

# Learning Media Educational Game "Gebang Datar" Geometric Shape Material with Independent Strengthening Character for Fourth Grade Elementary Students

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**Abstract**—The lack of interesting mathematics learning media in the geometric shape material makes students bored and has difficulty learning and understanding the subject matter. Based on these problems, the purpose of this research is to produce a media educational game "Gebang Datar" is valid according to material and media experts, and practically used by teachers and fourth grade elementary students. This research and development used the Dick & Carey model. In the validation activity, a fairly high score was obtained from material and media experts with a very valid category. In the trial students' activities, it was found that this game can reduce boredom while studying. So that this learning media can foster student motivation to learn. Furthermore, related to the problem of independent character, character assessment questionnaires and observation activities with good categories are used to establish students' independent characters. The results of the student evaluation after using the educational game "Gebang Datar" got a good category because it was above the average score. So the educational game "Gebang Datar", can improve student learning achievement and affect the level of students' understanding of the geometric shape material and is well used to establish students' independent characters.

**Keywords**—*learning media, gebang datar, geometric shape, independent*

## I. INTRODUCTION

Learning media is a tool or complement used to help in the learning process in each subject. One of these subjects is Mathematics. With the media in the mathematical learning process, it is expected to help improve material understanding and motivate students to attract students' attention in learning.

According to the Great Dictionary of The Indonesian Language by the dictionary development team of the Center for Language Development and Development, Mathematics is the science of numbers, the relationship between numbers and the operational procedures used in solving number problems[2].

The presumption of mathematics as a scary lesson should be abolished and replaced with a fun lesson that can motivate students to learn. Mathematics is essential for developing students' thinking skills. This is in line with the opinion of Yuniawatika et al, mathematics is a very important lesson to grow and develop students' thinking skills and instill character education in students who are expected to survive in uncertain and competitive circumstances [3]. In primary schools most of the subject matter is delivered conventionally, so the material looks less interesting.

The learning media used in Mathematics learning, especially in geometric shape materials in grade IV elementary school, is still very little or evens none. This is in line with the problems in grade IV of SDN Bajang 1 Blitar, which is the media used in mathematics learning geometric shape materials in the form of images of geometric shape shapes affixed to the board and also present concrete objects shaped like geometric shapes. Therefore, a learning innovation is needed so that the material looks more interesting and fosters students' motivation to learn. Through engaging mathematics learning, students can develop knowledge, attitudes, and behaviors through their behavior changes [4].

The lack of interesting mathematical learning media on geometric shape materials makes it difficult for students to study and understand the material

carefully. Therefore, at the time of being given an individual assignment there are still many students who choose to cheating on their friend's work because they feel less confident in their own abilities. This indicates that the application of independent character has not been implemented properly. In fact, character education has been applied to every unit of education, one of which is basic education, one of which is independent character.

The implementation of character education in learning activities can form a solid identity for students and the planting of characters, one of which is independent character and good behavior will create noble value in students[6]. In general, some of the above problems, become the basis for developing an interactive learning media that is interesting and fun so as to grow the character of students.

The criteria of learning media developed are adjusted to the stages of cognitive development of elementary school students. In general, elementary school students are in the age range of 7-11 years, so in that age range according to Piaget [7] elementary school students are still in the concrete operational stage. At this stage, students are still learning something concrete, because students are not yet able to think abstractly. In addition, elementary school students are still happy with the play activities. According to Chabib et al., the method that teachers can use during learning activities in the classroom is "Playing While Learning" [8]. That is an appropriate method for learning activities because it matches the learning characteristics of elementary school students. Therefore, it is necessary to develop a learning medium in the form of an educational game.

Educational games are designed with the aim to stimulate students' learning desires related to the topics of the lesson through play activities, in the hope that students can understand the topics presented more easily and can increase the motivation of the child to learn. The Massachusetts Institute of Technology (MIT)[10] proves that a game or game is very functional to improve the intelligence and understanding of players, especially students, to a problem in this subject matter. This is supported by Muhtasyam's previous research [11], where from the development of the game produced a medium that shows satisfactory student learning outcomes. The results of the study showed that educational games were developed as an alternative learning medium that can facilitate students' learning activities so as to influence student learning outcomes.

In addition, judging from the character problems of grade IV students in elementary school, the development of learning media must be adjusted to solve the problem of independent character deviation. Therefore, with the learning media in the form of educational games are expected to foster the independent character of students. This is in

accordance with research conducted by Ahmadi et al., which shows that there is an increase in student learning achievement after using Multimedia Indonesian Culture (MIC) educational media shown from pretest and posttest results that achieve a 100% completion score and achieve a 33.21% increase so that learning media can be used as a tool to strengthen the character education of elementary school students [12]. Thus, it can be concluded that the use of learning media in learning activities as a tool to shape the character of students.

Based on the expected learning media criteria, the learning media developed in the form of educational games on mathematics content, especially geometric shape materials, where the media can instill the concept of geometric shape and train students' skills in working on math problems related to geometric shape materials that aim to allow students to use this educational game learning media anytime and anywhere, especially during the Covid-19 pandemic and online learning today.

## II. METHOD

The research and development model conducted in the development of educational game learning media "Gebang Datar" with the strengthening of independent character refers to the Dick & Carey development model which has 10 stages tailored to the conditions and needs of research and products developed [13]. The description below shows the activity that has been done during the development phase of this research. Each phase should be done sequentially.

### 1. *Assess Needs to Identify Goals*

At this stage, the needs assessment is carried out with the aim of finding a problem and knowing what needs must be met in grade IV elementary school so that problems in learning can be solved.

### 2. *Conduct Learning Analysis*

This observation activity aims to identify students' knowledge, skills, and attitudes during the learning activities.

### 3. *Analyze Learners and Contexts*

This activity aims to know that the media developed should be in accordance with the needs of students and the conditions of the student's learning environment.

### 4. *Write Performance Objectives*

Specific objectives can be determined by analyzing the core competencies, basic competencies, and indicators used in learning in grade IV in the elementary school.

### 5. *Develop Assessment Instruments*

This activity is conducted by making an evaluation question for the assessment of students' knowledge that refers to the indicators and specific

objectives that have been created at the previous stage.

6. *Develop Learning Strategy*

The development of learning strategy in the research in grade IV SDN Bajang 1 Blitar is divided into 3 stages of activities, namely introduction, core by involving the use of learning media that has been developed, and closing.

7. *Design and Develop Learning Media*

At this stage, activities are carried out to develop and develop learning media that has been adapted to the needs of students, teachers, and the learning environment conditions of grade IV elementary students.

8. *Develop and Construct Evaluation of Learning Media*

In this study, there are 4 stages of evaluation of educational game media developed, namely (1) validation of experts, (2) practicality test of grade IV teachers at SDN Bajang 1 Blitar as users, (3) small group trials of phase I as many as 6 students, and (4) small group trials of phase II as many as 6 students.

9. *Revise Learning Media*

After evaluating the learning media, the next stage is to revise the learning media.

10. *Design and Conduct the Final Evaluation*

At this stage, it contains only statements about the results of development research that has been carried out.

III. RESULT

The results of this research and development in the form of educational game learning media "Gebang Datar" geometric shape material with independent strengthening character for grade IV elementary students are packaged in the form of interactive games and given backsound games so as not to be boring and contain an attractive look in accordance with the character of the child, presented in Figure 1.

The games in "Gebang Datar" educational game learning media are presented into 3 types of games, thus making the learning media of this educational game more varied and students do not feel bored if only with one type of game. The type of game in the learning media of educational game "Gebang Datar", is presented in Figure 2.



Figure 1. Home menu display of educational game "Gebang Datar"



Figure 2. Display of game types on educational game learning media "Gebang Datar"

In addition, the learning media of this educational game has geometric shape materials used, making it easier for students to learn the materials first before playing the available games. The material in the learning media of "Gebang Datar" educational game, presented in Figure 3.

The learning media of this educational game there is a question of training or quiz used to know the level of understanding of students to the material. The question of training or quiz in the learning media of educational game "Gebang Datar", presented in Figure 4.



Figure 3. Display of materials on the learning media of educational game "Gebang Datar"



Figure 4. Display of training questions or quizzes on the learning media of educational game "Gebang Datar"

When working on a question on each type of game or quiz, there will appear a score obtained if answered correctly or wrongly. The display when working correctly or incorrectly is presented in Figures 5 and 6 .



Figure 5. Display when working on the correct question



Figure 6. Display when working on wrong questions

Validation of educational game learning media "Gebang Datar" by material experts and media experts, as well as practicality test by grade IV teachers as users and 12 grade IV students of SDN Bajang 1 Blitar. The following are the results of the data acquisition of trial activities.

The results of the material validation assessment obtained a value of 90% which if interpreted based on the table of eligibility level criteria referred to from Akbar[14] is included in the achievement rate of 85.01% - 100% with very valid criteria and according to material experts can be used in learning activities with little revision. Furthermore, the results of media validation assessment obtained a value of 90% with very valid criteria and according to media experts can be used in learning activities with little revision. The following validation results are presented in Table 1.

Table 1. VALIDATION RESULTS

No.	Validation Subject	Score	Validation Value	Criterion	Note
1.	Material Expert Validators	90%	90%	Very Valid	Can be used without revisions
2.	Media Expert Validators	90%			

After validation, the practicality test is then conducted to the user, namely grade IV teachers at SDN Bajang 1 Blitar by using 10 aspects of questions related to the material and product display. The results of the assessment of practicality by the user obtained a value of 100% which if interpreted based on the criteria of practicality referred to from Akbar [15] included in the achievement rate of 75.01% - 100% with very practical criteria.

After conducting practicality tests to teachers as users, then the next is conducted small group trials conducted twice, namely small group trials phase I and small group trials phase II. At the time of the trial activities of a small group of phase I a number of 6 students obtained practical results of 100% which if interpreted based on the criteria of practicality referred to from Akbar [15] included in the criteria is very practical and can be used in learning activities without revision. Furthermore, in the trial activities of a small group of phase II with a total of 6 students also obtained results of 100% with a very practical category and can be used in learning activities without revision. According to students, educational game "Gebang Datar" is interesting and fun, can add insight and science, this educational game can reduce boredom during learning, and can be played anytime and anywhere. Overall, students are very happy using the learning media of educational game "Gebang Datar".

After knowing the practicality, in the small group trial activities conducted evaluation questions to measure the ability of students' knowledge of the material after using educational game media "Gebang Datar". In the trial activities of small group phase I obtained an average evaluation value of 84.16 and in the trial of a small group of phase II of 92.91 which when compared to the value of KKM, then the value is greater than the value of KKM is 75.

In addition, the small group trial activities also conducted independent character assessment of educational game learning media "Gebang Datar". At the time of the trial activities of small group I obtained the average results of self-assessment through observation activities of 87.5 and through questionnaires of 100% while in the trial activities of small groups phase II obtained a score of 95.83 through observation activities and 100% through questionnaires, if adjusted to the category benchmarks according to Pophan and Sintronik, the results obtained fall into intervals of 66.68% - 100% with good categories [16]. The assessment results obtained are an indicator that the learning media of educational game "Gebang Datar" is well used as an independent character shaper in grade IV elementary students.

Overall, based on the above results, it can be known that the learning media of "Gebang Datar" educational game is very valid, very practical and worthy of use in mathematical learning activities, and effectively used as an independent character shaper in grade IV elementary school students.

#### IV. DISCUSSION

Learning media is a communication tool used in learning activities. According to Riana learning media is a tool in learning activities that emphasizes that media as a means of conveying

messages or learning information [17]. The existence of a medium in learning becomes one of the factors that determine the success of learning activities, because the media has a strategic function in learning activities. One of the functions of learning media according to Jennah is that the learning media serves as a carrier of information from source to recipient both from teacher to student and from student to teacher [18].

The implementation of this research and development experienced several obstacles, namely at the stage of designing until the process of designing educational games took a long time because the selection of materials used to make the game is very difficult to find, and the design used by the game is quite complicated. In the implementation of validation on the learning media of this educational game runs quite smoothly because the validation process is done online. The validation result from material experts to the learning media of educational game "Gebang Datar" obtained a fairly high validity value of 90% and was declared very good to be used in learning activities. The material expert also provides input on the materials and questions contained in educational games in order to adjust the editorial of the question to the choice of answers. According to Thorn that a medium must have a cognition content that contains clear subject matter [19]. Therefore, students will not experience misconceptions if the learning media contains clear material and is able to understand and master the material well.

While the validation results by media experts on the product of the development of educational game learning media "Gebang Datar" also obtained a fairly high validity value of 90% and can be used in learning activities without revision. The validation result of this educational game can be said to have been good, because in the previous research owned by Arif & Sumbawati who developed educational games on digital photo composition subjects in class XI SMK only got a media feasibility score of 68.3% [20]. Suggestions and inputs from media experts on the learning media of educational games "Gebang Datar" are asked to use colors familiar with the lives of elementary school students and validation is also done by the class teacher to ensure the learning media is in accordance with the students. This is in line with one of the principles of learning media according to Rusman which is contextual means the creation of learning media adapted to the social and cultural environment conditions of students [21]. So that learning activities using educational game learning media "Gebang Datar" will become more meaningful.

After the product was validated by material experts and media experts, then a practicality test was carried out for users, namely the fourth-grade teacher at SDN Bajang 1 Blitar Regency who got a score of

100% so that product educational game "Gebang Datar" was declared very practical and could be used in learning activities without revision. According to the fourth-grade teacher at Bajang 1 Elementary School, Blitar Regency as a user, the learning media for educational game "Gebang Datar" is interesting and practical to use to help students in learning activities as well as being one of the alternative learning media, especially on geometric shape materials in grade IV SD. This is in accordance with the opinion of Thorn that one of the criteria for interactive multimedia is artistic and aesthetic, where learning media must have a beautiful and attractive appearance in order to motivate students in learning [19].

Furthermore, this product was tested on fourth grade students of SDN Bajang 1, Blitar Regency. The trial was carried out twice, namely the small group trial phase I and the small group trial phase II. In the first stage of the small group trial activity, the practicality results were quite high, namely 100%. So that the product can be continued to the small group trial phase II. In the small group trial phase II, the practicality results were also quite high, namely 100%. So that the product is stated to be very practical and can be used in learning activities without revision.

The results of the practicality value are supported by the positive response of students to the educational learning media game "Gebang Datar". According to students, the learning media for the educational game "Gebang Datar" is very interesting and fun. Educational Learning media game "Gebang Datar" can be used easily and can reduce boredom while studying. So that this learning media can foster student motivation to learn. In addition to knowing the practicality of the media, this activity has also carried out an assessment of students' independent character/attitudes towards the educational learning media game "Gebang Datar" through learning observation activities and through filling out student response questionnaires related to independent characters. While the assessment of student knowledge through evaluation activities.

In the small group trial activity stage I, the results of character assessment through learning observation activities obtained an average value of 87.5 and in the small group trial stage II obtained an average value of 95.83. While filling out student response questionnaires related to independent characters to the educational learning media game "Gebang Datar", in the small group trial phase I and the small group trial phase II obtained an average value of 100%. If it is adjusted to the benchmark category according to Pophan and Sintronik, the value obtained is an indicator that the learning media is game Gebang Datar educational good to use as an independent character building in fourth grade elementary school

students [16]. This is in line with the opinion of Jossberger which states that students will succeed in learning if they have independence [22]. For this reason, a person can be said to be an independent individual if he has the characteristics or characteristics as mentioned by Pasani & Pramita, some indicators of students' independent character in learning activities include, (a) carrying out instructions as well as possible, (b) focused, serious, and consistent, (c) have confidence or self-confidence, (d) demonstrate the ability to learn independently, and (e) do/finish tasks and exercises on their own [6]. So that by using the educational learning media game "Gebang Datar" in learning Mathematics in grade IV elementary school, it is expected to make him believe in himself so that he will succeed in learning.

In addition, the knowledge assessment activity in this small group trial was carried out after students finished using the educational learning media game "Gebang Datar". In the small group trial phase I obtained an average evaluation of 84.16 while in the small group trial phase II it was 92.91. This value can be categorized as good because it is above the KKM average and is one of the indicators of student success in learning and can improve student learning achievement and affect the level of students' understanding of the geometric shape material. Thus this educational game has a positive effect on students both in terms of knowledge and student independence. This is in line with the research results of Wichadee, S., & Pattanapichet, F. who found the positive impact of digital games on student performance and motivation [23].

Based on several tests on the learning media product, this educational game "Gebang Datar" has several advantages, namely it can be played anytime and anywhere and is not easily damaged, contains several variations of types of games so that students do not feel bored and bored when playing it. While the shortcomings of the educational game "Gebang Datar" include, among others, that it can only be played using android phones version 5.0 Lollipop and cannot be played using IOS, it is necessary to use a stable internet network to access the website link of this educational game "Gebang Datar".

## V. CONCLUSION

Based on the results of data analysis, it can be concluded that the learning media is educational game Gebang Datar is valid according to media and material experts, and practically used by teachers and fourth grade elementary students. The learning media of the educational game "Gebang Datar" can improve student learning achievement on the geometric shapes material and increase students' motivation to learn and is well used to form students' independent characters. In addition, the use of this learning media needs to consider the situation and conditions, among

others, the material discussed is only about geometric shapes, and in using this media schools need to have supporting facilities including networks wifi, LCD projectors and the use of android mobile phones in learning activities.

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