Android-Based Multimedia Development and Worthiness for Economic Learning in High School

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Info Artikel	Abstract
	The Covid-19 pandemic has turned face-to-face learning into online learning, thereby minimizing interactions with other people. So that online learning requires preparation, including appropriate learning media. This study used the ADDIE development method to develop android-based multimedia in the tenth grade of high school economic subjects. The steps are taken consist of Analysis, Design, Development, Implementation, Evaluation. The stage consists of learning technical analysis and curriculum analysis. The design stage is the design of android-based media. Media and material expert validation carry out the development stage, the media implementation stage is tested in a limited class, and the evaluation stage is the finalization stage of the media used. The results showed that developing android-based multimedia in tenth high school economics learning met validity, effectiveness, and practice criteria.
	Abstrak
	Pandemi Covid-19 membuat pembelajaran tatap muka berubah menjadi pembelajaran online sehingga meminimalkan interaksi dengan orang lain. Pada pembelajaran online dibutuhkan persiapan meliputi media pembelajaran yang tepat. Tujuan penelitian ini adalah mengembangkan multimedia berbasis android pada pembelajaran ekonomi SMA kelas X dengan menggunakan metode pengembangan ADDIE, Langkah yang dilakukan terdiri dari *Analysis, Design, Development, Implementation, Evaluation.* Tahap terdiri dari analisis teknologi pembelajaran dan analisis kurikulum. Tahap desain merupakan desain dari media berbasis android. Tahap pengembangan dilakukan validasi ahli media dan materi, tahap implementasi media di ujicobakan dilaksanakan pada kelas terbatas dan tahap evaluasi merupakan tahap finalisasi dari media yang digunakan. Hasil penelitian menunjukan bahwa mengembangkan multimedia berbasis android pada pembelajaran ekonomi SMA kelas X memenuhi kriteria valid, efektif dan praktis.

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INTRODUCTION

The COVID-19 pandemic has significantly impacted education, changing from face-to-face learning (offline) to online learning. (Osman, 2020). Educational institutions apply distance learning to reduce the spread of covid-19. As a result, online learning involves a lot of e-learning in the learning process (Macapagal, 2020). E-learning-based education had become a significant component in the educational process in the pandemic era and has transformed from before, most of which were face-to-face learning to online learning (Adedoyin & Soykan, 2020; Febrianto et al., 2020).

The online-based learning process has several obstacles, including learning devices, material content, online learning processes, teacher readiness, and student readiness in online learning, generally different from face-to-face learning (Kebritchi et al., 2017). One very concerning aspect is the readiness of learning devices used in the online learning process, namely learning media. Learning media development is one of the primary keys to understanding success (Wibawa, 2017). In addition to facilitating online learning, teaching media increases student motivation in learning (Saadé & Al Sharhan, 2015; Smith et al., 2018).

The development of Android-based learning media is very much needed because it allows students to learn anywhere, anytime, more flexible, and more practical by using a smartphone (Toktarova et al., 2015). In the era of the covid-19 pandemic, the development of android-based learning media is significant and needed because it facilitates distance or online learning (Kim, 2020; Lopes & McKay, 2020). The process of developing learning media must also pay attention to several elements. One of them is conformity with learning objectives, characteristics of media that are following the learning process, able to support learning content, easy to obtain, easy to use, effectiveness in delivering learning content, and making it easier for students to learn (Arkorful & Abaidoo, 2015; Kumar, 2013; Prasetyo et al., 2019; Rahmawati, 2016).

This research is the development of android media for economic learning. This research is considered necessary because, in a pandemic situation like now, suitable media can make it easier for students to learn the material they are studying (Alhafidz & Haryono, 2019; Atmojo et al., 2020; Pedro et al., 2018). Learning media plays an essential role in the online learning process, and research results support this that suitable learning media can improve students' understanding abilities (Iksan & Saufian, 2012). So that in this development research, Android-based multimedia will be developed in economic learning for the tenth grade of SMA 1 Cirebon.

METHOD

This research is included in the type of development research or R&D (Research and Development). Educational Research and Development (R&D) is the process used to develop and validate educational products (Sukestiyarno, 2020). This research resulted in a product in Android-based multimedia learning media in economics learning on the economics of tenth grade. The research subjects were tenth-grade students of SMA 1 Cirebon. This development research uses the steps of developing the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) with the following description:

Analysis

Student analysis is a process to determine students' learning technology needs so that products can be produced following the needs of students learning economics. Curriculum Analysis: This stage analyzes the material taught to students and the learning objectives to be achieved. Needs analysis is the key to how media development will be developed to be effective in economic learning for students.

Design

The design process is the process of compiling Android-based multimedia learning media. The design includes the appearance of media, the flow of use, and the material content delivered in the learning media. The basis of the design stage is the results of the analysis that has been done previously. The design developed is made to make it easier for students to understand the material being taught.

Development

The development stage is the process of compiling the design of android-based multimedia learning media. The designs that have been assembled are implemented in the form of Android-based multimedia products in the tenth grade of economics learning. Multimedia learning media goes through two stages of the test process: 1) Expert judgment or expert test, which consists of media experts and economic learning material experts for class 10. 2) Small group test, which tests the media on a limited or small scale

Implementation

This stage is a follow-up process from the development stage, namely products that have undergone a revision process in expert tests and limited trials and are produced better outcomes. The implementation stage is the broader application/use of Android-based multimedia media in economics learning for the tenth grade of senior high school.

Evaluation

Evaluation is a process of providing an assessment of Android-based multimedia media in class X economic learning developed. Evaluation is the stage where assessing the developed android media so that services can be distributed to students.

FINDINGS AND DISCUSSION

Based on the research stages of the development of the ADDIE model on android-based multimedia in class X economics material at SMA 1 Cirebon, it is explained as follows:

Analysis

1) Student analysis

    Based on student analysis, data obtained that all students of class X SMA 1 Cirebon have smartphones. The development of Android-based multimedia for economic learning does not have problems, and all students can use it.

2) Curriculum Analysis

    The curriculum analysis stage shows that economic learning for class X SMA 1 Cirebon discusses the main economic problems, explaining the main problems of classical economics, the economic system, and the Indonesian economic system. The analysis stage begins with an analysis of student needs, including student conditions, the need for learning resources needed, and the availability of learning tools they have. The design stage is the process of designing products that students need. The analysis results show that with the covid-19 pandemic, it is impossible to carry out face-to-face (offline) learning so that all students can only learn online (distance). The analysis of students' needs for learning materials shows that students need learning media that can assist in understanding and explaining economic material. The analysis of learning devices shows that all students already have smartphones with Android and iPhone operating systems.

Design

The design stage is making media based on the needs needed by students and the material displayed in class X economics learning at SMA 1 Cirebon.

Figure 1. Main Menu

The initial display design of an Android-based multimedia application uses a pilot in everyday life to make it easier to understand.
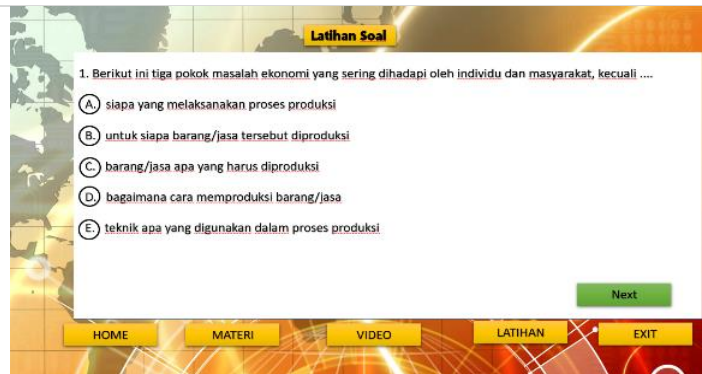

Figure 2. Material

Android-based multimedia in the tenth grade of economics learning, especially about economics, displays are learning videos that allow students to learn from reading material and understand through learning videos that already exist in the developed teaching media.

Figure 3. Learning Videos

The question to the teacher feature is also included in the application, thus facilitating students who feel confused after learning through the Android-based multimedia application so that teachers can provide additional feedback and explanations for students who ask questions.

Figure 4. Menu Practice Questions

Learning evaluation is also provided in Android-based multimedia applications, so students are allowed to practice questions related to the material studied previously. In addition, evaluating each sub-chapter of learning in the application is also designed to conduct a final online test. It makes the evaluation and assessment process more accessible. The design stage is to create based on the student's needs for the required learning. Due to online learning and requiring interactive and easy-to-understand learning media, Android-based multimedia has been compiled for class X economics learning. Another innovation in the media is a teacher question menu whose contents facilitate students to ask questions regarding material that has not been understood. The economics teaching multimedia is prepared on an android-based basis to facilitate the distribution, operation, and remember that all students have an Android-based smartphone.

Development

The development stage includes product validation from media experts, material experts, and limited trials.

1) Validation of media experts

Android-based Multimedia in Economics learning class X SMA 1 Cirebon is validated by a validator or expert validation. The instrument consists of 10 indicators related to appearance and ease of use and ten associated with the material's content displayed in the developed product. The validation results in criticism and suggestions become the basis and guidelines for researchers in making improvements/revisions of the developed product.

2) Product Revision

The revision or product improvement is improving the product based on the validator's recommendation to meet the criteria expected by the validator. Details of product revisions/improvements are shown in table—1 as follows.

Table 1. Product Revision

Suggestion/advice	Follow-up
Display	
Display the initial menu for more clarity	Menu display improved based on suggestions
Add score to practice questions	Exercises in the form of multiple-choice have direct measurements
Learning videos are made more interesting with the addition of sound	The learning video has been fixed, plus a learning narration
Content	
Practice questions added with different variations	Add practice questions
Add practice questions in the form of descriptions	Added the question of how much description
Add material about the application of fundamental economic problems	Added material about the application, accompanied by an example video

The development stage is the media validation stage based on display indicators and temporal indicators contained in Android-based multimedia in economic learning. Media experts and material experts carry out validation. The product development process is given suggestions and criticisms to be improved according to the validator's recommendations. The media meets the expected criteria and is valid to be used as a medium in economic learning. After going through the repair process and being approved by the validator, the media can be tested.

Implementation

This stage is applying to the research subject, namely class X SMA 1 Cirebon students. Through the results of the pre-test, post-test, student response sheets, the practicality of the media. The next stage is implementation or product testing. The developed product, namely Android-based multimedia in economics learning, was given to class X students and used as learning media during online learning, especially in economics learning the subject matter of economics. The students' implementation process measured learning achievement after using the press, opinions related to the media, and a media practicality questionnaire. The results are collected as an evaluation of product development.

Evaluation

The evaluation stage is the stage to find out the shortcomings of Android-based multimedia. The product evaluation results are described starting from

1) Expert Validation Results

Expert validators have provided a score for Android-based multimedia in economic learning. The display aspect, which consists of 10 indicators, based on the assessment of 3 indicators, gets a percentage of 85%, which is included in the outstanding category. The material aspect obtained a percentage of 83% and was included in the excellent category.

2) Product effectiveness

Based on the pre-test and post-test results carried out before and after using android-based multimedia in class X economics learning, the following results are shown in Table 2.

Table 2. Results of Pretest and Posttest

Pre-test		Post-test	
Total score	avarage	Total score	avarage
11.025	63	14700	84
175 students		175 students	

The data calculated the increase in scores obtained by students before and after using Android-based multimedia in economic learning. The formula used in calculating the gain is to use the N-Gain formula as follows.

$$\text{NGain} = \frac{\text{posttest} - \text{pretest}}{\text{score max} - \text{score min}}$$

The results of the N-Gain calculation show that the score is 0.74, which can be interpreted as an increase in height. These results indicate that android-based multimedia in economics class X SMA is effectively used to improve student learning outcomes.

The last stage is evaluation, which measures the product developed, namely Android-based multimedia in the tenth grade of economics learning, whether it meets the valid, effective, and practical criteria. The validator's assessment results of media experts and material experts show that android-based multimedia in the tenth grade of economics learning is valid because it meets the criteria and is included in the excellent category. The product's effectiveness is measured based on the results of student learning outcomes after using the media. The results obtained indicate that android-based multimedia in class X economics learning improve student learning outcomes in class X economics learning the subject matter of economics. It is shown by the increase in student learning

outcomes from before and after using the product showed a significant improvement. The product's practicality is measured based on a questionnaire from media users, namely students and validators.

The analysis of student opinions shows that android-based multimedia in economic learning helps students understand the material through reading and video content in the media. In addition to understanding the material through the media, students can also practice the understanding they learn through the practice questions contained in the media. Through Android-based multimedia in economics learning, students can learn anytime and anywhere. It is more flexible and with material content that is easier to understand through reading, videos, and practice questions. The practicality of the product and the suitability of the android-based multimedia product in economic learning were obtained through a student questionnaire after several days of using the media as a learning tool. The questionnaire results show that the percentage of the questionnaire is 80.3% which can be interpreted that android-based multimedia products in economic learning are included in the excellent category.

The results of this study are aimed at the development of android-based multimedia in economic learning in the tenth grade of SMA 1 Cirebon. The product development process applies the ADDIE development model, namely analysis, design, development, implementation, evaluation. Based on the description above shows that android-based learning media improves student learning outcomes. It is also reinforced through several previous findings that android-based learning media or sometimes known as mobile learning, is effective in helping students' learning processes. (García-Martínez et al., 2019; Poon & Koo, 2010; Saefi et al., 2017; Safitri et al., 2019; Sulisworo et al., 2016). Android can be an alternative that educators can develop. This is because it is easy to use and widely used by students, especially students in Indonesia. Android can be presented because the material displayed can be well designed to increase students' interest in learning in the learning delivered by the teacher. In addition, Android-based learning has flexibility in the learning process so that it becomes a solution in online learning (B & Raja, 2020; Cavus & Al-Momani, 2011; Göksu & Atici, 2013; Koole, M., McQuilkin, J., & Ally, 2010; Ozdamli & Cavus, 2011; Smith et al., 2018; Surjanti et al., 2018; Xie et al., 2018). Android-based multimedia development in economic learning class X SMA 1 Cirebon is a solution in online learning and effectively improves student learning outcomes.

CONCLUSION

Based on the development of android-based multimedia in economic learning of tenth grade of SMA 1 Cirebon, it shows that the media is valid for use in learning economics on the subject matter of economics. It is effective in improving student learning outcomes, and the last yak is practically used in learning. Through this research, android media can be used as an alternative to support learning during a pandemic. The results of this study can be developed regarding the development of virtuality-based android media so that the development of the media is more developed.

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