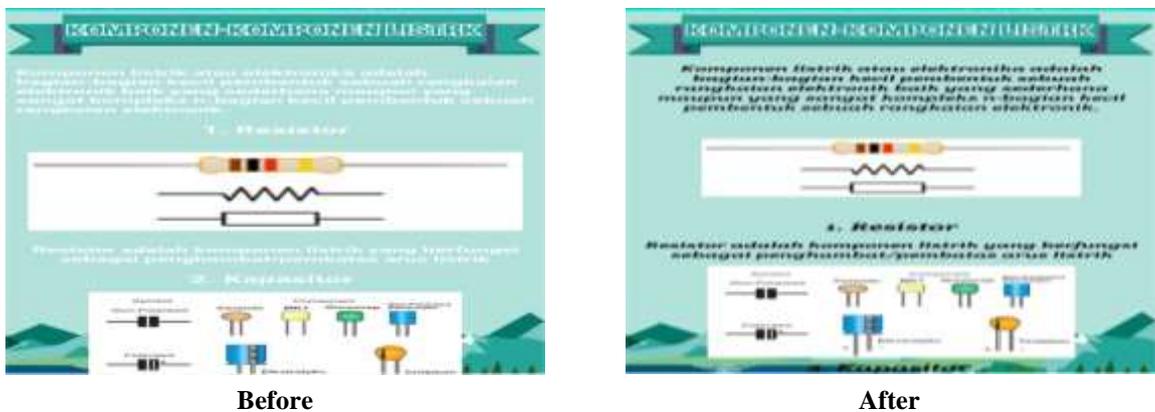


Figure 6. Revision

The word *selesai* (Indonesia) is altered by finish (english), as in the following picture..



Figure 7. Diction improvement

Previously, the fuzzle section was not given play instructions, after getting suggestions, we added how to use it as shown in the following image.



Before
After
Figure 8. Add play instructions for using the fuzzle

Lastly is a suggestion to add video sources to the bibliography, as in the following image..



Before
After
Figure 9. Bibliography for video sources

After making improvements under the suggestions given, a product trial is conducted.

4. Dissemination

Android-based mobile learning product trials were conducted in two elementary schools, SDN 2 Wates Timur and SDN 1 Tambahrejo. This trial was carried out in 2 stages, namely a small-scale trial with 10 students and a large-scale trial with 30 students. In addition, these trials were also carried out to educators. The following are the results of product tests conducted in 2 schools:

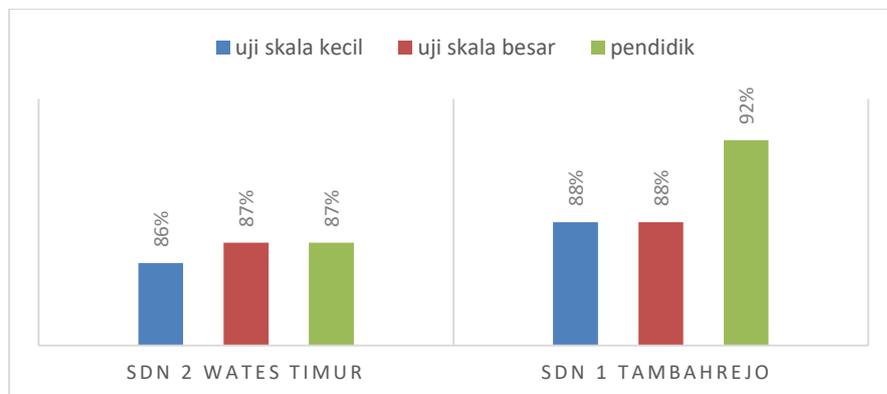


Figure 6. Results of product tests

Based on the chart above, android based mobile learning using the android studio is strongly feasible to be used as learning media. This is in line with (Dhita Fitriani, Nurwidodo, 2019) finding that android-based mobile learning on the circulatory system in elementary schools is a suitable medium in learning, also research conducted by (Ratnasari et al., 2020) Mobile Learning Based on APPYPIE Program for Physics Learning is feasible and interesting to be used as a learning medium. As for the findings of this study, android based mobile learning using Android Studio has advantages and disadvantages in its use. The advantages are the availability of games in a single media and can be used without mobile data (offline). This is aligned with the research conducted by (Dhita Fitriani, Nurwidodo, 2019) related to the development of android-based mobile learning on the circulatory system in elementary schools which got positive results where mobile learning was feasible, practical, and effective. The other advantages are not only text and images, but also animations, videos, interesting evaluation questions to do, and games to encourage students' curiosity in learning. This is in line with findings from (Diansah et al., 2021) which stated that learning using videos, animations, and interesting evaluation questions helps students to understand abstract material concepts and problem-solving. The drawback of android-based mobile learning using android studio lies in the large storage capacity and only cover electrical energy material for 6th grade.

CONCLUSION

In conclusion, android-based mobile learning using the android studio is suitable as a learning medium for electrical energy material for 6th grade Elementary School with eligibility percentage from media and material experts, 82% and 81% respectively. The response of educators and students to android-based mobile learning media shows a high percentage of 89% by educators and 87.5% by students which means very feasible category. The advantages of this media are easy, efficient, practical, effective, interesting in helping elementary school students understand science material.

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