

Development of Android- Based Learning Media in Object-Oriented Programming Subjects in Vocational High School Case Study: SMKN 1 Ranah Ampek Hulu Tapan



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ABSTRACT: The object-oriented programming learning process at SMKN 1 Ranah Ampek Hulu Tapan is not optimal, this is due to several problems, namely the availability of learning media only in the form of printed books that students borrow from the school library. This causes students to lack understanding of the learning material and are less motivated to study and causes students' grades to be low according to the data obtained that the students' KKM completeness score is only 64.28%. The aim of this research is to develop valid and practical object-oriented programming learning media.

The research method used is development research (R&D) with the ADDIE model which consists of 5 stages, namely analysis, development, design, implementation, and evaluate at each stage. This research involved 28 class XI RPL students who took part in object-oriented programming lessons.

Results This research is in the form of Android-based learning software that can be used as a complement to the learning process, especially object-oriented programming subjects. This product has been grade tested its validity by several material experts and learning media experts and an average validity value of 87.79% was obtained. And the practicality test results from users, namely teachers and students, obtained an average practicality value of 85.89%.

KEYWORDS: Development, Android, Validity, Practicality

INTRODUCTION

Education is something that is not can come off and always stick in human life. Education is the main aspect of its creation quality human resources, with education is able to create humans become individuals beneficial for life and processes learning that can help students in developing his abilities (Irsyadunas, 2021). Education _ is the main aspect for its creation quality human resources, with education is able to create humans become individuals beneficial for the life of a nation to achieve state goals.

The development of information and communication technology such as *Android* has not been utilized to support the learning process. Most teachers and students just use *android* to open social networks or games. Supposedly technological advances such as This *Android* can be used in the learning process. In the learning process, an educator is needed who is able to integrate information and communication technology as time goes by. As an educator, you are required to be able to creatively design teaching materials that enable students to directly utilize the available learning resources(Kuswanto, 2019)

Learning media is one of the methods or tools used in the teaching and learning process. Learning media is something that involves *software* and *hardware* that can be used to convey the content of teaching materials from learning sources to students (individuals or groups) which can stimulate students' thoughts, feelings, attention and interests in such a way that the learning process inside/outside the classroom become more effective (Cholifah, 2019).

According to (Firmadani, 2020)identifying several benefits of media in learning, namely: 1) delivery of subject matter can be uniform, 2) the learning process becomes clearer and more interesting, 3) the learning process becomes more interactive, 4 efficiency in time and energy, 5) improves the quality of student learning outcomes, 6) media allows the learning process to be carried out anywhere and at any time, 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 learning media can be applied at any level of education, be it formal or non-formal education as long as the aim is to simplify or help the teaching and learning process. One level of education that requires learning media in the teaching and learning process

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is Vocational High School (SMK). SMK Negeri 1 Ranah Ampek Hulu Tapan has several skill competitions, one of which is Software Engineering. Software engineering majors, especially object-oriented programming subjects, have not utilized Android devices.

Several related studies have been carried out previously, such as Noval Fajri Hamdani's research with the title development of science learning media on human digestion material, the research method used was development with a 4D model, the number of respondents was 30 students and 6 teachers. The research results show that the feasibility test of learning media from the content aspect is 88.19%, presentation is 93.74%, language is 89.81%, and graphics is 90.00%. Based on research with (Hapsari, 2021) the title "Development of *Android* -Based Interactive Learning Media on Matrix Operations material" it produces a learning media in the form of an *Android application* which contains operations on matrices. The feasibility test from material experts was 93.18%, media experts were 88.59%, and assessments from students were 83.18%, so an average of 88.32% was obtained. Research (Larassaty, 2021) with the title "Development of *Android* -Based Media Assisted by the Ispring Suite Application in Mathematics Learning for Fifth Grade Elementary School Students" Results from the research, produced *Android-based mathematics learning media* on plane material for fourth grade SD/MI students. The material and media expert assessment of the product was 86.67%, with a very good category and the student assessment of mathematics learning media was 87.8%.

Based on previous research and referring to the results of observations and interviews conducted on July 12 2023 with resource persons, object-oriented programming subject teachers and class XI RPL students 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 material and 3) low student learning outcomes. From these three problems, it can be explained that learning media facilities are limited, where the media used is still conventional, namely using printed books borrowed from the school library for a certain period of 1 week. The use of printed books is also difficult for students to understand both in terms of the use of language and the existing material. The limitations of class XI object-oriented programming textbooks can also affect students' interest in learning. Inappropriate learning media can also affect student learning outcomes. This can be seen from the students' final semester exam scores that have not reached the Minimum Completeness Criteria (KKM) score, namely 75. Of the 28 students, only 10 completed and 18 did not. Or the percentage that was completed was 35.71% and that which was incomplete was 64.29%.

RESEARCH METHODS

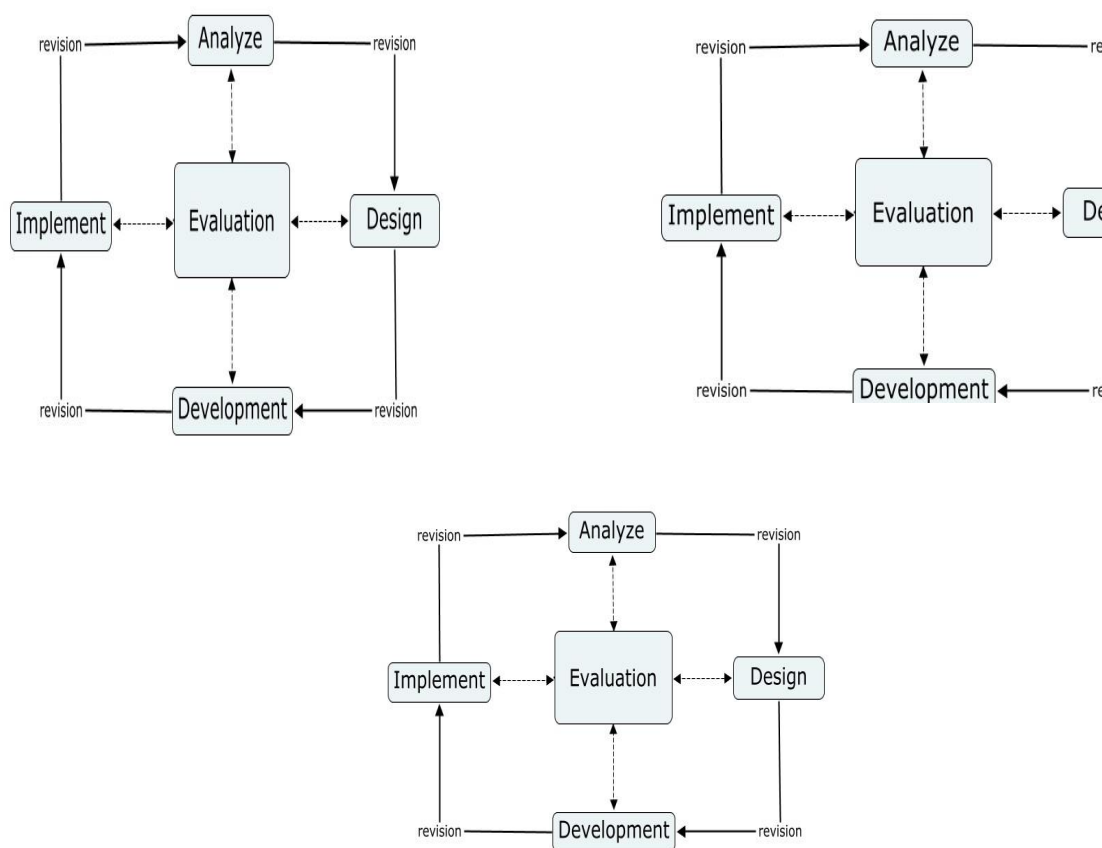
This study was carried out by students in the RPL class XI at SMKN 1 Ranah Ampek Hulu Tapan totaling 28 people in object-oriented programming lessons year lesson 2022/2023. Location research on Jalan Padang Kejai Kenagarian Kampung Tengah Tapan, Ranah Ampek Hulu Tapan sub-district, Pesisir Selatan Regency, West Sumatra Province. An "informant", that is person Which is part from background behind study and used For give information about circumstances And situation Which become part from background behind study, is focus investigation.

The kind of research that was category of development research, abbreviated as R&D, with the ADDIE development model. R&D aim For create new products or perfect it product Which Already There is. R&D is approach or process study Which Enough strong For increase practice teaching And learning. More special again, necessary done study development For look for solution challenge learning Which related with problems certain (Tegeh, 2013). ADDIE Model Which is Wrong One model design learning systematic is a paradigm development Which used in process development content learning This.

Decision For use model This taken after consider that model This follow process development Which systematic and based on base theoretical design learning. Model This arranged in a way programmed, with Suite activity Which systematic, For solve the problem learning Which related with source Study Which in accordance with need And characteristics participant educate.

Model This arranged in a way programmed with Suite activity Which systematic. Model This consists from five step, that is: (1) analysis, (2) design, (3) development, (4) implementation, And (5) evaluation. The ADDIE model can be shown in Figure 1 below:

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Picture 1. ADDI E Development Model

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

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

The research started from observations at SMK Negeri 1 Ranah Ampek Hulu Tapan, based on observations the researchers found a problem, namely that the learning media used was only printed books.
 - b. Needs Analysis

Based on the results of teacher and student interviews, information was obtained that all students had *Android* -based *smartphones* but there was no *Android- based learning media* . Therefore, learning media is needed to attract students' interest in learning in order to increase understanding of learning material.
 - c. Analysis of Student Characteristics

This analysis was carried out to determine the characteristics of students in participating in object-oriented programming learning
 - d. Curriculum Analysis

Curriculum analysis was carried out by analyzing KI/KD in object-oriented programming subjects in class XI RPL. This is done to determine the KI/KD that will be developed.
2. Design, at this stage verification is carried out to results or achievement Which desired (learning objectives), and determining approach or strategy Which used.
3. Development, at this stage what is done is: develop , make And verify source Study, as well as development material And supporter Which required.
4. Implementation, at this stage prepare environment Study And carry out learning with involve student.
5. Evaluation, at this stage carry out an evaluation quality whole product And process teaching.(Hidayat, 2021)

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The instrument used in this research is a questionnaire. There are two types of questionnaires, namely a questionnaire on the validity of learning materials and media and a questionnaire on the practicality of learning media. Before the questionnaire is distributed to respondents, a questionnaire validation process is first carried out so that the questionnaire that will be used to collect data is truly valid. The material validity questionnaire consists of 2 aspects, namely 1) achievement of learning objectives which contains 7 questions and 2) suitability of the curriculum containing 5 question items. And the learning media validity questionnaire consists of 3 aspects, namely 1) ease of use which contains 5 questions, 2) attractiveness which contains 5 questions and 3) language and readability which contains 4 questions. This practicality questionnaire consists of 2 types, namely teacher practicality consisting of 10 questions and student practicality consisting of 15 questions. All questionnaires are arranged based on a Likert scale, namely 1 to 4 with categories 1 = Disagree, 2 = Somewhat Agree, 3 = Agree and 4 = Strongly Agree.

FINDING AND DISCUSSION

Study **This development produces Android** -based learning media products on the concept of encapsulation and inheritance 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. On stage analysis This analysis is carried out need And problem material, media learning, condition student learning , And competence base Which used on moment designing media learning use Android based. By special, discussion This will concentrate on method teaching which used in class XI RPL.

Based on the problems faced by class *Android*- based which can make it easier for students in the learning process. At the design stage, learning media are designed according to basic competencies in the appropriate order of learning indicators through storyboards. After the storyboard is complete, it continues with the learning media development stage. Figures 1 to 8 show the development sequence.

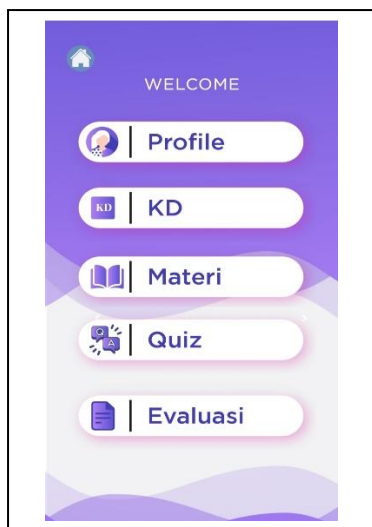


Figure 2. Main Menu Display



Figure 3. Profile Menu Display



Figure 4. Basic Competency Display

Based on Figure 2, it can be explained that the learning media design consists of a profile menu, basic competencies, materials, quizzes and evaluation. Figure 3 explains the profile of learning media creators and Figure 4 explains the core competencies of the concepts of encapsulation and inheritance.

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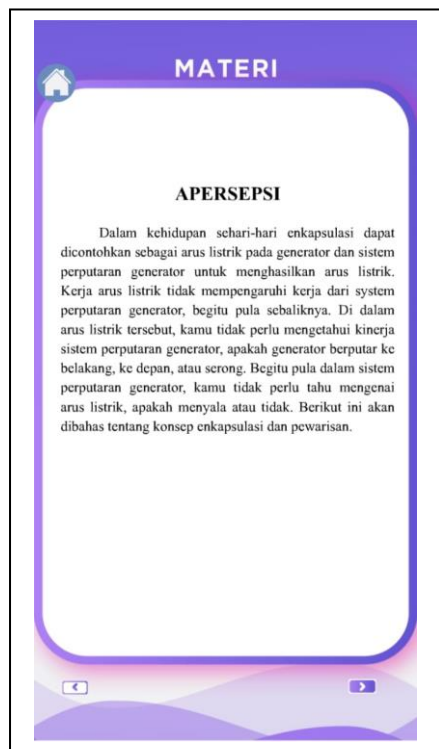


Figure 5. Apperception Material Display

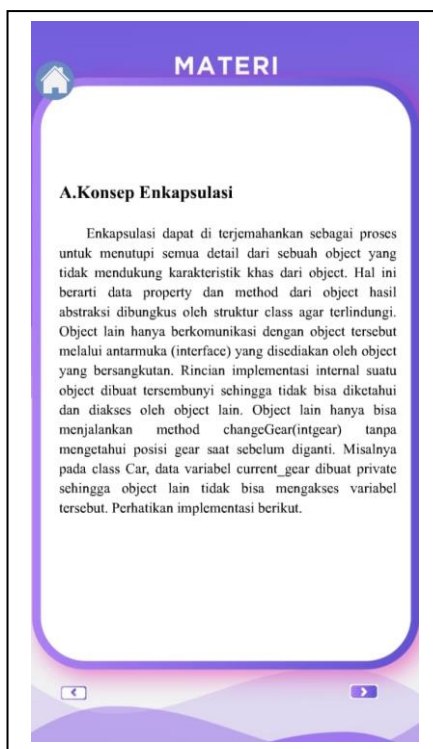


Figure 6. Encapsulation Material Display

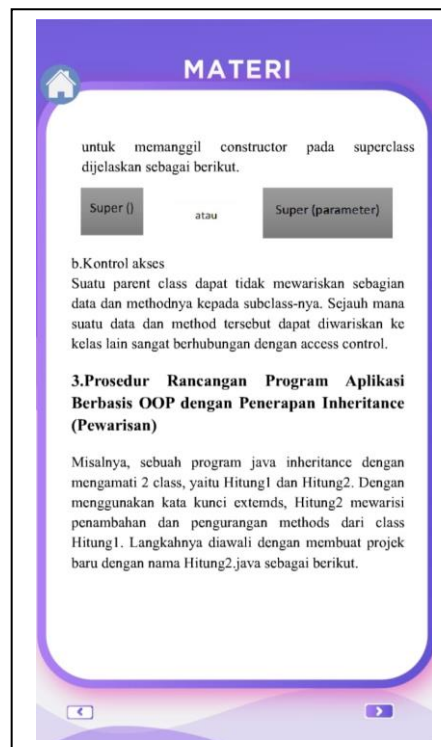


Figure 7. Inheritance Display

Figure 5 explains the content of the material, namely Apperception, Figure 6 explains the material on the concept of Encapsulation and Figure 7 explains the procedure for implementing inheritance.



Figure 8. Guide View

Based on Figure 8, it can be explained that the display contains a guide for taking the quiz, so that students do the quiz according to the instructions and avoid mistakes.

The learning media that has been developed then needs to be validated by media experts and material experts. Validation of learning media carried out by media experts aims to determine the suitability of the product as a learning media 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 14 questions with 3 assessment aspects, namely ease of use, attractiveness of appearance, language and readability. The results of media expert validation can be seen in table 1.

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Table 1. Media Validity Results

o	Research Aspect	Media Validator			Category
		V1	V2	V3	
1	User convenience	80	100	100	Valid
2	Attractive appearance	70	90	65	Valid
3	Language and readability	93.75	100	87.50	Valid
Average		87.36 %			Valid

Based on table 1, it can be explained that the results of the assessment by 3 learning media experts obtained an average score of 87.36%, meaning that the learning media created was declared "Valid". The basis for declaring valid is if the value is (>66) and invalid is the value (≤ 66).

Expert validation results material aim For know opinion about appropriateness material from learning media Which generated. Validation material Also done with show the learning media created and submit the questionnaire to validator. This questionnaire consists of: from 13 questions _ grouped become two aspects, namely achievement of objectives and suitability of the curriculum. And the results of the material expert validation can be seen in table 2.

Table 2. Material Validity Results

o	Research Aspect	Material Validator			Category
		V1	V2	V3	
1	Goal achievement	87.5	93.8	78.1	Valid
2	Curriculum suitability	90	90	90	Valid
Average		88.23 %			Valid

Based on table 2, it can be explained that the results of the assessment by 3 material experts obtained an average score of 88.23%, meaning that the learning media created was declared "Valid". The basis for declaring valid is if the value is (>66) and invalid is the value (≤ 66).

After the learning media is declared valid, a practicality test is then carried out using a questionnaire by the teacher object-oriented programming subjects for know is media learning based *android* this is really practical in learning. Questionnaire This consists of 4 aspects of assessment, namely material content, appearance, language and convenience. The number of questions/statements is 10 and the practicality test results are available seen on table 3.

Table 3. Teacher Practicality

No	Assessment Aspects	%	Category
1.	Material Contents	75.00	Practical
2.	Appearance	96.67	
3.	Language	87.50	
4.	User Ease	100.00	
Average		88.54	

Based on table 3, it can be explained that the results of the subject teachers' assessment obtained an average score of 88.54%, 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).

Next, a practicality test is carried out by 28 students taking object-oriented programming courses for know is media learning based *android* This practical or not . Questionnaire This consists of 4 aspects of assessment, namely the content of student interests, appearance, language and student activity. The number of questions/statements is 10 and the practicality test results are available seen on table 4.

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Table 4. Student Practicality

No	Assessment Aspects	%	Category
1.	Student interests	83.33	Practical
2.	Appearance	82.86	
3.	Language	78.57	
4.	Student activity	88.21	
Average		83.24	

Based on table 4, it can be explained that the assessment results of the 28 students who took the subject obtained an average score of 83.24%, 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 research results and discussions on the development of learning media *Android* based on object-oriented programming material at SMK Negeri 1 Ranah Ampek Hulu Tapan. It can be concluded that the creation of this learning media uses *Adobe Animate* application *software* and has been tested for its level of 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 media validity test results obtained an average of 87.36% in the Valid category. The material validity test results were 88.23% in the Valid category. Thus it can be concluded that this learning media is declared very valid.

Android- based interactive learning media from teacher practicality data was 88.54% in the practical category. Meanwhile, the response from 28 students was 83.24% in 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 at SMKN 1 Ranah Ampek Hulu Tapan.

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