

Development of Android-Based Learning Media on Web Programming Subjects at SMK Negeri 1 Ranah Ampek Hulu Tapan

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ABSTRACT: The learning process in web programming subjects at SMK Negeri 1 Ranah Ampek Hulu Tapan has not been optimal, this is due to several problems, namely 1) the availability of limited learning media (books), 2) lack of student motivation to learn and 3) lack of understanding of learning materials. This condition causes students' scores to be low. Based on the results of observations, the completeness of students' scores in web programming subjects was 45%. The purpose of this research is to develop and produce valid and practical web programming learning media.

The research method used in this study is Research and Development with the ADDIE model. This model consists of 5 stages, namely analysis, develop, design, implementation, and evaluate at each stage. This study involved 20 students in grade XI RPL who participated in web programming learning.

The results of this research are in the form of Android-based learning software that can be used as a complement in learning, especially web programming subjects. This learning media has been tested using validity and practicality tests. The validity test of the learning media aspect was carried out by 3 lecturers with an average result of 85.72% and the learning material aspect was carried out by 3 teachers with an average result of 86.22%. Meanwhile, the practicality test was carried out by 2 teachers and 20 students and obtained an average practicality score of 89.15%.

KEYWORDS: Learning, ADDIE Model, Validity Test, Practicality Test

INTRODUCTION

Law No. 20 of 2003 concerning the Education System, that education is a conscious and planned effort that aims to create a learning atmosphere and learning process so that students can be actively involved in developing their own potential and have spiritual strength, religious self-control, personality, moral intelligence, nobleness, and skills of society, nation, and state. In order for the functions and goals of education to be achieved, it is necessary to have learning activities arranged in a learning program. Education is the main aspect to create quality human resources, with education able to create human beings who are useful for the life of a nation to achieve state goals.

The development of information technology, especially in the field of education, has an influence on the learning process such as teacher teaching methods, student learning methods and the use of learning media. Currently, communication devices, especially in learning, in the form of laptops and smartphones. However, the use of smartphones such as android by students has not been utilized optimally to support the learning process. Most students use *Android* Just to access information in the form of entertainment such as social media access or playing games for a long time. Technological advances such as *Android* This can be used to improve the quality of learning. In the learning process, a teacher is needed who is able to integrate information and communication technology along with the times. As a teacher, it is required to be able to creatively design a teaching material that allows students to directly utilize the available learning resources (Kuswanto, 2019)

Learning media is one of the tools used in the teaching and learning process. Learning media is something that concerns *software* and *hardware* which can be used to convey the content of teaching materials from learning sources to students (individuals or groups) that can stimulate learners' thoughts, feelings, attention, and interests in such a way that the learning process inside/outside the classroom becomes more effective. Learning media is something that is needed in learning, so that the teaching and learning process is more effective and easy for students to understand. Utilizing digitally packaged learning media

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can arouse interest in learning and have a significant impact on students' attractiveness in learning the competencies taught (Cholifah, 2019)(Basrul et al., 2021).

According to identifying several benefits of media in learning, namely: 1) the delivery of subject matter can be standardized, 2) the learning process becomes clearer and more interesting, 3) the learning process becomes more interactive, 4) efficiency in the use of time 5) improves the quality of student learning outcomes, 6) media allows the learning process to be carried out anywhere and anytime, 7) media can foster students' positive attitudes towards the material and learning process, and 7) change the role of teachers in a more positive and productive direction. (Firmadani, 2020)The use of this learning media can be applied to any level of education, whether formal or non-formal education as long as the purpose is to facilitate or help the teaching and learning process. One of the levels of education that requires learning media in the teaching and learning process is Vocational High School (SMK). SMK Negeri 1 Ranah Ampek Hulu Tapan has several skill competencies, one of which is Software Engineering (RPL). RPL majors, especially in web programming materials, have not utilized learning media that can be accessed through Android devices.

Some related research that has been done previously such as research with (Asril, 2022) Development of Basic Programming Learning Media with the research method used is development with a 4D model, the number of respondents is 25 students and 5 teachers. The results of his research show that the learning media developed produces a level of validity of 88% and a level of practicality of 90%. The results of the study with (Salsabila, 2023)Development of Cooperative Learning-Based Print Modules on Production Management Subjects, the research method used is development with a 4D model, the number of respondents is 30 students and 6 teachers. The results of the study showed that the media feasibility test was 93.33% and the material was 94.64%. Based on pResearch with Title (Hapsari, 2021)"Development of Interactive Learning Media Based on *Android* on the Matrix Operations material" Produce a learning media in the form of an application *Android* which contains about the operation on the matrix. The feasibility test from material experts is 93.18%, media experts are 88.59%, and the assessment from students is 83.18%, so an average of 88.32% is obtained. in his research (Irawan, 2021)with the title "Development of Android-Based E-Modules for Production Management Subjects in Grade XI Students at SMK Negeri 1 Surabaya" The purpose of this research is to provide provisions for students to be able to carry out the production process optimally. In addition, production management is also the first step before production takes place. Production management lessons require students to be able to know how to prepare a script to the selection of a film crew. Research conducted by (Juanda, 2022)media based learning *Android* developed using Camtasia Studio 8.0 and *Android* Studio as the main tool. Learning media based *Android* The validation test was carried out by one material expert and media expert. The validation results of both validators show that learning media can be used with revisions or improvements. Through this learning media application, both students and lecturers will be helped in organizing the teaching and learning process both online and offline.

Based on previous researches and referring to the results of observations and interviews conducted on May 21, 2025 with resource persons for web programming subjects and students of grade XI RPL at SMK Negeri 1 Ranah Ampek Hulu Tapan, information was obtained that there were several obstacles that occurred in the learning process, namely 1) limited learning media facilities, 2) students' difficulties in understanding learning materials and 3) low student learning outcomes. From these three problems, it can be explained that the limited learning media facilities, where the media used is still conventional, namely using printed books borrowed from school libraries for a limited period of time. The use of printed books is also difficult for students to understand both in terms of the use of language and existing materials. The limitations of class XI web programming print books can also affect students' interest in learning. Improper learning media can also affect student learning outcomes. This can be seen from the acquisition of final semester exam scores for students who have not reached the Minimum Completeness Criteria (KKM) score, which is 75. Of the 20 students, only 9 completed and 11 did not complete. Or in terms of the percentage that is complete is 45% and the incomplete is 55%.

RESEARCH METHODS

This research was carried out on 20 students in grade XI of RPL SMK Negeri 1 Ranah Ampek Hulu Tapan in web programming lessons for the 2024/2025 school year. The location of the research is on Padang Kejai-Tapan street, Kampung Tengah Village, South Coast Regency, West Sumatra Province. During the research, the researcher gets an "informant", which is a person who is part of the research background and is used to provide information about the circumstances and situations that are part of the research background, and are the focus of the investigation.

The type of research used in this study is Research and Development (R&D) with the ADDIE development model. R&D aims to create new products or improve existing ones. R&D is a research approach or process that is robust enough to Increase

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teaching practice and Learning. More specifically, it is necessary to conduct research development to find a solution to the challenge Learning related to a specific problem. ADDIE model which is one of the design models (Tegeh, 2013) Learning systematic is a paradigm development used in the process Development of learning materials.

The decision to use this model was taken after considering that it follows a systematic development process and is based on the theoretical foundation of learning design. This model is structured programmatically, with a systematic series of activities, to solve learning problems related to learning resources that suit the needs and characteristics of students. The model consists of five steps, namely: (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. The ADDIE model can be shown in the following figure 1::

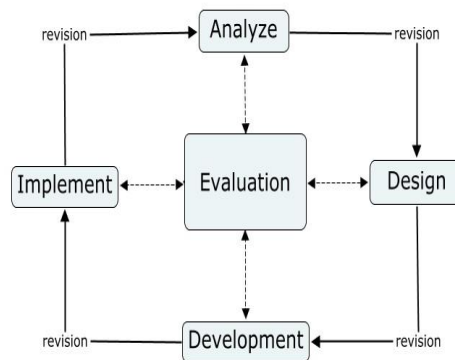


Figure 1. ADDIE Development Model

Based on Figure 1, each stage can be described as follows:

1. Analysis, at the analysis stage, is to analyze the needs for the learning media to be designed. The activities carried out at this stage are as follows:

a. Preliminary Analysis

Conducting observations at SMK Negeri 1 Ranah Ampek Hulu Tapan, based on observations, researchers found problems, namely the learning media used has not varied and one of the media used is in the form of printed books.

b. Needs Analysis

Based on the results of teacher and student interviews, information was obtained that all students already have *Android-based smartphones*, but there is no *android-based learning media* yet. Therefore, a learning medium is needed to attract students' interest in learning in order to increase their understanding of the learning material.

c. Student Characteristics Analysis

This analysis was carried out to find out the characteristics of students in participating in web programming learning

d. Curriculum Analysis

Curriculum analysis was carried out by analyzing learning outcomes in the web programming subject of class XI RPL. This is done to determine the learning objectives to be developed.

2. Design, at this stage, is carried out media design such as display, interface, order of material and verification of the desired results or achievements (learning objectives), and determination of the approach or strategy used.

3. Development, at this stage what is carried out is: developing, creating and verifying learning resources, as well as developing the necessary materials and supports.

4. Implementation, at this stage, prepares a learning environment and carries out learning by involving students.

5. Evaluation, at this stage evaluates the overall quality of the product and the teaching process. (Hidayat, 2021)

The instrument used in this study is in the form of a questionnaire (questionnaire). There are two types of questionnaires, namely the validity questionnaire of the material and the teaching media and the questionnaire of the practicality of the learning media. Before the instrument or questionnaire is distributed to the respondents, the questionnaire validation process is carried out so that the questionnaire to be used to collect data is completely valid. The questionnaire validation process is carried out by an instrument expert and experienced in research. The learning material assessment questionnaire consists of 2 aspects, namely 1) the achievement of learning objectives which contains 8 statements and 2) the suitability of the curriculum containing 6 statements. And the validity questionnaire of learning media consists of 3 aspects, namely 1) ease of use which contains 6 points

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of statement, 2) attractiveness which contains 6 points and 3) readability which contains 5 points of statement. This practicality questionnaire consists of 2 types, namely teacher practicality consisting of 12 statements and student practicality consisting of 15 statements. All questionnaires were arranged based on a Likert scale, namely 1 to 4 with categories 1= Disagree, 2=Disagree, 3=Agree and 4= Strongly Agree.

DISCOVERY AND DISCUSSION

This development research produces android-based learning media products on encapsulation and inheritance concept materials in object-oriented programming subjects. This research uses a *Research and Development (R&D)* approach using the ADDIE development model. This model consists of 5 steps, namely: (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation. At this stage of analysis, an analysis of the needs and problems of the material, learning media, student learning conditions, and basic competencies used when designing learning media using android-based learning is carried out. In particular, this discussion will concentrate on the teaching methods used in class XI Broadcasting.

Based on the problems faced by grade XI students, broadcasting shows that many students do not understand the material delivered by teachers because the learning media is less interesting such as the conventional learning model through lectures and only uses printed books To overcome this problem, it is necessary to design an *android-based* learning media which can make it easier for students in the learning process. At the design stage, the design of learning media is carried out in accordance with basic competencies in order according to learning indicators through storyboards. After the storyboard is completed, it will continue to the development stage of learning media. Figure 1 to Figure 6 show the order of development.



Figure 1. Initial Views



Figure 2 Button Operating Instructions



Figure 3. List of Learning Materials

Based on Figure 1, it can be explained that it contains an initial view of the design of the learning media, Figure 2 contains instructions on how to use the media. Figure 3 explains the contents of the list of learning materials which contain a) Definition and function of html, b) Structure of html, c) Function of html tags, d) Format of html text and e) HTML commands.

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Figure 4. HTML material

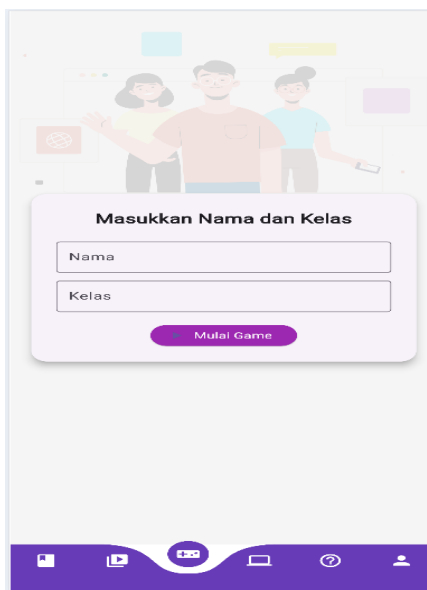


Figure 5. Student identity form

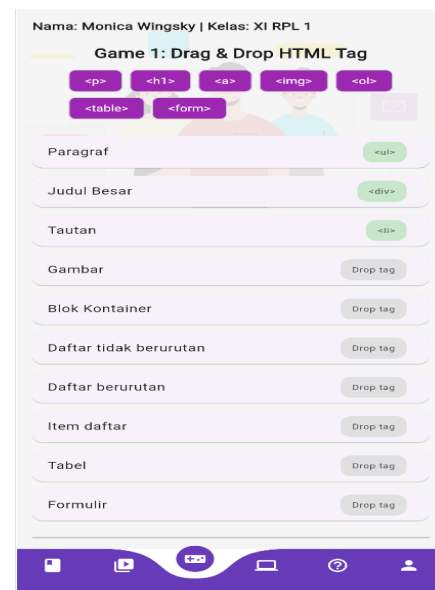


Figure 6. Types of games in learning

Figure 4 contains material that is practical in html. Figure 5 contains the student's identity form before opening the educational game. Figure 6 contains the types of games provided. The learning media that has been developed then needs to be validated by media experts and material experts. The validation of learning media carried out by media experts aims to determine the feasibility of the product as a learning medium and as a basis for improving and improving the quality of learning media. Validation is carried out by showing the media created and filling out a questionnaire containing 17 statements with 3 aspects of assessment, namely ease of use, attractiveness of appearance, and readability. The results of the validation of media experts can be seen in table 1.

Table 1. Media Validity Results

Assessment Aspects		Validator Media			Category
es		V1	V2	V3	
1	Ease of use	84,25	86,50	84,50	Valid
2	Attractiveness of the look	86,50	85,00	85,25	Valid
3	Readability	88,75	84,25	86,50	Valid
Average		85,72 %			Valid

Based on table 1, it can be described that the results of the assessment by 3 learning media experts obtained an average score of 85.45%, meaning that the learning media made was declared "Valid". The basis for declaring valid is if the value (>66) and invalid is the value (<=66).

And the results of the alliance of material experts aims to find out opinions about the feasibility of the material from the learning media produced. Material validation is also carried out by showing the learning media made and handing over questionnaires to validators. This questionnaire consists of 13 questions grouped into two aspects, namely the achievement of goals and curriculum suitability. And the results of the validation of the subject matter experts can be seen in table 2.

Table 2. Material Validity Results

Assessment Aspects		Material Validator			Category
o		V1	V2	V3	
1	Goal achievement	86.25	88,50	85.30	Valid
2	Curriculum fit	85,75	87,75	83,75	Valid
Average		86.22 %			Valid

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Based on table 2, it can be described that the results of the assessment by 3 subject matter experts obtained an average score of 86.22%, meaning that the learning media made was declared "Valid". The basis for declaring valid is if the value (>66) and invalid is the value (≤ 66).

After the learning media is declared valid, then a practicality test is carried out using a questionnaire by the teacher of object-oriented programming subjects to find out whether this *android-based* learning media is really practical in learning. This questionnaire consists of 4 aspects of assessment, namely the content of the material, the appearance of the media, the language and the ease of use. The number of statement items is 12 and the results of the practicality test can be seen in table 3.

Table 3. Results of the Teacher's Practicality Test

No	Assessment Aspects	%	Category
1.	Contents of the material	83,66	Practical
2.	Media display	88.72	
3.	Language	90.25	
4.	Ease of use	90.42	
Average		88,26	

Based on Table 3, it can be described that the results of the assessment of the subject teachers obtained an average score of 88.26%, meaning that the learning media made was declared "Practical". From the material aspect, only 83.66% of this needs to be done to adjust the material with the existing curriculum.

Furthermore, a practicality test was carried out by 20 students who took the web programming subject to find out whether this *android-based learning media* is practical or not. This questionnaire consists of 4 aspects of assessment, namely the content of student interest, media display, language and student activity. The number of questions/statements is 15 and the results of the students' practicality test can be seen in table 4.

Table 4. Results of Student Practicality Test

Yes	Assessment Aspects	%	Category
1.	Student interests	85.50	Practical
2.	Media display	84.25	
3.	Language	86.20	
4.	Student activeness	86.45	
Average		85,60	

Based on Table 4, it can be described that the assessment results of 20 students who took the web programming subject obtained an average score of 85.60%, meaning that the learning media created was declared "Practical". The basis for declaring practical is if the value is (>66) and impractical is the value (≤ 66).

CONCLUSION

Based on the results of research and discussion of the development of android-based learning media in film production management materials at SMK Negeri 4 Padang, it can be concluded that the creation of this learning media uses *Adobe Animate* application *software* and has been tested for its validity and practicality. The media validity test was carried out by 3 validators and the material validity test was carried out by 3 people. And the results of the media validity test were obtained on average of 85.72% with the Valid category. The results of the material validity test were 86.22% with the category Valid. Thus, it can be concluded that this learning media is declared to be very valid.

The practicality test of android-based learning media from teacher practicality data was 88.26% with the practical category. Meanwhile, the response from 20 students was obtained 85.60% with the practical category. Thus, it can be concluded that the response of teachers and students to android-based learning media *is* practical, so it is suitable for use in the learning process in class XI RPL SMK Negeri 1 Linggo Sari Baganti Hulu Tapan.

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