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Development of Learning Media Using Android-Based Articulate Storyline Software for Teaching Algebra in Junior High School

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Abstract. Mathematics is a science that deals with the study of abstract forms so that it requires objects or visual aids to concretize them to become more tangible and clear. Science and technology has developed rapidly in education, one of which is an android-based learning media. The purpose of this study was to develop an Android-based learning media on mathematics specifically in the form of algebraic for students in grade VII of SMP Negeri 2 Kartasura. Furthermore, after the development, the validity and feasibility tests were conducted by media experts, material experts, learning practitioners and students. This research conducted by Research and Development (R&D) method. In its development, 6 stages must be passed namely the analysis phase, the planning phase, the development phase, the verification phase, the validation phase, and the final phase with the learning media called OBAR. The developed media was feasible with the result of validation from media experts obtaining an average score of 3.94, was valid. The result of the validation from material experts obtained an average score of 4.5, was very valid. The results of validation by learning practitioners obtained an average score of 4.2, was valid. Moreover, the validation of the students' responses obtained an average score of 4.54, was most feasible category.

1. Introduction

The industrial revolution 4.0 has spread throughout the country, marked by the use of information and communication technology in everyday life, one of which is in the field of education. The results of the international study center engaged in literacy, reading, mathematics and science, namely PISA (Program for International Student Assessment) announced that in 2018 Indonesia experienced a lower score than in 2015. In the field of mathematics the 2018 test results showed a score of 379 while in 2015 test results with a score of 389. This is consistent with PISA in 2014 Indonesia was at the 38th level out of 42 countries in the field of mathematics, while in 2012 Indonesia was ranked 64th out of 65 countries. Pisa stated that 76% of Indonesian students' mathematical literacy skills did not reach level 2, which is the lowest score level in the score level. Innovations should made in the learning process are teaching by means of conveying them using learning facilitators such as the use of learning technology which aims to increase student learning motivation and learning effectiveness that students are expected to understand the material provided [7]. To encourage students' motivation and enthusiasm in learning optimally, namely being able to use android-based learning media so that learning can be done independently with the presence of technology such as smartphones based on android [10].

As we know, in every level of education there are subjects that are always there, from elementary to tertiary level, namely learning mathematics. Mathematics is a science that is closely related to the activities of everyday life and also aspects of reasoning can be used in various fields such as technology, social, and many more. Mathematics is a highly efficient subject, but students are still less motivated in learning. They think that mathematics is a difficult, difficult and difficult subject stressful. This is supported by the appearance of teachers who are too serious [16].



Furthermore, there is mathematics learning which discusses algebraic forms. For example, when buying and selling goods in the market with each box that includes variables, coefficients and constants. Students usually find it difficult to determine variables, coefficients, constants and solve problems related to algebraic forms in combination with other materials. This requires an understanding of the concept in students so they don't feel difficult [5]. One of the media used in learning algebraic forms today is manipulative objects as learning tools in the form of physical objects that can be manipulated, with mathematical concepts and processes [18]. The existence of this learning media is adequate, but now Indonesia is entering a digital era which is marked by self-existence in global competition so that it must prepare the mental and skills that are most easily reached in good behavior by increasing learning through a combination of technology.

One of the technologies used is the Articulate Storyline software, which is a software that functions as a communication medium for presentations to assist interactive learning [12]. The Articulate Storyline technology application can be used as a learning medium which is expected to be able to help teachers deliver material that is difficult to explain and make the learning atmosphere fun and effective [13]. According to [12] Articulate Storyline can help learning effectively and efficiently because 11% is learned through the sense of hearing and 83% through the sense of sight. In addition, we can remember 20% of what we hear and 50% of what we see and hear. In line with the development of mathematics and technology. Especially in terms of education, the use of instructional media is needed for teachers with a variety of and interactive ones, one of which is the use of Articulate Storyline technology.

Based on the problems above, learning media that can be developed are learning media using Android-based Articulate Storyline technology. The purpose of this study was to determine the form of Articulate Storyline interactive media development in mathematics learning algebraic form material and to determine the feasibility of Articulate Storyline interactive media in learning mathematics algebraic form material.

2. Method

This research includes R & D (Research and Development) because in the steps taken have the aim to develop a product that can be accounted for. The development of this research product uses a modified Borg and Gall development model due to limited time and specific costs with 6 stages as seen in Figure 1.

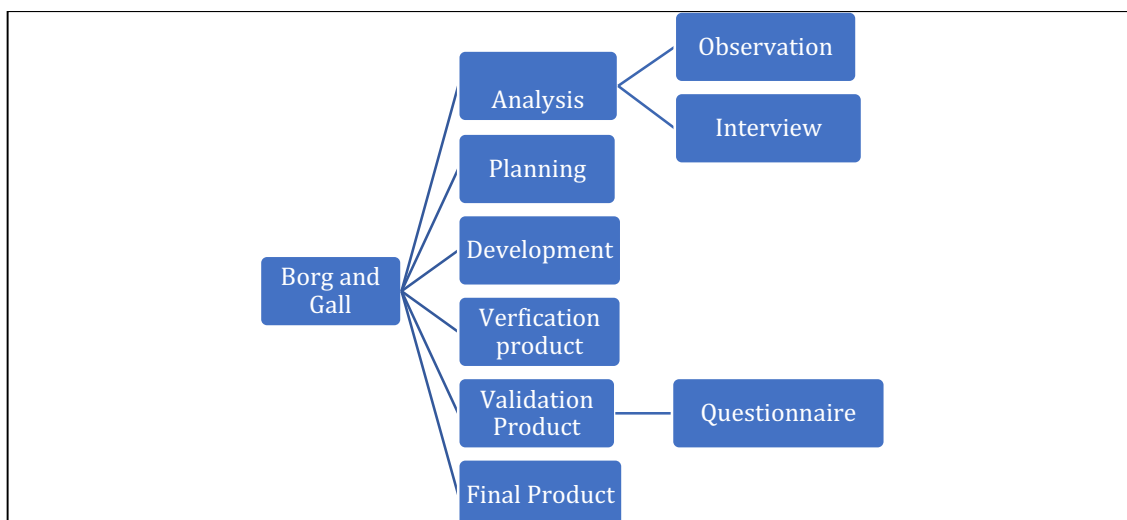


Figure 1. Phases in Research and Development

The subjects of this study were 32 students State Junior High School in Kartasura. In the implementation of this study the data were collected using a questionnaire obtained from expert

validators, learning practitioners and students. The instrument used in this study was (1) expert validation sheet for learning media to determine the quality of the media so that this media is worthy to be tested (2) validation sheet for material experts to determine the completeness and clarity of the material presented so that the material is feasible to be presented to students (3) practitioner validation sheet learning to determine the quality of the media in helping students' teaching and learning activities (4) student response questionnaire sheets to determine student responses and responses to the resulting learning media. The data analysis technique to determine the feasibility of the instructional media uses descriptive analysis by changing the qualitative form assessment into quantitative with the terms of the score as follows:

- a. Qualitative data, namely in the form of values with each criterion very good (SB), good (B), sufficient (C), poor (K) and very poor (SK)
- b. The quantitative data of the assessment score is in the form of numbers (SB = 5, B = 4, C = 3, K = 2, SK = 1) then calculating the average score of each criterion calculated by media experts and material experts. Then the score is compared with the ideal score to determine the feasibility of this learning media.
- c. Calculating the average score for each indicator using a formula with the total score divided by the number of subjects
- d. Changing the average score of qualitative values with the assessment criteria if it is more than 4.2 then the category is feasible. The average score is between 3,4-4,2 feasible category. The average score of 2.6-4.2 categories is quite feasible. The average score is 1.8-2.6 with a decent category. And the average score of less than 1.8 category is very less feasible.

3. Result and Discussion

The result of this research and development is that OBAR learning media uses Android-based Articulate Storyline. OBAR media is an interactive learning media using the Android platform that is included in the mobile-learning system in teaching and learning activities and according to the times. OBAR media development is carried out in several stages. These stages are (1) the analysis stage, at the analysis stage the researcher collects information sources related to the problems and needs of students during the learning process such as interviews and observations (2) the planning stage, namely by determining the purpose of making learning media (3) the Development Stage, namely developing learning media products in the form of algebra with Articulate Storyline software starting from compiling materials, compiling learning videos and compiling back sounds. (4) The product verification stage is carried out after the learning media is developed by conducting FGD (Forum Group Discussion). (5) Product Validation Stage, namely the product is validated by media experts, material experts, learning practitioners and the results of student responses to find out suggestions and comments about the learning product. (6) the final stage of the product, which is the result of all stages and produces learning media products based on android.

This learning mathematics using media based on android or smartphone is a technology that is already sophisticated in learning so that it can increase student motivation and help students in independent learning. Meanwhile, [8] study of mathematics learning, teachers use iPad to help explain learning material, exploit features of authenticity and personalization into formal settings and information. In this study, the teacher did not require explaining the learning material by exploiting it, but students were trained to study independently with technology and the teacher as a facility if there were things in learning that were less clear.

To develop OBAR learning media need several software namely Articulate Storyline, CorelDraw, Sparkol Video Scribe, Powtoon, and Inspiring Suit. The function each software in this development described in Table 1. The learning media developed uses the material compiler design with the www.animaker.com application and for evaluation or quizzes using www.Quiziz.com. To ensure the development process can run smoothly a storyboard needs to be made. The Storyboard for OBAR learning media can be seen in Figure 2.

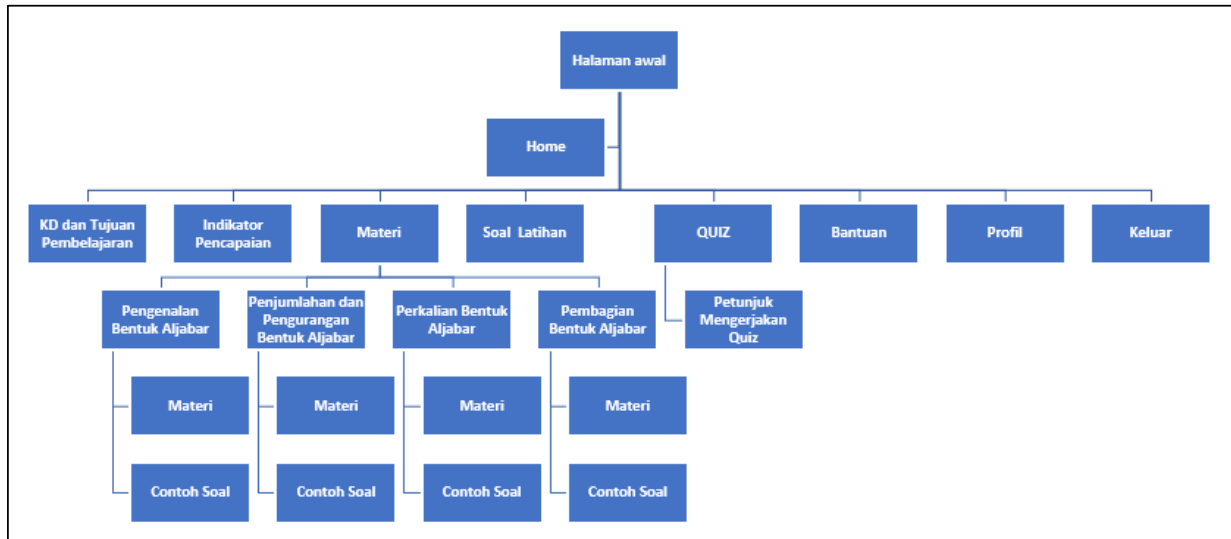


Figure 2. Story board for OBAR Learning Media

In Figure 3 was the opening page containing the title of the media. Students has to type they names then press gender to go to the main menu page. While the home page or main menu contains menu selection buttons that will go to the scene see Figure 4. There are 5 menu options including Basic Competencies and Learning Objectives, Competency Achievement Indicators, Learning Materials, Exercise Questions, and Quizzes.



Figure 3. Initial Display of OBAR Application

The results of the assessment were obtained from experts, they were two lecturers, one learning practitioner (teacher at SMP Negeri 2 Kartasura), and all 32 students. The validation results of each device for OBAR learning media using the Android-based Articulate Storyline software are feasible with the validation results from media experts obtaining an average score of 3.94, was included to valid categories. The results of the validation from the material expert obtained an average score of 4.5 with the very valid category. The results of the validation by the learning practitioner obtained an average score of 4.2 in the valid category. Furthermore, the results of the validation of the student responses obtained an average score of 4.54 with the very feasible category.

Table 1. The function of software used in development OBAR

No	Softwares	Function
1	Articulate Storyline	The main software in making OBAR learning media with multimedia format support (video, images, and timeline).
2	CorelDraw X7	Creating image designs such as logos, symbols, book covers in two-dimensional shapes.
3	Sparkol Video Scribe 2019	A learning video maker application with handwritten animation with audio.
4	powtoon	Online service software to create exposure to instructional videos, presentations with animated handwritten features, animated cartoons, and lively translation effects.
5	Ispring Suit 8	Authoring e-Learning to create various types of e-Learning content so that it can include quizzes or surveys, interactions, simulated dialogues, or screencasts.

Revolution 4.0 has spread throughout the country, which is marked by all daily activities using information and communication technology, one of which is in the field of education. Product development in the field of education is the creation of interactive android-based learning applications and is developed into an e-learning system which will later be published on the Play store and website for easy access to students.

Learning media is very important for the process of teaching and learning activities, in addition to facilitating the application of learning media to make a teacher and students create an attractive learning atmosphere so that learning is of quality and takes place optimally with an orientation at the level of student understanding. This invites students to be more active in independent learning simulations. In line with the opinion Martinez-Lage & Herren, in [4] which says that:

“It can also Individualize students’ learning since students can work at their own pace. This can help to shift from a teacher-centered classroom to a student-centered classroom. For higher-level students, they can acquire more advanced learning based on their own interest. For slow learners, it could reduce their anxiety. The final benefit is learning empowerment since teachers can provide authentic, current and culturally rich materials to the students while they can control their own learning pace.”

In today's learning system using technology or ICT-based using mobile-learning is a learning condition that affects students' interest in learning. For example, in learning algebra in class VII. In observing the learning process using conventional systems students tend to be less interested and the level of focus is reduced. This is in line with the achievement of the results of student responses to user indicators to increase student interest in learning. Interest is influential in learning because with interest someone will do something happily. Otherwise if there is no interest someone will not do it. This agrees with (Anderson, 2003) in [1] which states that:

“The application of ICT in teaching-learning process can enhance the quality of education in several ways such as increasing learner motivation and engagement, facilitating the acquisition of basic skills, and enhancing teacher training.”

In [1] discusses the teaching and learning process using ICT-based technology to improve the quality of education which aims to motivate and train teacher skills. From this research, it is not explained in detail the background of choosing the teaching and learning process using ICT-based technology.

In research [5] technology has an important role in advanced calculus learning material for computing and motivates students to help develop understanding of the procedural and conceptual

aspects of student lectures. This is in line with this research, Android-based technology using the Articulate Storyline in learning algebraic forms for students is able to develop students' level of understanding from both cognitive, procedural, and conceptual aspects. This can be seen from the questionnaire indicators which include the relevance of the material. Regarding the relevance of the material, it includes several statements regarding the quality of the material, such as the learning material is contained clearly and completely. In the software aspect, this research includes suitability in choosing fonts. In the linguistic aspect, for example in the use of language in understanding the material.



Figure 4. Home page of OBAR Application

According to [19], it was suggested that the process of learning activities based on Android changed student performance in understanding the calculus module and the numerical method. Teaching and learning activities using conventional and mobile-learning systems have significant differences, mathematics learning is easier to understand and effective for students because it can help students in independent learning [3]. Based on this explanation, the teaching and learning process using technology learning media is very necessary to improve the learning process that is more active, creative and innovative, but from this study only discusses the technology learning system does not discuss learning material in detail. In addition to developing Android-based learning media that is integrated in e-learning, this research is also in the form of android as an aid to the teaching and learning activity process in the form of algebraic form for class 8 in Junior High School equipped with animation-based learning material videos, complete explanations, and learning in the form of "Game Education".

4. Conclusion

Based on the research and development that has been carried out on the OBAR application learning media, several conclusions are obtained, namely the development of Android-based learning media using the Articulate Storyline 3 application software on the material of Algebraic Forms for Class 8 in Junior High School using the Borg and Gall development model which has been modified into 6 stages. These stages are (1) analysis stage (2) planning stage (3) development stage (4) product verification stage (5) product validation stage (6) product final stage. Based on the results of the validation of each of these devices, the OBAR learning media using the Android-based Articulate Storyline software is feasible with the validation results from media experts was valid. The results of the validation from material experts was very valid. The results of the validation by the learning practitioner was valid. Furthermore, the validation of the student responses concluded to very feasible category.

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