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Development of Android-Based Learning Media in Simulation and Digital Communication Subjects

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Abstract

The research's aim to get *a valid,* practical, and effective android-based learning media in the subjects of simulation and digital communication. This android-based *learning media* is designed to be able to improve the understanding of learners so as to improve learning outcomes. This study uses *research and development method* (R*and D)*with 4-D development procedure (*define, design, develop,* and *desseminate)*. The research subjects were students of class X Software Engineering at SMK Negeri 1 Sintuk Toboh Gadang consisting of 27 students. Data analysis techniques using N gain *test.* , as well as effective in improving the understanding of learners obtained from *the calculation of the gain score* obtained by 0.63 with a moderate category. So it can be concluded that android-based learning media is effective to be used as a media for simulation learning and digital communication.

Keywords: Learning Media, Simulation and Digital Communication

INTRODUCTION

In this era of the 21st century, the development of technology and science is developing very rapidly and rapidly to reduce, even eliminate the role in humans. With this era of industrial revolution where all designed by creating a sophisticated, pampered human being a variety of conveniences in carrying out an activity. One of them, with the development of communication technology and information that is disturbed in changing life in humans. The advancement of technology is very easy to serve between people in various parts of the earth.

The presence of technology is said to be a controller that is projected to master all aspects of human life including industry. Industrial Revolution 4.0 comes with a concept that proclaims technology continuously by based on deep communication through the internet will enable the exchange of information in an interacting manner, not only between humans, people and machines, but also between machines themselves. The development of industrial revolution 4.0 is affected by a change in the indonesian educator system. The world expects competition and innovation in change. Changes that impact teachers actively in educating learners by preparing funds to meet the

needs of the industrial revolution 4.0. The use of technology with all aspects including in the field of education, one of which is the use of technology as a learning media with a n learning media needs in the development of technology that is not left behind, and in learning activities carried out without inhibit space and time limits.

With information and communication technology can make it easier for learners to learn and get the information needed from anywhere and anytime. Information technology can turn conventional learning into learning using media tools. According to Arsyad (2011), the use of learning media in the teaching and learning process can generate motivation and stimulation of learning activities, and even bring psychological influences to learners. One of them in Vocational High School (SMK) can utilize technology, especially in learning. Where the media used in SMKN 1 Sintuk Toboh Gadang already use technology, ranging from the use of learning media in the *form of powerpoints,*the use of computers and the use ofprojectors in labor in *the use of Android Smarthphone* has not been used in the learning process, while *the advancement of smarthphone* technology *is very rapid and smarthphone* is widely owned by students in SMKN 1 Sintuk Toboh Gadang, *many smarthphones* have similar features to computers to improve their functionality, for example can read data in the form of documents, slides *on powerpoints,* pdf and flash.

With the *development of smarthphone,* teachers can use the Android *smarthphone as* a learning tool in the form of more interesting and flexible learning media, making it possible for learners to learn anywhere and anytime and can be used to learn independently. One of them can be applied to the subjects of Simulation and Digital Communication.

Smarthphone is not only for accessing social media but can also be used as a supporting medium in the teaching and learning process and for learners can be used as a self-learning medium. In the process of learning subjects Simulation and Digital Communication is still using *powerpoint.* Where *powerpoint* is a learning media contained in Microsoft *Office* by *displaying slides* that are projected using a projector containing simulation materials and digital communiques, but *powerpoint* is less supportive in the process of learning simulation and digital communication, *because powerpoint* can only be a learning presentation that is a tool for teachers in supporting the learning process in the classroom, *where this powerpoint* contains the subject matter taught. *This Powerpoint* program is designed for the purposes of making presentations, but *powerpoint* cannot be used as self-learning *software* in simulation and digital communication subjects

Android-based *learning* media that can produce learning media for learners, so *that their smarthphone* is not only limited to social media, but can also be used to support learning, learners become active, overcome boredom while learning, which used to use *powerpoints* and with lecture methods by teachers, they will later be more interested in the media downloaded and installed applications needed *through Playstrore on their respective android smarthphones,* not only social media but also learning media that can be used.

METHOD

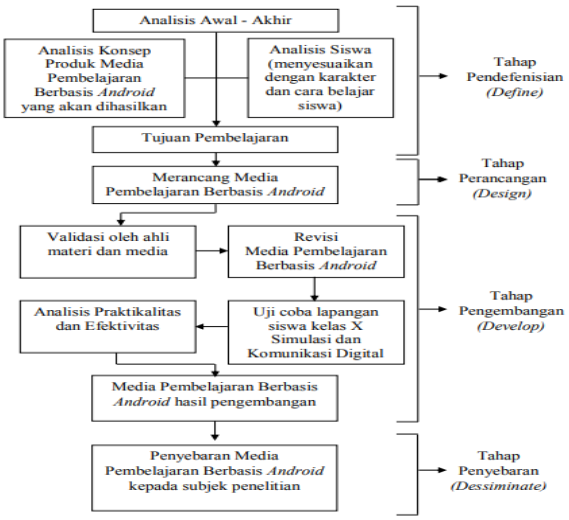
This research is a development research based on problem formulation and research objectives to be achieved. In this development research, the resulting product is *android-based learning* media created and designed by adopting the steps of the learning model. This development research was chosen because development research is research used or done to produce certain products and to test the effectiveness of products made and developed. So that the products produced in this research actually meet the requirements of testing and development before it can be applied in the learning process.

Development Model

The development model used with the development of learning media is a 4-D development model consisting of 4 mains such as; *Define, Design, Develop* and *Desimminate* (Trianto, 2012:189). Model.4-D researchers chose because the development model has a step in order, and the goal of producing a product that is in sync with the mas a that has been backgrounded in this study.

Development Procedures

Steps todevelop learning media for Simulation and Digital Communication Subjects can be seen in Figure 1



Gambar 1. Prosedur Penelitian

Research Sample

The sample in this study was 27 students of class X Software Engineering at SMK Negeri 1 Sintuk Toboh Gadang School Year 2020/2021.

Data analysis

Data collection techniques using observations and questionnaires. Observation is used to know the needs of learning media developed, namely android-based learning media.

The questionnaire contains media feasibility assessments by media experts, material experts, teachers, and students as users.
Data collection process using research instruments consisting of observation sheets and questionnaires. The observation sheet is carried out by observing student grades and the learning process, so that the observation results as a reference in the making of learning media. Questionnaires are used to reduce mediafeasibility.
Data are analyzed descriptively qualitatively and quantitatively. Qualitative data in the form of descriptive data obtained from validation results by experts, the results obtained are used as a reference for product revisions. Quantitative data is obtained from changing qualitative data using likert scale with scales of 4 (excellent), 3 (good), 2 (sufficient), and 1(less).
The product is said to be worth using if the feasibility value is already in or beyond the goodcategory.

Table 1. Percentage Scale and Categories

Percentage of Achievements	Category
81% - 100%	Excellent
61% - 80%	Good
41% - 60%	Enough
21 – 40%	Less
0 – 20%	Very Less

Android-based learning media developed is said to be effective based on student learning outcomes consisting of improving learning outcomes and the achievement of learning outcomes. Improved learning results using the *N gain test* with the following formula:

$$g = \frac{S\ post - S\ pre}{100 - S\ pre} 100\%$$

Description:
g= *gain score*
Spost = skor *posttest*
Spre = skor *pretest*

Normalized gain score is a good method to analyze prestest *and* posttest *results. Gain score* is a good indicator to show the effectiveness of learning as seen from pretest *and posttest scores.* The improvement of learning outcomes is categorized into three categories, namely:

Table 2. Category *Gain score*

No	***Gain score***	**Category**
1	g > 0,70	High
2	0,30 < g	Medium

	<0,69	
3	g <0,29	Low

RESULT AND DISCUSSION

Validity of Learning Media

Before being used in learning activities, mehe android-based *learning* has had a valid status through validation test. The test stage of media validity is conducted so that the learning media developed can be known feasibility based on the assessment of material experts and media experts. The purpose of validation activities in this study is to obtain valid status from experts. If this learning media is not valid then validation will continue until a valid android-based learning media is obtained. Android-based *learning media* in this study is said to be valid if the validator has stated that the media is valid and there is no revision to the android-based *learning* media.

Validity test data obtained from instrument data filled by validators who are media experts and experts of learning materials. Here are the results of the poll data from the results of expert validation.

Validity of media experts

The validity of the media is a validation of the design of the resulting product. This media validation is done by two media expert validators and this media validation has three assessment requirements, namely didactic requirements, construction requirements and technical requirements. Media validation poll format can be seen in attachments

The assessment result of each aspect given validator is analyzed using the statistical formula Aiken's V. The results obtained are validation values against the design of the resulting product. The results of validation recapitulation summarized from aspects of learning media that are considered asman are seen in table 3 below.

Table 3. Validation Results against Android-based Learning *Media*

No	Aspek Validasi	V1	Kategori	V2	Kategori
1.	Aspek Didaktik	0,92	Valid	1,00	Valid
2.	Aspek Kontruksi	0,89	Valid	1,00	Valid
3.	Aspek Teknis	0,90	Valid	0,93	Valid
Rata-Rata		0,90	Valid	0,98	Valid

Based on table 3 shows validation results from media experts on android-based learning media. The validation result shows that this *android-based* learning media has a validity value of 0.90>0.66 given the 1st validator and a validity value of 0.98>0.66 given by the 2nd validator, then the android-based learning media *belongs* to the validity category.

Validation of material experts

Validation of this material is carried out by two validators of Simulation and Digital Communication learning materials. The purpose of validation of this material is for the accuracy and suitability of learning materials contained in *this android-based learning* media whether it is in accordance with the needs of learning.

Validation done by material experts is reviewed from aspects of material quality, learning aspects, interaction aspects and display aspects. In the implementation of validity, experts review the material in this android-based learning media and then validators give value to the material in the learning media. The results of the study of each aspect given validator were analyzed using aiken's V formula. The results of validation recapitulation are summarized from aspects of learning media material that are assessed as seen in table 4. following.

Table 4. Material Validation Data Against Android-Based Learning *Media*

No	**Validator**	**Assessment**	**Category**
2.	Validator 1	0,87	Valid
3.	Validator 2	0,88	Valid
Average		0,88	Valid

Based on table 4. aboveshows the validation results of *android-based learning* media material has a validity value of 0.87>0.66 given by the 1st validator and a validity value of 0.88>066 given by the 2nd validator, then the material in the android-based learning media *belongs* to the validity category.

Praktikalitas Media Pembelajaran

Teacher's response to the practicality of android-basedlearning media

Practicality is related to the ease of use of developed learning media. Practicality data was obtained through a questionnaire filled by two teachers of SMKN 1 Sintuk Toboh Gadang in the subjects of simulation and digitalcommunication. The results of the assessment of practicality are summarized in table 5 below:

Table 5 Results of Teacher Response Poll

No	Aspects	(%) Category	
1.	Facilities	95	Very Practical
2.	Time	97,5	Very Practical
3.	Use	100	Very Practical
Average Student Response		97,5	
Aspect Category		Very Practical	

From table 5 can be taken the average practicality assessment is 97.5% so it can be concluded that android-based *learning* media fall into the category of "Very Practical".

Learners' Response to Android-Based Learning Media Practicality

Media practicality also requires input in the form of responses from 27 students of SMKN 1 Sintuk Toboh Gadang. This data is obtained after the learner uses the learning media, then the learner fills in with the given questionnaire (Appendix 13). The results of the assessment of the practicality of learning media are summarized in table 6 below:

Table 6. Student Response Questionnaire Results

No	Aspects	(%) Category	
1.	Facilities	89,81	Very Practical
2.	Waktu	92,22	Very Practical
3.	Penggunaan	90,81	Very Practical
Average Student Response		90,95	
Aspect Category		Very Practical	

From table 6. can be taken the average practicality of 90.95%, so it can be concluded that the learning media is included in the category of "Very Practical"

Effectiveness of Learning Media

Classical Completedness

Classical completion is seen from the percentage of the number of learners who complete after using *android-based*learningmedia. The basis for determining the effectiveness of *android-based* learning media is the presentation of classical completedness of learners greater than or equal to 85% then android-based learning media *is* effectively used. Otherwise, the learner's classic completedness presentation is smaller with 85% of android-based learning media ineffectively used. The following results of average student grades in Simulation and Digital Communication subjects are presented in table 7.

Table 7. . Classic Student Completed Class X RPL

No.	KKM	Number of Learners	%
1.	< 75	3	11%
2.	≥ 75	24	89%
Amount		27	100

Based on the results of the analysis described in table 7. obtained data on the number of complete learners as many as 24 learners (89%), this indicates classical completion has been achieved, it can be concluded that *android-based* learning media effecttuf is used if reviewed from classical completion.

Test of Gain Score

Improvement of learners' learning outcomes *after preetest* and *postest is* calculated with a gain score. Learning media is said to be effective if the gain score obtained ≥ 0.3 or at least in the medium category. The gain score is 0.63 in the medium category. The result of gain score analysis can be seen in table 8

Table 8 Gain Score *Recapitulation*

N	Minimum Value	Maximum Value	Gain Score
27	0.33	0.93	0.63
Category			MEdium

Based on classical completedness reached 89% and niali gain score of 0.63 with medium category, it can be concluded that *android-based* learning media is declared effective.

Stages of Settlement

At this stage the learning media developed is ready to be used by teachers and learners in learning Simulation and Digital Communication and is ready to be widely distributed.

CONCLUSION

This study has produced Digital Simulation and Communication teaching materials with android-based learning media *in the X* class of Software Engineering expertise. The process of developing teaching materials Simulation and Digital Communication with android-based learning media was developed in reference to the development model of Thiagarajan 4-D namely *Define* (Definition), *Design* (Design), *Develop* (Development), and *Dessiminate* (Deployment)

Simulation and Digital Communication teaching materials with *android-based learning* media developed have been declared valid after being validated by 4 validators, 2 people for media validation and 2 people for material validation. The assessment results for media validation are declared valid by the validator

Teaching materials Simulation and Digital Communication with *android-based learning* media developed can be practical after a trial on teachers and learners. The results of the assessment of teachers and learners on the practicality of *android-based learning* media stated that android-based learning media is in a very practical category.

Teaching materials Simulation and Digital communication with android-based learning media has gone through the effectiveness test stage through the test of learners' learning results, namely *pretest* and *postest.* The effectiveness test results state that this android-based learning media is in the effective category. Evidenced by the learning outcomes of learners who experienced.

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