



Setreasure : Android-Based Learning Media on Sets Material

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ABSTRACT

This study aims to determine the feasibility of developing the SETREASURE learning media that has been developed and to determine the students' responses to the SETREASURE learning media. SETREASURE is aimed at seventh grade students, especially on set material. This research was conducted using the Research and Development method with the ADDIE development procedure (Analyze, Design, Development, Implementation, and Evaluation) using the Construct2 application and the web2apk. The data collection technique used a validation questionnaire in material validation sheets, media validation sheets, and student response questionnaires. The developed learning media application is equipped with material especially on in seventh grade. The feature of application, such as explanations, videos, sample questions, practice questions, and game score results. The data analysis technique in the form of an assessment score was carried out quantitatively. Based on the validation results of the learning media, SETREASURE is very feasible with a score of 83.33% on the material aspect and 81.67% on the media aspect with a note of slight improvement, as well as the results of the student response questionnaire were given a percentage of 83.21%. Students also gave a positive response to the SETREASURE learning media so that it can be stated that this learning media is very interesting for students.

Keywords: Construct2, Learning Game, Mathematics Learning Media, Sets

1. INTRODUCTION

In order to meet the demands of the current the global changes, students need to be prepared so that they can develop actively and creatively according to what they like. This is in accordance with the statement from the Indonesia Minister of Education and Culture, Nadiem Makarim, regarding the independent learning policy. One of the points is to implement an innovative learning process to achieve optimal learning coverage (Dirjen Pendidikan Tinggi, 2020). The essence of the enactment of the independent learning policy is to teach students to be more independent by learning through many references and developing their potential. In response to this, it is necessary to have a breakthrough to innovate in making various kinds of learning resources that are interesting and fun for students.

The millennial generation is a generation born in very rapid technological developments. The millennial generation is very familiar with the use of technology. They use technology a lot in their daily activities and can spend hours with it. The goals also vary depending on the needs of each individual. The first three motivations are seeking information, connecting with friends, and entertainment (games). While playing games, most people do not realize that they have spent too much time with their smartphones. The students' frequent access to games makes them feel fine to spend time playing games and become addicted to games (Septania, 2018). This opinion is in line with the opinion of Sari et al. (2014), which states that games have an addictive charm that can make players addicted.

The issue of smartphone addiction in adolescents and children has been studied for a long time, and this has inspired researchers to come up with innovations by treating smartphone addiction in children by creating healthy features. These educational games are helpful as a learning platform for millennial students packaged as tools/ learning Media. The game itself is a strategy game that is quite effective for teaching mathematics. This is in line with Tokac et al. (2019) statement so that the development of Android-based games for learning mathematics is needed as a healthy game innovation in the form of educational games. The game method in learning mathematics can increase learning motivation by spurring students' adrenaline so that students feel learning mathematics is fun, cheerful without feeling forced but can increase students' competence, which leads to increased achievement or learning outcomes (Nursida & Dwirahayu, 2016). Many math games have been created, but most of these games are games with the quiz genre, so that students only need to answer the questions. This is certainly less interesting for students. So it is necessary to have a breakthrough in the game genre that attracts students' interest in playing it and raises students' interest to use it often.

From the development of existing research, there is a novelty developed by researchers in this study, namely developing mathematics learning media in the form of educational adventure games to be used as material supplements and independent assignments outside of learning and teaching students. The development of mathematics learning media was carried out with the help of the main application, namely Construct2, and other supporting applications, namely CorelDraw X8 and Web 2 APK Builder. Construct2 is an application under the auspices of Scirra in the form of a game engine that functions to create game/game applications in HTML5 format, which can then be developed into other multi platforms such as web browsers, Android, Kongregate, windows, iOS, Linux, Mac, etc. licensed versions, namely free and paid

(Hartanto et al., 2014). The Construct2 application has advantages compared to other builder applications. It is pretty easy to use without having to understand coding, and the appearance is easy to understand. In addition, there are also many tutorials and usage guidelines that have been provided on the construct2 website and Youtube.

The material used in the development of this media is the set material. The set is fundamental in the development of mathematics taught at the junior high school level and is closely related to everyday life. However, most students have low scores in understanding the set and its operations (Manurung, 2018). In addition, Asnidar (2014) state that many students made mistakes in solving set operation questions.

From the above background, the author aims to develop learning media for the SETREASURE application (Android-Based Educational Game), a mathematics learning media that utilizes technology to assist students in learning mathematics on set material.

2. METHOD

The method in this research is development research with the ADDIE model, which consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluating (Siswono, 2019). The data collection instrument used consisted of the results of the media feasibility test in terms of media and material, and a questionnaire was given to students to measure the level of media attractiveness and student responses to the SETREASURE media. The analytical technique used is quantitative descriptive analysis in the form of the results of the assessment scores from the validator and the student response questionnaire scores, and qualitative analysis to describe the comments and suggestions given by the learning media validators. The questionnaire is given using a Likert scale with a rating scale of 1-4. The following is a flowchart of this research in Figure 1.

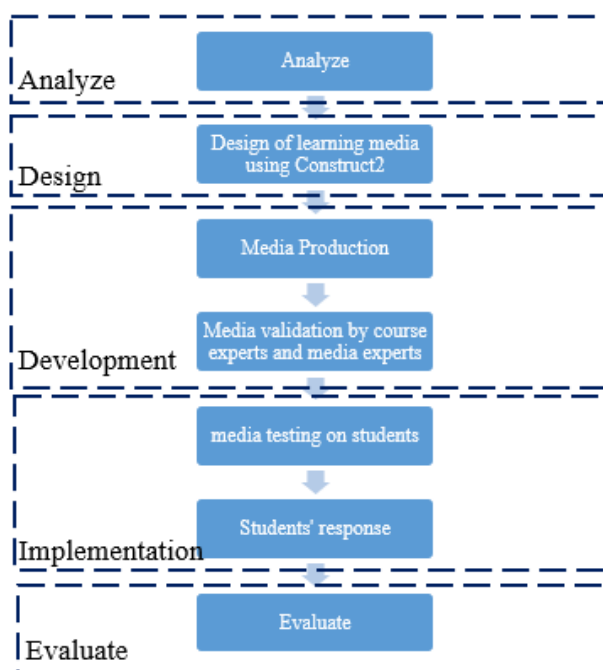


Figure 1. The flowchart of this research

Based on Figure 1, at the analysis stage, researchers conducted a needs analysis of students based on applicable curriculum references and suitable learning media as an effort to overcome solutions to problems when students are learning. At the design stage, researchers design the application using the knowledge they have and then design the application flow so that it can be run correctly and effectively. At the development stage, researchers carry out validity from experts and carry out revisions regarding what features need to be improved and added. At the implementation stage, researchers tested the application on several students and were given a response questionnaire regarding the feasibility of the application that had been used. At the evaluation stage, researchers evaluate the results of the questionnaire obtained from students.

3. RESULTS AND DISCUSSION

There have been many studies on the development of mathematics learning media before, but most of them use the form of the quiz genre to teach a material concept. While in the development of the SETREASURE learning media, there are several materials presented in the form of animated videos and explanations of the material presented in an exciting and easy-to-understand way for students, then there are adventure games that students must play to complete a mission with practice questions at each level. The purpose of this game is as a media for children's games outside of the primary teaching and learning activities, but it still has a positive impact on students by running educational games so that students can play while reviewing the material they have learned before.

3.1. The Process of Developing SETREASURE

The results of this study consist of the process of developing android-based educational game learning media on the set material, which includes a description of the ADDIE development model stage and the results of the development of android-based educational game learning media on the set material, which includes the results of obtaining the validity value and the level of student response to SETREASURE.

At the analysis stage, activities were carried out to describe the problem and determine the right solution to overcome it. The problems obtained are as follows: a) Students tend to be passive because learning is teacher-centered, b) Supports the independent learning program by the Ministry of Education and Culture, c) The number of students who like games on Android-based smartphones. In the analysis of the curriculum, information was sought about the 2013 curriculum. Based on Permendikbud No. 65 of 2013 concerning the standard of primary and secondary education processes, the learning principles used today are learning to use various learning resources and use technology and communication to improve the efficiency and effectiveness of learning. In media analysis, activities were carried out, including determining suitable media to overcome problems in needs analysis, namely researchers developing android-based educational game learning media (SETREASURE). The media was developed using the Construct 2 application as the primary application for making games, Coreldraw X8

for designing layout designs and objects on the layer, and Web 2 APK Builder to convert projects into the android format.

Based on the Analysis results based on curriculum and media. The media design stage (design) was carried out as follows: a) determine the material used in the learning media to be developed, namely the set. The material is presented in the media and was divided into definitions of sets, subsets, universe sets, slices and combinations of a set, b) layout design and storyboards. The design of the media uses adventure/adventure looking for treasure and is packaged by inserting set material. The storyboard contains technical drawing development media flow from the beginning to the end, including the main page/menu, materials, games, questions, about us, and rewards.

At the development stage, the design that has been made is carried out by developing feature designs, developing material and games presentations, choosing transparent colors that are suitable for Junior high school students, and packaging applications. Then the learning media validation test was carried out on the material and media aspects. The results of the validation of the Android-based SETREASURE application can be categorized as very feasible with the acquisition of validation of material aspects and media aspects in Table 1.

Table 1. Fixed and Random Effects

Validation Aspect	Persent-ation	Category	Suggestion
Material	83,33%	Very Feasible	-Make some examples of questions in the material video
Media	81,67%	Very Feasible	- Add app hint - Give prologue and epilogue to the game - Check navigation buttons at level 2 - Give control to the navigation of the displayed video

Based on Table 1, the data obtained from the validation of materials and media, an analysis of the feasibility of SETREASURE educational game media and SETREASURE learning media is said to be feasible to be applied. The input received is used as a product revision before being tested on respondents. At the implementation stage, field tests are attempted after the feasibility test was carried out in the previous stage. The field test aims to see the response of students after using the media. Based on the questionnaire given to the students, a total of 25 respondents, which aims to determine students' response in learning mathematics using SETREASURE, the response index is 83.21%. The results of the student response index indicate that students strongly agree that the SETREASURE media is exciting and fun to learn mathematics. At the evaluation stage, based on the feasibility test on the SETREASURE learning media from the material aspect, media aspect, and the results of the student response questionnaire, media improvements, and further revisions were carried out.

3.2. Description of SETREASURE

For starters on the application, Prolog games will be presented, which contains a storyline that aims to explain instructions for using the media and an opening video that aims to show the game's storyline, which is a secret mission that players must fulfill carry out in this game. In addition, there is also the main page that explains the features provided on the media, including materials, games, instructions, and biodata of media makers, as shown in Figure 2.



Figure 2. Main Menu

In the Material menu, players can choose material to watch and study first. The materials that can be selected include the definition of sets, subsets, universe sets, slices, and unions (Figure 3). The material is presented in the form of videos. When finished, students can return to the main page by pressing the home button. On the main page, there is also an About Us menu. The About Us menu will explain the biodata of the media maker, credits, and the parties involved.

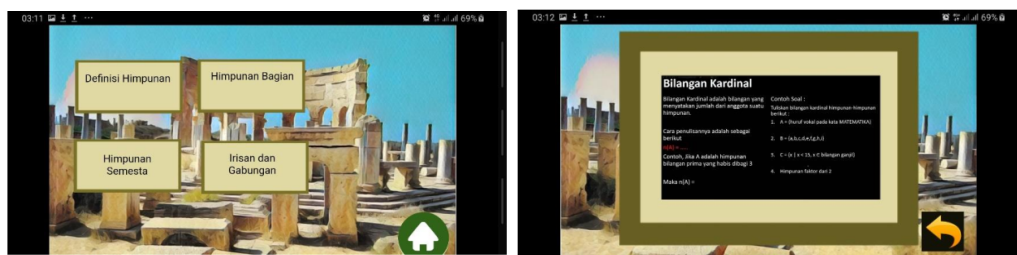


Figure 3. Materials in SETREASURE

Furthermore, the last is the games menu which is the main menu of the SETREASURE application. SETREASURE consists of four levels. Each level has four practice questions categorized as low, medium, difficult, and very difficult. In the game, there are coins and treasures. If the player gets one coin, then the player will get a score of 1. If the player touches the treasure box, then a question will appear on the screen, and the player must answer it to get a score of 20 (correct answer) and return to the beginning of the game if wrong. If the player does not answer it, he does not get a score, but in the last question of the game at each level, it must be answered with 14 correct answers to continue to the next level and, if wrong, returns to the beginning of the game. After the game layout levels, one to four are passed, the reward layout will be displayed. The reward layout displays the score earned by the player. The display of the game can be seen in Figure 3.

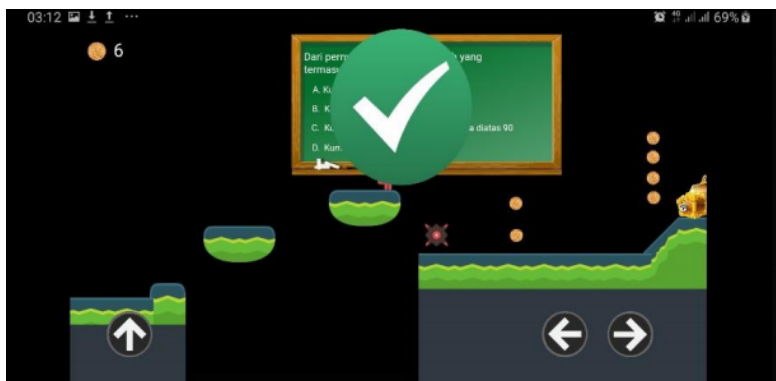


Figure 3. Display Questions answered correctly

4. CONCLUSION

SETREASURE was developed using the ADDIE method with the stages of Analysis, Development, Design, Implementation, and Evaluation. This development was carried out with the Construct2 application and the Web 2 apk Builder. The SETREASURE application has been validated by material and media experts and a student response questionnaire that shows that 83.33% of the material content is in accordance with the applicable Basic Competencies. In addition, this application also gets a score of 81.67%, which means that SETREASURE is attractive, has a creative design, and is suitable for junior high school students. So that SETREASURE media can be categorized as learning media that is "very feasible" to use.

Questionnaires were given to students regarding the response to learning mathematics after using the SETREASURE application. From the analysis of the questionnaire given to students, a percentage of 83.21% was obtained, which means that students strongly agree that SETREASURE can stimulate their learning and is exciting and fun to use. Several questions are given to students about SETREASURE also showed that students were enthusiastic about playing SETREASURE with more levels and higher level questions. In addition, the materials and games on SETREASURE have been able to provide students with an exciting understanding of the set material. For further research, it is recommended to create an application with a game with more levels. Apart from that, for developing applications on the material, it is recommended that moving animations be created to make it more attractive

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