

Development of Android-Based Mobile Learning Media for Computer Device Materials as Teaching Materials for Informatics Subject Teachers

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ABSTRACT

The development of information and communication technology has brought significant changes to the world of education. One of these changes is the increasing use of technology-based learning media, such as mobile learning, which offers integration and accessibility in the teaching and learning process. However, the main challenge in implementing mobile learning is ensuring that the media suits the needs and characteristics of teachers and students. This research aims to develop mobile learning media that is suitable and appropriate for Computer Science teachers at SMPN 1 Bendosari in learning Computer Science, especially in computer hardware material. The research method applied is the Research and Development (R&D) method using a development model known as the ADDIE model. The ADDIE model consists of five main stages, namely Analysis, Design, Development, Implementation and Evaluation. The results of research and development show that mobile learning media regarding computer hardware in Computer Science subjects has been tested by media experts and subject matter experts. At the expert evaluation stage, the material expert rated the product at 4.6 (good category). Media experts gave the product a score of 4.35 (good category). The results of the mobile learning media feasibility test also show that the media is suitable for use. Thus, the conclusion of this research is that the mobile learning product produced has met the required standards and is suitable for use as teaching material for teachers in computer science learning, especially in computer hardware material at SMPN 1 Bendosari. The contribution of this research is the development of mobile learning media that is effective and in accordance with the required educational standards, especially in computer hardware material. The resulting products not only provide practical tools for teachers in the learning process, but also encourage wider and more effective use of technology in the school environment.

Keywords: *Development, Mobile Learning, Computer Devices, Informatics*



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INTRODUCTION

Education has experienced significant development along with advances in Information and Communication Technology (ICT) which have penetrated various aspects of learning. ICT has provided new opportunities in developing innovative learning. Learning media technology has become a powerful tool to change the way we learn and teach (Hamid Sakti Wibowo, 2023). Computer Science subjects are becoming increasingly important in teaching technology skills

to students at various levels of education. In the current digital era, the use of mobile learning has become a popular and effective alternative for delivering learning material. Learning via mobile learning devices provides benefits to students, especially in accessing learning materials more easily. Learning materials can be accessed via various devices such as smartphones, tablets, Smart TVs, or others. As a result, students can access learning from wherever they are without being bound by space and time constraints (Rahmat, 2019) However, despite the recognition of mobile learning in education, there are still shortcomings in developing learning media that meet the needs of teachers, especially in the context of computer device materials for seventh-grade students at SMPN 1 Bendosari. This gap requires further research to identify teachers' needs, explore the potential of mobile learning media, and develop relevant and effective learning media.

This research emphasizes the urgency and novelty in developing mobile learning media on computer device materials as teaching materials for Computer Science teachers at SMPN 1 Bendosari. The presence of mobile learning technology provides new opportunities to facilitate more interactive, flexible, and effective learning. Therefore, this research aims to fill the existing knowledge gap by developing mobile learning media that meet the needs of teachers and students and to make a positive contribution to the improvement of Computer Science learning quality in the current digital era.

The urgency of this research is supported by the fact that although technology has become an integral part of daily life, its use in the context of learning has not been fully optimized in various educational institutions. Therefore, this research seeks to fill this gap by developing innovative and relevant learning media for Computer Science learning at SMPN 1 Bendosari.

This research will clarify the difference between existing learning practices and the potential offered by the development of mobile learning media. Thus, it will be evident that this research not only corrects but also complements existing learning practices with the use of more advanced and effective technology.

This research supports existing learning practices by enhancing learning quality through the integration of mobile learning technology. Thus, this research not only debates the use of technology in learning but also provides concrete solutions in the form of innovative and relevant learning media development.

In this context, the development of mobile learning media is a strategic step to improve the quality of computer science learning. Mobile learning media has advantages in terms of flexibility, accessibility, and interactivity, allowing students to learn whenever and wherever they are (Husaen, 2023). The use of mobile learning media can also assist teachers in presenting learning materials more attractively and effectively.

Based on the author's findings from initial interviews with Computer Science teachers at SMPN 1 Bendosari, in the process of teaching Computer Science subjects at the school, teachers still rely on textbooks and Microsoft PowerPoint as learning media. The use of these media has been ongoing for several years without any changes or additions to new learning media. As a result, when teachers explain the material, many students are less interested, and the learning appears monotonous and ineffective. Therefore, teachers hope for the development of new learning media to make the learning process more enjoyable and engaging.

This research is focused on Computer Device materials, where educators not only deliver material verbally or through discussions with students but also use learning media to enhance students' interest and skills in the subject. In terms of facilities, SMPN 1 Bendosari already has a computer lab and provides internet access to support learning activities to become more practical. Additionally, seventh-grade students already have adequate smartphone technology for learning.

Based on the above explanations, the author concludes that one essential component in an educator's teaching materials is learning media. One type of learning media used is Mobile Learning. Through the development of appropriate mobile learning media, it is hoped to increase students' learning motivation, facilitate independent learning, and enhance their understanding of computer device materials. Furthermore, the development of this media can also assist teachers in presenting learning materials more dynamically and attractively (Friendha Yuanta, 2019). Thus, this research is expected to make a positive contribution to the development of computer science education in the current digital era. Based on the background above, research is conducted with the title "Development of Mobile Learning Media on Computer Device Material as Teaching Materials for Computer Science Subject Teachers in Grade VII SMPN 1 Bendosari".

METHODS

The type of research applied here is research and development, known in English as Research and Development (R&D). R&D is a research method aimed at creating specific products and testing their effectiveness. Conducting needs analysis research is crucial to produce products that meet societal needs. Additionally, to ensure that these products can function effectively in society, research to test their effectiveness is necessary (Alfiria dkk., 2019)

In this research context, the development model used is the ADDIE model. The ADDIE model is one of the simple and easily understandable instructional system design models. As the name suggests, this model consists of five main phases: Analysis, Design, Development, Implementation, and Evaluation. This method has proven effective in developing learning media oriented towards user needs and relevant educational standards (Dewa Made Adi Andhika Nida dkk., 2020). Below are the results and discussion of this research.

By using this model, research can be conducted in a structured and systematic manner to produce optimal teaching materials for teachers in the field of informatics.

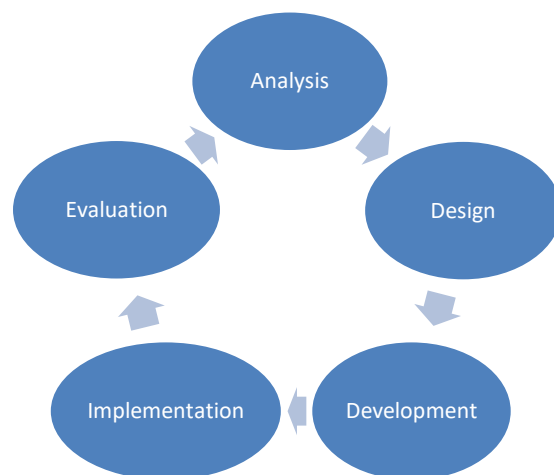


Figure 2.1 ADDIE Model

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RESULTS AND DISCUSSION

The development of mobile learning media provides several benefits: Mobile learning media enables flexible access to learning materials, allowing students to learn whenever and

wherever they are. With various interactive and multimedia features, mobile learning media can enhance students' interest and engagement in the learning materials (Laswadi, 2022). It also facilitates self-directed learning: students can access learning materials independently through their mobile devices, allowing them to learn according to their own pace and learning styles.

The population in this study is the computer science teachers at Smpn 1 Bendosari. The sample consists of 2 active computer science teachers in that school.

1. Analysis Stage: The needs analysis stage is conducted through interviews with computer science teachers to identify their needs in developing mobile learning-based instructional media and observations. Data is collected through structured interviews and analyzed to determine the needs that must be met in media development (Melnix & Razi, 2024).
2. Design Stage: The design stage includes application design to determine layout, style selection, font, color, and the use of animated images. The development of mobile learning media is based on the analysis of needs and principles of multimedia learning design. Instructional media design is carried out considering effective instructional design principles and user needs (Rachman Hakim & Hidayani, 2021). Below is the display of mobile learning:

3.



Figure 3.1 Opening



Figure 3.2 Opening



Figure 3.3 Menu display



Figure 3.4 Material display



Figure 3.5 Quiz display



Figure 3.6 Video display

4. Development:

The development phase involves creating a prototype of mobile learning media using development software that meets the requirements, such as Kodular/Adobe Flash Professional CS6 for creating Android-based applications (Mardhatillah dkk., 2022). After the development phase, the media will be validated by subject matter experts and media experts. Suggestions and feedback from both will be used to revise the media to make it better. Suggestions from subject matter experts include adding simpler formulas, while suggestions from media experts include improvements to the design and the addition of features such as quizzes and content. The validation instrument used is an instrument developed based on the BNSP assessment standards.

1. Media Expert Validation:

In this stage, validation is conducted by a media expert from Bangun Nusantara Veteran University, namely Mr. Hamda Kharisma, M.Pd, a lecturer in the Department of Educational Technology. This validation process consists of two stages.

a. First Stage

Conducted on March 4, 2024. Below are the results of the first stage of media validation:

Table 3.1 Results of First Stage Media Validation

No	Indicator	Score
1	Relevance of materials used for learning media	4
2	Use of communicative language	5
3	Use of clear sentences	5
4	Use of easily understandable sentences	5
5	Engaging presentation of materials	4
6	Ease of understanding video playback	5
7	Appealing video illustrations	3
8	Clarity of materials	3
9	Clarity of examples	3
10	Appealing animations	4
11	Quality of instructional videos	4
12	Clarity of instruction	3
13	Presentation of materials	3
14	Practicality of instructional videos	4
Total		55
Average		3.92
Criteria		SUFFICIENT

In the initial stage of the research conducted by media experts, the total score obtained is 55 with an average score of 3.92. Based on the feasibility evaluation conducted, the android-based learning media product developed falls into the "adequate" category. However, there are several aspects that still need improvement to enhance its outcomes.

b. Second Stage

Implemented on March 7, 2024. The following are the results of the validation of the second stage media:

Table 3.2 Results of Second Stage Media Validation

No	Indicator	Score
1	Suitability of material used for learning media	4
2	Communicative language used	5
3	Clarity of sentences used	5
4	Sentences used are easily understood	5
5	Presentation of material used is interesting	4
6	Video playback is easily understood	5
7	Interesting video illustrations	4
8	Clarity of material	4
9	Clarity of examples	4
10	Interesting animations	5
11	Quality of instructional videos	4
12	Clarity of instruction	4
13	Presentation of material	4
14	Practicality of instructional videos	4
Total		61
Average		4.35
Criteria		GOOD

The results of the second stage of the research by media experts indicate that the total score obtained is 61 with an average score of 4.35. Based on the feasibility evaluation table, it can be concluded that the Android-based learning media developed falls into the "good" category.

2. Material Expert Validation

In the material validation stage, it was validated by Mr. Masudi, S.Kom, a teacher at SMPN 1 Bendosari, on March 18, 2024. Input and suggestions from the material expert were used as the basis for revising the media so that it can be developed into even better media. Here are the results of the material validation:

Table 3.3 Results of Material Expert Validation

No	Indicator	Score
1	Material corresponds to competencies	4
2	Material aligns with learning objectives	5
3	Extent of material coverage presented	5
4	Explanation of material on media is appropriate and clear	5
5	Material is easily understood	4
6	Examples included in media are appropriate to the content	5
7	Intellectual appropriateness of students	4
8	Material is logically organized	4
9	Grammatical accuracy	5
10	Spelling accuracy	5
Total		46
Average		4.6
Criteria		GOOD

The results of the material experts' research obtained a total score of 46 with an average of 4.6. Based on the feasibility test table, the Android-based learning media developed falls into the "good" category.

5. Implementation:

This research aims solely to conduct feasibility evaluation of the media and materials. After completing the feasibility evaluation of the Android-based learning media, the next step is to enter the implementation phase, where the learning media will be handed over to teachers for use in teaching Computer Devices for seventh-grade Informatics subjects at SMPN 1 Bendosari.

6. Evaluation:

Evaluation is the final step in the ADDIE development model because in this study, it only reaches the validation test for media feasibility. Therefore, the evaluation referred to is the evaluation of feedback and input during the validation tests for both media and content. Subsequently, researchers can determine the suitability of this instructional media for use in the learning process based on the validation results of the product and the responses indicating that the developed media is suitable for use in the learning process (Arif Andi Hidayat, 2023).

CONCLUSION

The use of mobile learning media in the learning process must meet evaluation criteria from various aspects, including learning, content, language, layout, motivation, and benefits. This evaluation is conducted by media experts and content specialists to ensure that the media meets the needs and is effective in delivering learning materials. In the validation stage, media experts rated this Android-based learning media at 4.35 (good) category. Meanwhile, in the content expert validation stage, it scored 4.6 (good) category.

Based on the trial results of this Android-based learning media development, it falls into the "good" category. The evaluation of the media's feasibility also indicates that it is suitable for use in the learning process. Therefore, it is hoped that teachers can develop innovative and effective learning media, which can attract students' interest and help them better understand the subject matter. Thus, the development of mobile learning media has good prospects for improving the quality of informatics education in schools, with recommendations to continue developing and applying this media in future learning processes.

CONFLICT OF INTEREST

The author declares that there are no conflicts of interest related to the publication of this article. All opinions expressed in this article are entirely the author's own and are not influenced by any party or personal interest that could affect the interpretation or reporting of the research findings.

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