Developing of Android Based Educational Games As a Supplementary Media For Vocabulary of Junior High School Students

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Abstract

The problem in learning English is almost all students have difficulty in learning vocabulary and the students lack of mastery of English vocabulary, another problem is that students' interest in learning vocabulary is very low because they think it is very difficult to memorize it. In addition, teachers do not use media to help the vocabulary learning process. So, the students need media to help learn vocabulary. The aim of this study is to develop the android based educational games and to know the result of develop the android based educational games. This type of study is Research and Development (R&D) used the Borg and Gall procedure which uses 6 stages out of 10 stages of development. There are need analysis, product design, product validation, product revision, product testing, and revise the product. The subject of the research is seventh grade students in SMPI Hasanuddin Kesamben. The feasibility of the media based on the results of the percentage of expert validation, namely: 92% media experts with Valid/Very Decent categories, material experts 81.25% with Valid/ Very Decent categories. Furthermore, the results of student satisfaction were 89% with the product category "Valid / Very Decent". Based on these results, it can be concluded that the Android-based educational game media for vocabulary is very interesting to use as a supplementary media.

Key words: android, educational game, vocabulary

Introduction

In the era of globalization and technology, humans are required to have good English skills (Makrifah, 2018). English as an international language is used as a communication tool in everyday life and in academic activities. In Indonesia, English is the official foreign language in schools. It has become a compulsory subject and as one of the subjects tested in the National Examination. Besides, there are so many elements in English such as vocabulary.

Vocabulary is one of the components of language which has the most important role in mastering four language skills. (Watkins, 2007) said that vocabulary is very important because without vocabulary, English cannot be conveyed. It means that vocabulary is important in learning English. In addition McCarty in his book stated "no matter how well the student learn grammar, no matter how successfully the sounds of L2 just cannot happen in any meaningful way", We cannot communicate with others in a certain language if we don't know much words of the language. In the teaching and learning of English need a wide vocabulary acquisition. The acquisition of vocabulary becomes the most important part in learning foreign language. It is fundamentals of a language because vocabulary has significant role in communication process. Teaching English always has different challenges at every level. Furthermore, teaching English in junior high schools also has different challenges every year. Junior high school students are "Z" generation, they are the first generation that is widely and directly exposed to the digital technologies such social networking sites and overloading information on the internet (Turner, 2018). Born in the era of technological environ-

ment, most of "Z" Generation are familiar with internet and social networking websites as they were introduced by their parents at the early age of their life. One of the characteristics of "Z" generation is that they like instant things and really like technology such as gadgets. They will be interested in learning if the teacher used technology for media to teach. In fact the teacher has difficulty using technology in learning process. The teacher learning is monotous, students just listen the teacher says and find the meaning or students just memorize the changes of verb, the nouns, adjectives, and adverbs. As the results students get bored and learning is not well accepted.

According to (Rofi'ah, 2018), the problem that often occurs is that students feel English is not the main language for them, so they are lazy to study. These problems are also found in learning English, especially vocabulary at SMPI Hasanuddin Kesamben. Based on the researcher's observations and the results of the needs analysis questionnaire on Tuesday, January 12, 2021, almost all students have difficulty in learning vocabulary. The problem is the lack of mastery of English vocabulary. Another problem is that students' interest in learning vocabulary is very low because they think it is very difficult to memorize it. In addition, teachers do not use media to help the vocabulary learning process. So the learning process cannot going well. This fact makes the writer want to investigate to solve the problems faced by students in learning vocabulary. In addition that vocabulary is quite often used in the learning process.

To overcome this problem the author provides a solution by making an Android-based educational game. According to (Kompas, 2018) from Tech Crunch, the game application category is the most downloaded in the play store. Many of online games in the play store also makes students prefer to play online games in their spare time rather than using them to search for learning information. In addition, the use of games today is not only a medium of entertainment for students but also a medium that can be used in the learning process. That matter as evidenced by the many researchers who develop android games as learning Media.

The previous study that almost related with this study is done by Ahmad Afwal Fuadi on 2020 with title "Pengembangan Media Pembelajaran Game Edukasi Berbasis Android Pada Materi Fungsi Untuk Melatih Kemampuan Penalaran Kovariasional Siswa". This study used RnD research design, the results showed that the educational game named "IO-Function" was declared valid by three validators with an average validity value of 4.47 and was declared practical in theory with the category can be used without revision. Meanwhile, based on the results of the student response questionnaire analysis, educational games were declared practical in practice with a very good category with a percentage of 87.71%. The IO-Function educational game was declared to be effective in training students' covariational reasoning skills with the results of the classical mastery percentage of students being 91.42% (Fuadi, 2020). Another is "Pengembangan Game Edukasi Berbasis Android Sebagai Media Pembelajaran Biologi Bernuansa Motivasi Siswa Kelas XI di SMA/MA" that have been done by Okta Rianingtias on 2018. This research used RnD research design. Sample of this research were 3 class of eleventh grade. The result of the research was showed that using android based educational games as a learning media is effective (Rianingtias, 2018).

Based on the problem above the aim of the research is to develop the android based educational games and to know the result of develop the android based educational games as a supplementary media for junior high school students.

Material and Method

This type of research is development research. Products that are developing educational game to improve vocabulary mastery. The products in this study will developed using the Research and Development (R&D) method by Borg and Gall (Meredict D Gall, 2002). There are ten steps to develop R&D, researchers only used six steps, because of the six steps it can be developed a product that can be used after several revisions. Then the development step becomes: need analysis, observation and collecting data, product design, validation product, revision product, product testing, and revise the product. 1. Need Analysis In this step the researcher analysis the student problem in learning vocabulary. The researcher make observation in the school, the instrument used in the preliminary study is Questionnaire and unstructured interview with English teacher. 2. Product Design is to design the product according to the problem. At this stage is designing educational games 3. Validation Design. After the design product is done, then the game is

validated by validator. Design validation is the process of assessing what a product is effective or not. 4. Product Revision, after validation by validator, it will be known weakness of the product. The weakness will be reduced by their presence design improvement. The design improvement will be made based on suggestions from the validator to produce a product that is ready to be tasted. 5. Product testing, the trial was carried out based on the provisions that had been determined by the previous researcher such as the time and place of implementation and the subject of the trial. 6. Revise Product, product revision is done by replacing or adding according to suggestions from experts.

Data Source of Development Data source can be defined as from where the data is obtained. An overview of the need analysis will take place at SMPI Hasanuddin Kesamben. The subject of this research were seventh grade students consisting of 20 students. The data used in this study are data obtained by researchers when conducting classroom observations and other supplementary data in the form of questionnaires, and interviews. Instrument that used in this research is media expert validation questionnaire, material expert validation questionnaire, and satisfaction of student's questionnaire. In this research and development used two kinds of techniques data collection, including questionnaire and interview. Questionnaire given in this study used to collect data to determine the feasibility of the product. Questionnaire given to media experts, material experts, and students as research objects. There are three kinds of questionnaires used in this research, namely a needs analysis questionnaire, a validation questionnaire, and a student response questionnaire. Interviews in this study were conducted with teachers in the field of English studies in school. The aim is to find out English learning, especially vocabulary during class as well as responses to the products developed.

Validity

Product validation is done to assess whether the design of the educational game based android developed is to appropriate and to find out whether exist or not discrepancies in the product made from both the appearance and the content. The researcher will provide an assessment sheet to each expert.

The product validity test is carried out by:

1. Validator of material is Mr. Gatut Hermawan,

S.Pd as a English Teacher in SMPI Hasanuddin Kesamben. There are four aspect that are assessed namely material aspect, learning aspect, practicality aspect, and display aspect.

2. Validator of media is Lukman Hakim Saputra, Amd.Kom who have graduated from Polinema majoring in informatics engineering, and he has a certificate of competence from BNSP with competency "Software Programming Computer". There are two aspect that are assessed namely display aspect and practicality aspect. The display aspect contain an assessment of feasibility the display of the product and the practicality aspect contain an assessment of feasibility the the practicality of the product for student use.

Reliability

Reliability is the constancy of a test to measure or observe something that is the object of measurement. In this study to measure reliability using the following formula according to (Arikunto, 2013) shown in Table 1:

$$P = \frac{\sum X}{\sum X1} X\ 100\%$$

Data Analysis

Data analysis techniques used to test all instrument questionnaires using a Likert scale, the validator is given four response options with each score is different. A score that describes the response from negative to positive. As for the scale measurement of development research on the questionnaire given by using a Likert scale as fol-

Table 1. Validation and Reliability Criteria

Percentage (%)	Validation Criteria	Explanation Eligibility Criteria
80-100	Strongly Valid	Very decent
60-79	Valid	Feasible
40-59	Quiet Valid	Less feasible
0-39	Less valid	Very importer

Table 2. Likert Scale

No	Quantitative Analysis	Statement	
		+	-
1	*Sangat Baik (SB)*	4	1
2	*Baik (B)*	3	2
3	*Cukup Baik (C)*	2	3
4	*Kurang Baik (K)*	1	4

Table 3. Eligibity Criteria

No	Percentage (%)	Eligibility Category
1	< 21%	Very importer
2	21 – 40 %	Less feasible
3	41 – 60 %	Decent enough
4	61 – 80 %	Feasible
5	81 – 100 %	Very decent

lows: (show in Table 2)
Based on the results of the validation questionnaire can be analyzed by calculating the percentage of answers to the questionnaire on each item with the formula:

$$\Sigma = \frac{X}{N} X\ 100\%$$

The eligibility category is based on the following criteria by Arikunto (2009). Show in Table 3.

Results and Discussion
The Result of Need Analysis

The step before carrying out the product development process, it is necessary to conduct a preliminary study or needs analysis to identify problems and potentials in schools so that can be used as references in product development. The instrument used in preliminary study is observation, questionnaire of need analysis and unstructured interview with English teacher. Based on the questionnaire that has been given to 20 of 7th grade students at SMPI Hasanuddin Kesamben regarding problems with vocabulary learning. Based on the questionnaire has been given, it can be concluded that students have difficulty in learning English, especially in vocabulary. It can be seen from question number one (*Apakah anda menguasai banyak kosakata Bahasa inggris*?) almost all students feel they do not master a lot of vocabulary, even though according to the results of research conducted (Gallego, M.T., & Agustin Llach, 2009; Laufer, 1998; Qian, 2002). From the results of the study, it is estimated that intermediate L2 learners have around 1,000 words to 3,000 words, indicating another wide variation. In addition, after an interview with the teacher was conducted, the students' lack of interest in learning occurred due to the absence of media for vocabulary learning. From the results of questionnaires and interviews, as well as considering online learning due to the pandemic, it can be concluded that students need vocabulary learning media that is interesting and easy to use anywhere. In addition, junior high school students are Generation Z who grew up with technology, and tend to use gadgets a lot in their daily lives. Researchers provide solutions by developing Android-based educational games as supplementary media to support vocabulary learning.

The Result Of Expert Judgement

Before validation to media experts and material experts the instruments for media experts and material experts are validated first by the supervisor. After the supervisor said that instrument is valid, the validation stage is carried out to two experts.

1. Material Expert

There are 4 aspects that are assessed, namely: material, learning, practicality, and display. Of the four aspects, there are 20 points of assessment criteria. The process of calculation using the following formula

$$P = \frac{\Sigma X}{\Sigma X1} X\ 100\% \qquad \frac{65}{80} X\ 100\% = 81,25\%$$

From the results of the validation to the material expert, it can be said that this android-based educational game has a validity level that is feasible. Proven by total score on question items 1-20 on the questionnaire given by material validator get a score 65 with validity percentage of 81,25% and the criteria is Very Decent.

2. Media Expert

There are two aspect that are assessed, namely: practicality aspect and display aspect. For the two aspect, there are 12 point of assessment criteria. The process of calculation using the following formula

$$P = \frac{\Sigma X}{\Sigma X1} X\ 100\% = \frac{44}{48} x100\% = 92\%$$

From the results of the validation to the media expert, it can be said that this android-based educational game has a validity level that is feasible given by material expert validator get a score 44 with validity percentage of 92% and the criteria is Very Decent.

The Result of Product Revision

Every expert gives suggestions to add or improve the educational game. Data for improvements and suggestions can be seen in the Table 4:

Table 4. Revisions from material and media experts

Suggestion	Revision
Font size usage is too small	Use of the font size is appropriate
Background color is too striking	Background color is appropriate with soft color

Any revisions are made on the advice of experts who have validated this product. Media experts gave revisions to font sizes that are too small causing students difficulty in reading and also a change the striking background color.

The Result Of Product Trial

The trial was conducted at SMPI Hasanuddin Kesamben with 15 students from 20 seventh grade students. There were 5 children who could not attend due to illness and for no reason. The trial was carried out by demonstrating the product that had been developed to students. After the students tried educational games, some students felt more interested and increased their interest in learning vocabulary by using games, but there were some students who had difficulty with the questions in the game. To overcome these problems, the researchers discussed with the English teacher and found solutions by changing the questions to be simpler and easier. After conducting a trial, the researcher given a student response questionnaire to the respondent, the result of the questionnaire of android based educational games reached Very Decent category. This can be seen in the total of score is 89% with the following calculations:

$$P = \frac{X}{N \; x \; Total \; Student} x100\% = \frac{534}{40 \; x \; 15} x100\%$$

$$= \frac{534}{600} x100\% = 89\%$$

Discussion

Based on the result of need analysis almost all students feel they do not master a lot of vocabulary, even though according to the results of research conducted (Gallego, M.T., & Agustin Llach, 2009; Laufer, 1998; Qian, 2002). From the research results, it is estimated that intermediate L2 learners have around 1,000 words to 3,000 words, showing wide variations. After interviewing the teacher, the students' lack of interest in learning occurred due to the absence of media for vocabulary learning. In addition, junior high school students are Generation Z who grew up with technology, and tend to use gadgets a lot in their daily lives. Researchers provide solutions by developing Android-based educational games as companion media to support vocabulary learning.

Research and development is carried out to develop learning media in collaboration with technology such as android in vocabulary education games. The product development process is carried out in accordance with the adaptation stages of the Borg and Gall steps (Meredict D Gall, 2002), of the ten product development steps, researchers only use six steps, namely needs analysis, observation and data collection, product design, validation design, product revision, and product testing. The first stage of this research and development is a preliminary study or needs analysis. From the results of a preliminary study conducted at SMPI Hasanuddin Kesamben, it turns out that learning media in schools still use learning books and there is no supplementary media for vocabulary learning. Based on the researcher's observations, students use hand phone more often than reading books and the activities that students often do with hand phone are browsing and playing games. Therefore, researchers develop media that is on the rise among students in order to generate motivation in learning, by developing Android based educational games that can be played on mobile phones.

Furthermore, the development planning stage, before the product developed, planning is carried out on the concept of the game. Development planning process begins with storyboard creation and game flows are created in the form of flowcharts. Design process game

is done through planning based on the display, design, and gameplay from start to finish game. After planning the design of the development then the next product in the design with the design that has been created. In the process of product development using software maker of a special application develop game namely *Unity* that using simple coding. In addition to designing the design of the look contained in the game using the Canva application and *Unity*.

From the development stage, then the android based educational games is validated by material and media validators, here are the results of the validation as well as the results of comparisons with previous research by Okta Rianingtias (2018) with title "Pengembangan Game Edukasi Berbasis Android Sebagai Media Pembelajaran Biologi Bernuansa Motivasi Siswa Kelas XI di SMA/MA on 2018".

1. The Results of the Material Expert's Assessment

In the Okta Rianingtias (2018) resarch, there is only one aspect that is assessed by material validation, namely the content aspect which is carried out in two stages, getting 62.57% results in the first stage and 81.24% in the second stage, it means the product is suitable for use. In this research validator of material is Mr. Gatut Hermawan, S.Pd as a English Teacher in SMPI Hasanuddin Kesamben. There are four aspect that are assessed namely material aspect, learning aspect, practicality aspect, and display aspect. The result for material expert it can be concluded that the material in this educational game valid or is suitable for use with a total score of 81,25%. From the results of the material expert validation, it can be concluded that Okta Rianingtias requires two stages of validation to obtain valid criteria, while in this study it only requires one validation to obtain valid criteria.

2. The Results of Media Expert's Assesment

In Okta Rianingtias (2018) research, there are three aspects assessed by media experts, namely aspects of quality, aspects of effectiveness, and aspects of programming of the three aspects scored 77.5%. This means that the media is suitable for use.

In this research validator of media is Lukman Hakim Saputra, Amd.Kom who have graduated from Polkesma majoring in informatics engineering. There are two aspect that are assessed namely display aspect and practicality aspect. The display aspect contain an assessment of feasibility the display of the product and the practicality aspect contain an assessment of feasibility the the

practicality of the product for student use . The result of the two aspect, it can be concluded that the android based educational game valid or suitable for use with a total score 92 % . This means that the media suitable for use.

From the result of the media expert validation, it can be concluded that the Okta Rianingtias (2018) research get score 77% and this study get higher results than the previous research is 92%. it means that the developed media has better eligibility criteria than the previous media.

After the validation the product, the product can be tested as a supplementary media, the trial was carried out at SMPI Hasannudin Kesamben with 15 seventh grade students as respondents. Then they filled out a satisfaction questionnaire given by the researcher with the percentage obtained 89% with the criteria is Very Valid/Very Decent. It means that the android based educational game can be used as a supplementary media. On the giving of student response questionnaires. There is a difference between this research and the research of Okta Rianingtias. In the Okta Rianingtias research used 3 classes to become respondents with the following scores in Table 5:

It can be seen in the table above that from the three classes the results obtained are: 85.90%, 78.69%, 80.50%. It means that the student response is very good, and in this research just used one class get score 89% with criteria Very Valid/Very Decent. To the data above, it was found that students were interested in using the products that had been made. This statement is based on the enthusiasm of students in using this product, from 15 students who took part in the trial there were 10 students who used the product to play. In addition, based on the observations of researchers during the trial, students took turns playing educational games and competing to get the highest score.

Table 5 Satisfaction respon of students

No	Class of Respondens	Amount of students	Percent
1.	X MIA 1	22	85,90%
2.	X MIA 2	33	78,69%
3.	X MIA 6	36	80,50%

Conclusion

Based on the results of development research and presentation of the discussion has been described, then the conclusions obtained are:

a. Development of an Android-based educational game application containing vocabulary material for seventh grade junior high school, namely meaning and vocabulary quiz was developed by using the tools of the application developer service provider with simple coding technique using Unity. Apart from that, another supplementary application is Canva.

b. The feasibility of the media based on the results of the percentage of expert validation, namely: expert media by 92%, material experts by 81,25%. Furthermore, the results of student responses is 89% with the product category "Very Valid/Very Decent" as a supplementary media.

Suggestion

From the results of research, analysis, discussion and conclusions can put forward some suggestions as follows:

1. Suggestion for teacher Teachers can optimize the use of media and adapt its use to the learning material and able to provide new innovations in developing media such as Android-based educational games that contains learning materials.

2. Suggestion for student Students are expected to be able to use educational game media this vocabulary well and have to learn more vocabulary so that vocabulary mastery increases.

3. Suggestion for other researcher Researcher suggestions for other researchers should be able to develop android based educational game media for specific vocabulary or other materials. The developed product can be registered on the Play store so that it can be accessed in a wider area with a more innovative and creative design and appearance, using attractive images and also adding sound as a complement to the product.

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