

Android-Based Learning Media Development Strategies During Pandemic Times To Improve Student Science Literature

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Abstract:

This study aims to develop appropriate android-based learning media to improve students' scientific literacy. This study uses the Four D model procedure. In addition to developing android-based media, this research also develops a syllabus, lesson plans, and scientific literacy instruments. This research was conducted in one of the Surya Private Junior High Schools in Pematangsiantar City. The validation of android-based learning media was carried out by three validators of media experts and material experts. Expert validation data analysis was carried out using the Pearson validation formula. The feasibility study of android-based learning products shows validity of 85% with very valid criteria. The results of the media feasibility study obtained an average score of 90%. The syllabus obtained an average score of 84%, lesson plans obtained an average score of 84%, and scientific literacy instruments obtained an average score of 85%. In conclusion, android-based media products on natural science material are feasible to be implemented in learning, especially during the covid-19 pandemic.

Keywords: Learning Strategy, Android, Scientific Literacy, Pandemic

A. Introduction

The spread of the coronavirus initially had a huge impact on the economic and social world, but now the impact is also being felt by the world of education (Purwanto et al., 2020). The Covid-19 pandemic has affected all education systems from pre-school, primary, secondary to tertiary institutions. Based on an ABC News report on March 7, 2020, school and college closures have occurred in more than a dozen countries due to the Covid-19 pandemic (Purwanto et al., 2020). UNESCO estimates that nearly 900 million students have been affected by the closure of educational institutions due to the Covid-19 pandemic (Nicola et al., 2020).

The closure of pre-school educational institutions, basic education to higher education levels due to the Covid-19 pandemic has had a major influence on the learning process and educational curriculum (Rahmawati & Putri, 2020). In Indonesia, the primary and secondary level national exams have been abolished (Fauzi & Khusuma, 2020). The research process of several researchers, including final year students, has undergone many changes. Student exchange activities and study visits are temporarily suspended. Due to the Covid-19 pandemic situation, the Indonesian government has implemented physical distancing for citizens. Physical distancing that must be applied causes the learning process of students in the classroom to change the method by learning from home or learning from home (Herliandry et al., 2020). The government's decision to suspend all educational activities, makes the government and related educational institutions have to provide alternatives and innovations in the educational process for students who cannot carry out the educational process directly in educational institutions

(Purwanto et al., 2020). Students, in this case, school students, are required to spend time at home by studying, discussing, doing assignments, and taking exams with online media (Safitri et al., 2020).

The learning innovation impact of Covid-19 opened a new paradigm for educational institutions that no longer described the learning process as having to go through face-to-face in the classroom (Fitriyani et al., 2020). There is an important role for online remote technology information systems in education that must be prepared to carry out the learning from a home method. One alternative is to use Android as a learning medium. The use of android as a learning media can be an alternative and a solution to make students more active in the learning process. The more active students will affect the learning outcomes. Learning outcomes are also closely related to students' scientific literacy (Siahaan, Haloho, et al., 2021).

Based on the results of the 2018 PISA, Indonesian students are ranked 72 out of 79 test-taking countries. The test results show that the average score of students is 371 in reading, 379 in mathematics, and 396 in science. This score is below the average of 79 PISA participating countries, which is 487 for reading ability, and 489 for math and science (OECD). (2018). This result shows a decrease with the previous PISA TEST results, in 2015, Indonesian students recorded higher averages for all fields, namely 397, 386, and 403 for reading, mathematics, and science (Pisa, 2015).

PISA does not teach school material. Meanwhile, schools have school facilities and infrastructure to support learning, including computer laboratories, science laboratories, and LCDs, but their use has not been maximized (Hadisaputra et al., 2019); (Siahaan, Lumbangaol, et al., 2021). In connection with these problems, it is necessary to make improvements, adjustments, and updates in learning activities during the Covid-19 pandemic, namely by developing and utilizing Android-based learning media that can display abstract and microscopic concepts that are difficult to visualize or display directly on the internet. laboratory. In general, Android is widely used by the community, especially students. The use of smartphones is currently popular in the world and is not left behind in Indonesia. The smartphone can have a huge impact on human life and provide a lot of convenience in its use. However, the use of smartphones is only used for the use of social media and only a small number of them use them to assist learning activities. (Muyaroah & Fajartia, 2017).

The development of android-based media is expected to increase the literacy rate of students. Learning through the use of instructional media allows students to focus on the content. Learning media contains complete media elements, including animated audio, video, text, and graphics, thus enabling users to interact through the available functions. (Gunawan et al., 2017). Cole & Todd, (2003) This means that interactive media can respond positively and increase student interest in learning, which is reflected in the results of very high learning evaluations and excellent learning activities, this is also supported by research from Kamlaskar, (2007) which states that respondents with a percentage of 80% said interactive multimedia was interesting and fun. This research aims to produce appropriate android-based learning media to improve students' scientific literacy.

B. Methods

This research is a research and development (Research & Development) which aims to produce certain products, and test the effectiveness of these products. The research uses a 4D development model (Mulyatiningsih, 2016). This research focuses on the development of

android-based learning media on substance and its characteristics in the Surya Pematangsiantar Private Junior High School.

Data collection techniques for the validity of learning media products include questionnaires on the validity of the syllabus, the validity of lesson plans, and the validity of scientific literacy instruments. This validity data were obtained from expert lecturers, namely material experts and media experts. Questionnaire data regarding expert responses related to the feasibility of developing products were analyzed by transforming the average score of all observed aspects into qualitative sentences with the criteria proposed by (Ernawati & Sukardiyono, 2017).

C. Findings and Discussion

Findings

This study uses a 4-D model that is focused on the development stage, which includes validity testing. The development of android-based learning media first goes through the define and design stages. At the define stage, content analysis, and literature review are appropriate. Many parts are decided in this section, such as the equipment needed, the number of instruments to be developed, the type of instrument to be selected, the material to be determined, namely the substance and its characteristics, and who will be involved in this research. In addition, student analysis, task analysis, concept analysis, and specification of learning objectives were also carried out.

In the process of designing this android-based media, there are suggestions for improvement from the validator such as loading material aspects. In addition, the images used in android-based media must be of high quality to make them appear clearer. The selection of high-quality images will make students happy and enthusiastic in learning activities (Suranti et al., 2020). The media produced as an initial draft has gone through a validation test process by three expert validators who review aspects of content, presentation, and learning activities. The results are presented in Table 1.

Table 1. Product Validation Results

Device	Average value (%)	Criteria
Syllabus	84	Very Worthy
RPP	84	Very Worthy
Media	90	Very Worthy
Instrument	85	Very Worthy
Average	85	Very Worthy

Based on Table 1 above, shows that the average percentage of product validation/feasibility results is 85% with very feasible criteria. This means that the developed product can be implemented in learning. The developed android-based learning media is considered suitable to be applied in science learning because it has been facilitated with steps to develop students' scientific literacy. Android-based learning media is made to be used independently by students with the help of Student Worksheet. However, in general, this media can also be used as a presentation medium by teachers during a pandemic. This media is used in learning with the inquiry learning model

Discussion

During the COVID-19 pandemic, learning at home or online is a solution to continue the rest of the semester. Online learning is defined as a knowledge transfer experience using video, audio, images, text communication, and software (Basilaia & Kvavadze, 2020) and with the support of an internet network (Chen et al., 2020). This is a modification of knowledge transfer through website forums (Basilaia & Kvavadze, 2020) and digital technology trends as a hallmark of the 4.0 industrial revolution to support learning during the Covid-19 pandemic. Technology integration and various innovations are the hallmarks of online learning (Banggur, 2020). In addition, the most important thing is the readiness of educators and students to interact online.

The main purpose of the design stage is to prepare prototype devices such as test preparation, media selection, and format selection. At this stage, the first device design was also produced which included the syllabus, lesson plans (Learning Implementation Plan), and test instruments. Android-based learning media products use an inquiry model. Hartono, (2013) said that several learning steps are contained in general problems, namely asking questions, proposing hypotheses, collecting data, testing hypotheses, and drawing conclusions. These steps aim to emphasize the importance of solving various problems that are displayed in the developed teaching materials. In addition to development in terms of learning activities that are adapted to the syntax of the learning model (Manurung, 2021).

The results of this study are reinforced by Umami & Jatmiko, (2013) which states that compared to the current learning process commonly used in schools, students feel happier and more motivated in all activities carried out in the learning process using the inquiry model and can improve their critical thinking skills and receive positive feedback from students. This is also supported by research by Bilgin, (2009) which shows that inquiry learning can have a positive impact on students' activities, attitudes, and performance and is reinforced by the statement (Sarwi et al., 2016) that inquiry learning can effectively improve students' conceptual understanding and develop student personality.

At the design stage, researchers compile android-based media products by making flowcharts and storyboards. Then collect supporting materials such as photos, videos, animations, and pictures. All materials collected are then entered into the Adobe Flash computer program application regarding flowcharts and storyboards. Making flowcharts and storyboards aims to provide an overview of the form and content of the display on android-based media. Flowcharts and storyboards became the first reference for researchers to develop android-based media into complete products using Adobe Flash CS 6. The results of android-based media products that were created were then packaged in a learning Compact Disc (CD) as a product design to support the learning process (Manurung & Manurung, 2021). Android-based media is also equipped with a user manual feature that makes it easier for students to understand the developed media. The test questions designed in android-based media are in the form of e-assessments. The test developed is a scientific literacy test in the form of multiple-choice questions.

The product resulting from this development research is an android-based learning media application. This learning media product was created and designed by the researcher himself, to be able to be used as a teacher's tool in delivering material and also as an independent learning resource that students can use outside of school at any time, especially during the Covid-19 pandemic (Siahaan, 2021).

During the Covid-19 pandemic, students are required to carry out online learning. So the use of android media as a learning resource is very important. The results of the development of android-based learning media are presented in Figure 1 below.



Figure 1. Android-Based Media Display

Android-based learning media can be used as learning media for junior high school students because the average feasibility value shows that the application is feasible, students can study substances and their characteristics, such as elements, compounds, and mixtures by using this application on their smartphones. In addition, students can also evaluate their knowledge by following the quiz section on the developed android media.

This android-based media has the advantage that it can be used independently both at school and outside of school because this media is easy to get, just download it via Google Drive so it can be used practically and can be downloaded via gadgets or computers. This learning media is also equipped with a discussion and at the end of the evaluation, there is an assessment score to determine the level of student achievement using this learning media. This is following research from Muyaroah & Fajartia, (2017) which shows that android-based learning can improve student learning outcomes.

This research is supported by research conducted by Martono & Nurhayati, (2014) that 95% of users feel comfortable and satisfied in using mobile learning applications. (Hadi, 2015) also conducted android-based research with the results of the average percentage score of the questionnaire being 77.91% or within good criteria. While the results of research by Astra et al., (2015) obtained an average media feasibility from experts of 83.13% or appropriate criteria.

D. Conclusion

Based on the results of this study, the conclusions obtained include android-based learning media which obtained very effective results after being tested by expert verifiers. Criticisms and suggestions from the verifier are used as material for equipment repair. The evaluation of each Android media component expert can be used for media improvement. In addition, the content developed by Android-based media follows the guidelines for the preparation and concept of substances and their characteristics.

Acknowledgment

This work is supported by the campus of the HKBP Nommensen Pematangsiantar University

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