

# Improving Student's Management Ability with Developed Halma Media

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**Abstract.** *The purpose of this study was to develop learning media for the halma game to improve the ability to count multiples of a number for grade 4 SD in Demak Regency. This research method is Research and development. There are 3 stages in this research: the preliminary study stage, the development stage, media validation, and field testing, as well as the dissemination and socialization stage. The results of this study are in the form of manual learning media products in the form of multiples number board games from paper and MMT, and digital, in the form of digital in the form of a game application using articulate storyline 3. Validation from media experts and material experts gave assessments, validators I, II, III, and IV respectively 36, 35, 37, and 36 from a maximum score of 40. The media developed was categorized as very good. The results of the control class posttest t test and the experiment shows the value of  $t = -336$  with a Sig. (2-tailed) value of  $0.664 > \alpha = 0.05$ , so that the media developed is valid.*

*Keywords: Checkers game, multiples of numbers*

## 1. Introduction

To achieve the learning objectives, the teacher updates learning media. Learning media is an external factor that greatly influences the successful achievement of learning indicators.

One of the learning media that children like is media that contains elements of games and challenges. Because the age of the child is the age of playing. Playing is a basic need for a child that must be met. By playing, children get the opportunity to explore and develop their imagination.

According to Rubin, Fein and Vandenberg (1983) and Smilansky (1968) in Tedjasaputra (2005: 28), elementary school children aged 6-12 years, the games they run are included in games with rules, which means that their games apply certain rules. These elementary age children are able to understand and obey the rules of the game.

Learning media in the form of games is an effort to make learning unsaturated, students are not phobic with mathematics, this is in accordance with Prayitno's (2017) research entitled Mathematics Games an Attraction for Students, explaining that the phobia of mathematics is a reality that many faced the world of education. Starting from the assumption that mathematics is a difficult subject, not interesting / reluctant to learn, fear to suffer from math phobia. Based on the results of the literature study, the writer found that mathematics games are an alternative in an effort to make mathematics "attract" the interest of students so that they are more fond of learning mathematics.

From the results of the analysis on this problem, the root of the problem is that the media used is less effective and creative, so to increase students' motivation and understanding in learning mathematics about the multiplication of numbers in grade IV SD Negeri Sidoharjo 1 Guntur Demak, I developed a halma game media. This learning media can be used as an alternative strategy that is felt to better understand the characteristics of students because learning will be interesting and fun and learning objectives will be achieved.

Based on the background of the problem, a Research and Development study was carried out with the title "Development of Learning Media for the Halma Game to Improve the ability to count multiples of a number for Grade IV Elementary School Students in Demak Regency".

## 2. Literature Study and Hypothesis Development

According to Tambunan (1987) in Karso, et al (1998: 142). Mathematics is the knowledge of quantity and space, one of the branches of the many systematic, ordered, and exact sciences. Matematika are calculated numbers that are part of human life. Mathematics helps humans predict accurately various ideas and conclusions. Mathematics is the knowledge or science of logic and interesting problems. Mathematics discusses factors and their relationships, and discusses space and form. Mathematics is the queen of knowledge.

In 4th grade mathematics learning, one of the materials taught is about the multiple of a number. According to Hobri (2018) The multiple of a number is the product of the number with the original number. For example: Number 5, the multiple of number 5 is  $1 \times 5 = 5$ ,  $2 \times 5 = 10$ ,  $3 \times 5 = 15$ ,  $4 \times 5 = 20$  etc., so the multiple of numbers 5 is 5, 10, 15, 20, 25, ...

Therefore, in order to be successful in learning mathematics, learning media are needed that are in accordance with the conditions of students. Musfiqon (2012) in Nunuk Suryani et al, (2018: 4) argues that learning media is a tool that serves to explain some of the overall learning program that is difficult to explain verbally. In other words, a learning media can be used as the main media used for the entire learning process or as a complement and supplement only.

Ani Cahyadi in Media and Learning Resources Development: Systematic and planned theories and procedures (2019: 51). In general, the steps in the procedure for selecting media for learning are as follows: need analysis, identify student characteristics, study learning objectives, review teaching materials, types of media that suit the needs of selecting media, availability, user ability of supporting facilities and costs.

Research conducted by Dwi Wahyu Listyarini, Abdur rahman As'ari and Furaidah (2018) entitled: The Influence of the Halma Game Assisted Teams Games Tournament Model on Interests and Learning Outcomes in Sound Material for Class IV Elementary School Students which was conducted on grade IV students in two Schools, namely SDN Kejawan and SDN Grujugan Kidul 3, Bondowoso Regency, the 2016/2017 academic year has shown that there are significant differences in learning outcomes between the Teams Games Tournament (TGT) learning model assisted by halma games with control using the Teams Games Tournament (TGT) learning model.

Research in the field of health education conducted by Enisah, Yuyun Sarinengsih, and Imam Abidin (2019) entitled: Effect of Health Promotion with Halma Simulation on Knowledge Level of Caries Prevention of 1st Grade Students of SDN 115 Turangga Bandung City, shows that the design of modified halma games showed an effect of 19.6% with a significance value of 0.013 (at p value <0.05) on increasing knowledge of grade 1 elementary school (SD) children aged 6 to 7 years on the prevention of dental caries.

From the above, the researcher makes a hypothesis. The hypothesis in this study is the learning media for the Halma Game that was developed can improve the multiplication of a number of students in grade 4 SD in Demak Regency

## 3. Research Methods

Research method uses Research and Development (R&D), the researcher intends to produce certain products, and at the same time test the effectiveness of certain products in the learning process using media. According to Sugiyono (2016: 47), development research is more directed at efforts to produce certain products and then test their effectiveness so that they are ready for real use in the field. The product design produced in this study is the development of a learning model based on learning media for the halma game in the form of game paper sheets and digital games

This research was conducted at SD Dabin 2 UPTD Dikbud, Guntur District, Demak Regency, from February to September 2020.

Sources of data in research are the subjects from which data can be obtained. (Arikunto, 2010: 172). Sources of data from the study consisted of data on learning model needs, expert validation test data and model effectiveness test data obtained from teachers and students.

Data collection techniques in this study in this study using observation, documentation, interviews, questionnaires and tests. While the data analysis carried out in this research and development is quantitative data analysis techniques, which consist of: needs analysis and analysis of the results of the validation tes.

#### **4. Results and Discussion**

Based on the analysis of the results of the interviews with teachers, it was concluded that the development of instructional media was needed.

Interviews with students were conducted to find out their opinions about the needs of game learning media. Interviews were conducted orally to fourth grade students of SD N Sidoharjo 1 and SD N Tlogorejo1. Based on the answers of several students, it can be concluded that in learning students do not understand how important it is to implement learning using learning media. The results of the interview can be concluded that it is still rare for teachers to use learning innovations, as well as a lack of enthusiasm for students actively in learning, and a lack of enthusiasm for students actively in learning. Students feel less interested in learning because students only listen and are told to work on questions in the Student worksheet.

The learning media for the halma game that was developed aimed at increasing the ability to count multiples of numbers was designed through three stages, namely planning, processing and evaluation. At the planning stage by analyzing the material, learning objectives and learning media used and the needs for media development. At the stage of the process, the design of the halma game media was carried out to improve the multiplication of numeracy skills. At the evaluation stage, a test of the effectiveness of the developed halma game media was carried out.

The learning media for the halma game developed based on manual and digital media. Manual media is media that uses human labor, for example images on paper, MMT, books, and others. Meanwhile, digital media is media that no longer uses human labor manually, but rather an automatic operating system with a computerized system or a format that can be read by a computer.

At the planning stage of media development, researches analyzes KD, objectives and media that have been used so far. KD in the development of instructional media is KD 3.3 and 3.4 in grade 4 SD. The learning objective is that children can explain the factors and multiples of numbers, identify factors and multiples of numbers.

The various learning media used so far include calendars. The media used so far has not been effective, so the development of learning media from the halma game is held.

At the implementation stage, namely the manufacture of media products. Manual products are made of MMT, paper and stationery in the form of markers. In the checkerboard game, the game board is a paper with a picture of a six star, with small triangles inside that relate to one another. The corner meeting of the triangle is given a full circle. In its development, a paper board at the intersection of the triangular corners will be drawn a circle containing numbers. The numbers at the top of the game board with these numbers will be turned upside down so that they can be read in the opposite direction. The technique used is to use the Microsoft Office word in art and then the image text is rotated.

The questions are made on paper to cross the numbers towards the middle star. The questions were made by paying attention to the aspects of the student's proximity to the environment in which the students were located. The questions are written in the color according to the work on the game board.

Making manual media for the development of the halma game uses an MMT board and a game board containing 3 pictures of the halma game from paper. MMT media measuring 80 X 100 cm contains a six-star image inside which contains triangles and circles. Inside the circle is filled with numbers which are options to determine the multiple of a number. These numbers consist of two directions, namely the downward direction and the upward direction which is written in reverse. The goal is that students when

playing can see clearly from their respective directions. The MMT media will later be installed on the blackboard used by the teacher to explain the game technique.

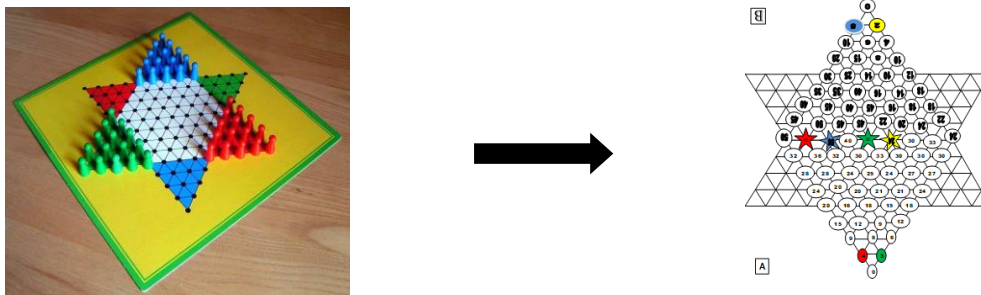


Figure 1 Development of Learning Media for the Halma Game

Manual media from paper are made of 3 levels following questions for each level. This manual media depicts a hexagon and a circle, the same as the MMT manual media.

The paper media as a game board was played by two students. Students will play and compete to get to the stars according to the questions and colors. The correct and fastest student wins. Students who win will mentor weak friends as peer tutors.

The media manual is a paper book containing: title, content, and evaluation. The title page is made as attractive as possible in order to attract students in particular and users in general. Contents contain instructions for use, board games and questions to play. Meanwhile, the evaluation contains questions to test students' understanding of the material given.

Digital media is a game application that can be played off line (without internet). Students will be sent an application to then install the game. Students can play alone with a laptop / PC or with an Android cell phone. There are 6 levels in this game. Each level student will get a score that will be accumulated at the next level up to level 6.

The material used to make digital media for the halma game was developed to increase the ability to count multiples using a laptop / PC and android with the Articulate storyline 3 software. This storyline 3 application was chosen because Articulate Storyline has several advantages so that it can produce a more comprehensive and creative presentation. This software also has features such as timeline, movie, picture, character and others that are easy to use. Articulate Storyline was chosen because it is easy to use and the resulting output can be published in various formats including HTML5.

Digital media is a game application that can be played off line (without internet). Students will be sent an application to then install the game. Students can play alone with a laptop / PC or with an Android cell phone. There are 6 levels in this game. Each level student will get a score that will be accumulated at the next level up to level 6.

The development of learning media for learning the halma game to improve the multiplication of grade 4 elementary students in Demak district is considered effective.

This is shown from the results of extensive trials.

### 1.1. Expert validation results

The scores given by the validators I, II, III, and IV were 36, 35, 37, and 36 respectively from a maximum score of 40, with the very good category. The validators also provided input in the form of descriptive assessments for the following improvements. One of them is to replace some of the numbers that cause the path to stardom on manual media dead ends. Media experts stated that the results were good, could be developed and acted upon. Therefore, the learning media for the halma game that was developed to improve the ability to count multiples of numbers is very feasible to use.

### *1.2. Results and Analysis of Teacher's Questionnaire*

The questionnaire was given to the teacher to find out in detail about the need for learning media for learning halma games that were developed to improve the ability to count multiples of numbers. The questionnaire was given to grade VI SD N Sidoharjo 1 teacher Mrs. Nur Azizah, SD N Tlogorejo 1 Mrs. Mardiana Sari, S.Pd.SD, SD N Trimulyo 1 Mr. Solekul Hadi, S.Pd.SD, based on the results of the questionnaire that has been analyzed by converting quantitative data to qualitative data obtained the results of the average value of R is 2.67 with the classification category is sufficient. The average score obtained is in the good category, so it is worth using. Based on the results of these calculations, it can be concluded that the development of learning media for the halma game which is developed to improve the multiplication of numbers required by the teacher. Questionnaire given to the teacher. The aspects contained in the questionnaire include: media interest, conformity with grade 4 elementary school children, relevance to KD, goals, practicality, clarity of pictures and numbers, media size, cost-taking local wisdom, and innovation. As many as 93.6% said that the teacher liked the learning media for the halma game that was developed to improve the ability to count multiples of numbers. The teacher admits that he is interested because learning is more fun. There were 6.4% who stated that they were mediocre in learning using the halma game media that was developed to improve the ability to count multiples of numbers.

### *1.3. Results and Analysis of Student Questionnaires*

Questionnaires were given to students to find out in detail about the needs for learning media for learning halma games that were developed to improve the ability to count multiples of numbers. The questionnaire was given to grade IV SD N Sidoharjo 1 as an experimental class. The student questionnaire was distributed by the teacher to the experimental class students at the end of the lesson with the halma game media that was developed to improve the ability to count multiples of numbers, The aspects contained in the questionnaire included: media interest, ability to use independently, ability to use in groups, ability to encourage enthusiasm for learning, increasing the ability to count multiples of a number, clarity of pictures and numbers, costs, and innovation

The results of the student questionnaire sheets, that were distributed were as many as 98.7% stated that they were happy to learn using the halma game media developed to improve the ability to count multiples of numbers. They are happy because learning while playing makes students better understand the subject matter. Students can carry out a caring attitude towards their friends. There were 1.3% stated that it was normal because they could not use the halma game media that was developed to improve the ability to count multiples of numbers. Based on the results of the questionnaire that had been analyzed by converting quantitative data to qualitative data, it was obtained that the average value of R was 1.77 with a sufficient category classification. The average score obtained is in the good category, so it is said to be feasible. From these calculations it can be concluded that the development of learning media for learning the halma game which is developed to improve the multiplication of numbers required by students.

### *1.4. Compute the t test*

The results of extensive trials of multiple learning media with this checkpoint indicate effective criteria. The criteria for the effectiveness of the media are if the t test results for the post test score, the criteria are Sig. (2-tailed)  $< \alpha = 0.05$ . The results of the post test t test for the control and experimental classes showed the value of  $t_{count} = -436$  with a Sig. (2-tailed) value of  $0.664 > \alpha = 0.05$ , so that  $H_0$  was accepted. This means that the hypothesis which says there is an increase in the ability to count multiples of numbers with the use of learning media for learning materials developed is accepted and  $H_1$  is rejected.

The game media in the form of games really attracts students. This is in accordance with the results of Krisbiantoro's research (2017) entitled Mathematical Games as an Effort to Improve Elementary School Students' Mathematical Understanding, concluding that the presence of multimedia technology can help

student learning to be more attractive and help students understand learning. The result of this research is that math games have an influence on increasing the understanding of grade 2 students of SD Negeri 2 Pamijen Kec. Baturraden by 10%.

This is supported by development research conducted by Tarmidzi Ramadhan and Ade Amirulloh (2019) entitled *Android-Based Math Education Game Development (Operation of Fractional Numbers) for Elementary Schools*, concluding that the desire of elementary school students to learn is getting lower every day, because students do not understand or have difficulty understanding in the learning. To encourage student enthusiasm again, a change in learning style is needed, namely providing a new learning that attracts students to be more enthusiastic in learning using educational game media.

This is also supported by research from Abdullah Muhammad Ridhuan, Tony Lim (2012) in *The Impact of Video Games in Children's Learning of Mathematics*, explaining a research project in Year 3 elementary school students in Malaysia in the use of computer-based video games to improve fact learning. multiplication (table) in Mathematics. This study concludes that video games can actually have a positive effect on children's learning.

## 5. Conclusions and Suggestions

Based on the results of research on the development of learning media for learning halma games that were developed to improve the ability to count multiples of numbers, it can be concluded that this learning media is able to increase the ability to count multiples of a number in grade 4 SD in Demak Regency. The media used are manual and digital. The use of learning is effective. The t-test results obtained by the value = 2.538 with a significance level of  $0.012 < \alpha = 0.05$ . The percentage of positive responses given by teachers and students were 95.2% and 98.7%, respectively, from the minimum criteria of 75.01%. The learning activity of the control class students reached an average of 63% and the experimental class was 77%. Thus, the increase in student learning outcomes was higher in the experimental group, so it can be concluded that the use of the halma game media developed to improve the ability to count multiples of numbers is effective and worthy of use in learning activities.

As a suggestion, the product of halma game media that is developed to improve the ability to count multiples of numbers is expected not only to be used for fourth grade elementary school students in Dabin 2, Guntur district, but can be used for all fourthgrade elementary school students in Demak Regency.

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