

# Development of Science Monopoly on Force Theme for Elementary School Students

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## ABSTRACT

Monopoly media is media that is much liked by children, but this media has not been widely used and developed in the world of education. This study aims to develop instructional media products in the form of science monopoly style material by strengthening the curiosity character of fourth grade elementary school students which is valid, practical, and effective. This type of research includes *Research and Development* (R&D) with analysis, design, development, implementation and evaluation (ADDIE) models. The research participants consisted of material experts, media experts, user experts, and fourth grade students at State of Elementary School SDN Kauman 2 Kota Blitar. The results of the validity test from material experts scored 87.5% (very valid), from media experts 95.8% (very valid), and from user experts 92.5% (very valid). The practicality test results obtained a score of 90% (very practical) from students and 100% (very practical) from teachers. The results of testing the effectiveness obtained an average value pretest 67.5 and posttest 79 as well as the results of hypothesis testing through *Paired Sample T-Test* shows the sig value.  $2 (2\text{-tailed}) 0.000 < \alpha (0.05)$  means that there is a significant difference in learning outcomes. The results of observing the character of student curiosity obtained an average achievement of 83% so that it is categorized as very strong, which means that students are very curious when learning. Based on these various tests, monopoly science learning media on style material can be declared valid, practical, and effective for improving learning outcomes and strengthening the curious character of fourth grade elementary school students.

**Keywords:** Learning media, monopoly, style, elementary school

## 1. INTRODUCTION

Learning media is one of the important components in the implementation of learning. The existence of learning media is not only a complement but a necessity which if not there can lead to less effective learning because the learning objectives are not achieved properly [1]. The teacher as a facilitator in implementing learning plays a very important role in procuring learning media. The use of interesting and varied media can have a positive impact on students. One alternative use of learning media is in the form of games. *Games have* been used frequently in the last few decades because they are popular with all ages, from children, teenagers to adults. Games that usually function as a means of entertainment can also be inserted with educational content so that they can be used as learning media. *Game* that contains fun activities with educational content are called game education [2].

Science learning in elementary schools plays an important role as a foundation of students' knowledge and understanding. Through science lessons students are taught to care about what is in nature and the processes that exist in it. The more students can take and absorb existing lessons and then implement them in everyday life, the more benefits will be obtained as a provision for their life in the future [3]. However, science lessons are often considered by students as a difficult lesson [4]. One of the difficult class IV science materials is about style because there are many misconceptions [5]. Misconceptions of natural science about force include students thinking that heavier objects will fall first, objects can only remain still when there is no force at all, objects such as plasticine can change shape because of their soft structure [6].

In reality on the ground, based on the results of interviews and observations during the implementation of Teaching Assistance (AM) activities at SDN Kauman 2 Kota Blitar, information was obtained that student learning outcomes were still relatively low. This is due to various factors, such as subjects, student conditions, the way the teacher teaches, as well as the learning resources and media used. Classroom learning is often carried out through conventional models with lecture methods and using learning resources in the form of textbooks only for natural science content, but there is no supporting learning media. Learning with the conventional model which

is still teacher-centered is done by the lecture method. Learning using this model is done by the teacher explaining the material then giving assignments to students.

This can have a negative impact on student learning outcomes due to a lack of student curiosity and students who tend to be passive during learning activities. Not a few of the students who feel bored if in a lesson only listen to the teacher's explanation. Students who feel bored will start looking for their own activities, such as playing with something around them, chatting with friends beside them or even disturbing other friends who are still focused on following the lesson. This happens because of the characteristics of elementary school students who still like to play [7]. With such learning conditions will make the learning process less conducive and less effective which results in low student learning outcomes.

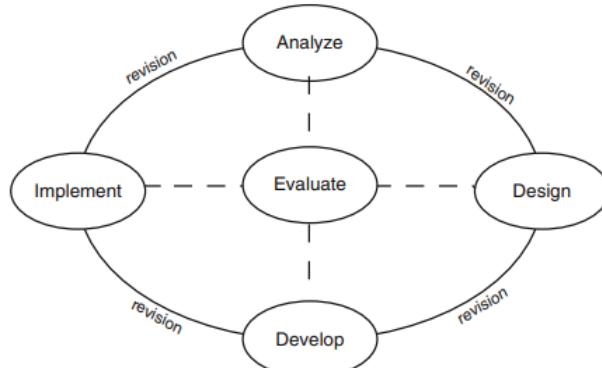
Student learning outcomes can also be influenced by student curiosity. Students' curiosity will arise when the object they see is considered interesting. But on the contrary, if the object that students see is considered boring, then they will not be interested and have no desire to learn more about the object [8]. Internal factors such as students' motivation and desire to learn, as well as external factors such as the materials and learning models used by the teacher influence the growth of students' curiosity. When compared to students who passively accept explanations from the teacher, students who are active because they have curiosity about the material taught by the teacher or what they learn themselves will produce more knowledge [9].

Many studies have been conducted as an effort to improve the learning outcomes of elementary school students. Some of these studies are research on the influence of problem-based learning models [10], cooperative learning models [11], teams games tournament [12], game-based learning [13], and the application of learning media using model direct instruction [14]. However, not many studies have explored in depth how media use is based on game education in learning. One example is game education used in learning, namely the monopoly game [15].

Based on the explanation above, a solution is needed for existing problems, namely by developing learning media that can go hand in hand with learning models according to the characteristics of elementary students. The learning media developed is a monopoly. Monopoly is one game education that provides benefits to the character and student learning outcomes [15]. In line with this, previous research by going Zyajra (2020) shows that the achievement of monopoly media in terms of material validity is 93.75%, media validity is 95.00%, user validity is 95.83%, and practicality is 97.70%. Product validity and practicality are also supported by the completeness of student learning outcomes so that monopoly media is able to improve elementary school student learning outcomes. The monopoly game used in this study only contained plots of material pictures so the researchers modified it by inserting interactive learning activities, such as quizzes and challenges to demonstrate various styles. With a variety of activities in one game, researchers hope to provide learning that has a good influence on efforts to strengthen the character of curiosity and improve student learning outcomes. Based on what has been described, it is necessary and important to conduct research on the Development of Learning Media Science Monopoly Style Material Science for Class IV Elementary Schools.

## 2. METHOD

This development research was carried out at SDN Kauman 2 Blitar City in 2023. This research used a type of *Research and Development* (R&D). This used 5 stages, analyze, design, development, implementation, and evaluation as in Figure 1.



**Figure 1** ADDIE Research and Development Model Stages  
Sumber: Branch (2009)

Participants in this study consisted of material experts, media experts, user experts, and students. In the study, the material expert was a PGSD lecturer who was an expert in natural science material with the initials Mrs. EU, S.Pd., M.Pd. He is a lecturer with expertise in science because he is a graduate of biology education and science education. His expertise includes elementary science education theory, strategies and models for elementary science education, and the problems of elementary science learning. The media expert in this study is a lecturer of higher elementary school teacher education in Malang, and a media expert with the initials Mr. FIM, S.Pd., M.Pd. He is a lecturer who teaches resources and learning media courses. The user expert is the homeroom teacher for class 4 at SDN Kauman 2 Blitar City with the initials Mrs. SW, S.Pd. Students who participated in this study were fourth grade students at SDN Kauman 2 with a total of 20 students consisting of 10 boys and 10 girls.

The research technique used is a questionnaire and a test. Questionnaires are made to measure the validity and practicality of the media. The media validation questionnaire was addressed to the validators, namely material experts, media experts, and teachers while the practicality questionnaire was addressed to teachers and students. The tests used in this study consisted of pretest and posttest. The preparation of tests developed from the so-called government. Basic competencies.

The assessment of the validity test of the experts was carried out using a Likert scale with a scale of 1,2,3,4. Assessment of the practicality test was carried out using the Guttman scale with yes and no answer choices. Assessment of the effectiveness test was carried out with the help of the SPSS 22 for Windows application through tests of normality, homogeneity, and hypothesis testing with the *Paired Sample T-Test*.

### 3. RESULTS AND DISCUSSION

#### 3.1. Results

The results of this study are in the form of learning media monopoly science style material for class IV Elementary School which was developed using the analysis, design, development, implementation, and evaluation (ADDIE) model.

The analysis phase aims to obtain information on student needs. The stages of analysis consist of analysis of student character, curriculum, KD and indicators. The results of the analysis of the characteristics of grade IV students according to Piaget's development are in the concrete operational phase so that students more easily grasp material with concrete objects and the characteristics of students who still like to play. The results of the curriculum analysis obtained information if in grade IV Elementary Schools used the independent curriculum. KD analysis and indicators were carried out on force material that encountered misconceptions about the material. Based on this needs analysis activity, it implies that students need a learning media that can go hand in hand with a learning model where students can be actively involved in carrying out learning.

The next stage is the design stage which aims to design monopoly media product components, including pictures, questions, and challenges related to style material in grade IV SD. Activities apart from designing products, at this stage are designing the instruments needed in research and development. These instruments include validation instruments, practicality instruments, effectiveness instruments, and curiosity character observation instruments. The validation instrument is addressed to material experts, media experts, and user experts. The practicality instrument is addressed to teachers and students. The effectiveness instrument in the form of test questions is addressed to students. The curiosity character observation instrument is addressed to the observer to assess student character.

The development stage of monopoly media begins with determining the physical product including the size of monopoly media and its cards, typeface, font size, color, illustration images, and the type of material used. The next step is printing the product according to the specified material. Monopoly board media is printed like a shape banner with a size of 60x60 cm, while the monopoly cards (play instructions cards, question cards, challenge cards, various styles cards, style influence cards, and punishment cards) are printed on paper. The products produced at the next development stage are subjected to expert validation to prove the feasibility of the products produced. Table 1 is the result of the expert validity test.

**Table 1.** Validity Results

No	Validator	Score (%)	Category
1.	Material Expert	87,5	Very valid
2.	Members of the Media	95,8	Very valid
3.	User Member	92,5	Very valid
Average		91,93	Very valid

Based on Table 1. The validation results of monopoly learning media obtain an average value of 91.93% so that they are included in the very valid category. However, there are some additional suggestions from material experts, media experts, as well as user experts. Improvements to the appearance of monopoly media are by emphasizing the color differences in each monopoly plot with attractive colors (Figure 2). Monopoly game guide cards are improved on the language aspect by using simpler language and affixing the identity of the developer (Figure 3). The questions used were changed from there were several questions with the LOTS cognitive level to questions with the HOTS cognitive level to train students to think at a higher level (Figure 4). The experiment activity on the challenge card was also changed from a simple experiment using only rubber to a more complex experiment by making toy cars from used bottles and using rubber (Figure 5).

**Figure 2** Monopoly Media Display**Figure 3** Monopoly Game Clue Card Display



Figure 4 Monopoly Problem Card Display



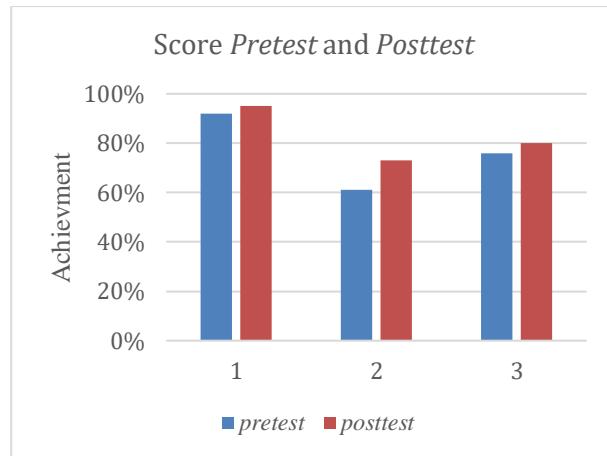
Figure 5 Monopoly Challenge Card View

The next stage is the implementation stage which is carried out by practicality testing and effectiveness testing on students at SDN Kauman 2 Kota Blitar. The level of practicality of the product is known from the results of the practicality trials shown in Table 2 below.

Table 2. Practicality Trial Results

No	Appraiser	Score (%)	Category
1.	Student	90	Very practical
2.	Teacher	100	Very practical
Average		95	Very practical

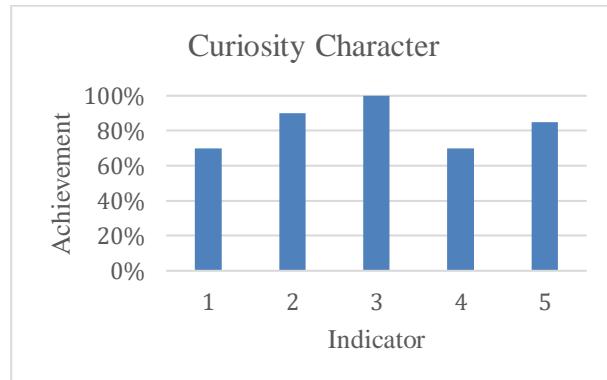
Based on Table 2, the results of the practicality trial of monopoly science learning media for style material carried out by students obtained a score of 90% so that it was classified as very practical, while the teacher's assessment obtained a score of 100% which was also classified as very practical. The average results of the practicality trials of monopoly science learning media for style material are 95% and belong to the very practical category, and there are comments and suggestions from students and teachers. The product was revised based on comments and suggestions obtained during practicality trials. Next, testing the effectiveness of the product with activities pretest and posttest. Yield value pretest and posttest can be seen in Figure 6 below.



**Figure 6.** Value Data Charts *Pretest and Posttest*

Based on Figure 6 it can be seen the achievement of student learning outcomes based on the distribution of indicators. In general, the three indicators achieved more than 60%. The achievement of the highest indicator is in indicator 1 with 95% achievement, but the smallest increase is 4%. The smallest achievement was in indicator 2 with 61% achievement, but experienced the highest increase of 12%. This matter show that student learning outcomes have increased in all indicators. Improvement in student learning outcomes can also be seen from the overall average value indicating that the average value pretest students 67.5 and the average value posttest students to 79. Results of Pretest and posttest students were then analyzed using inferential statistics with the help of SPSS 22. The results of the hypothesis test were through *Paired Sample T-Test* shows the sig value. 2 (2-tailed) 0.000  $<\alpha$  (0.05) means that there is a significant difference in learning outcomes ( $H_0$  rejected). The level of effectiveness of monopoly media can be known by calculating the n-gain score. Value calculation results pretest and posttest students through n-gain get a score of 0.37 so that it is included in the medium category.

During the implementation of the media test an assessment of the character of student curiosity was also carried out. The results of the assessment are presented in Figure 7 below. Curiosity character indicators assessed were asking questions (indicator number 1), enthusiasm (indicator number 2), attention (indicator number 3), like to try (indicator number 4), and demonstrating writing skills (indicator number 5).



**Figure 7** Achievement Character Curiosity

The achievement of the character of students' curiosity during the use of science monopoly learning media style material can be seen in Figure 7. In general, each indicator has an achievement of more than or equal to 70%. The indicator of the character of students' curiosity has the highest achievement of 100% on the attention indicator, the lowest achievement of 70% on the indicator of asking and trying, so that the average achievement is 83%. This means that the character of students' curiosity during the use of science monopoly learning media style material can be categorized as very strong, which means that students are very curious when learning.

The evaluation phase is carried out at each stage of research and development. Evaluation of the analysis phase, carried out when creating data collection instruments. Evaluation of the design stage, carried out according to input and suggestions from the supervising lecturer so as to obtain results in the form of improving monopoly media. The improvement made is by making monopoly media which is equipped with how to play, especially

activity instructions for each monopoly plot. Evaluation at the development stage is carried out according to input and suggestions from material experts, media experts, and users. The results of the improvements after the validity test include the use of facts from the development of science in Indonesia, making a spring style experiment by making toy cars from used bottles and using rubber, making questions at a cognitive level that further trains students to think at a higher level, there is an identity from the developer and a logo UM in manuals or media, the color differences in each plot are further emphasized with attractive colors, and simplification of language so that it is easily understood by children. Evaluation at the implementation stage was carried out based on comments, suggestions and input on the practicality questionnaire by users, namely teachers and students. The result of the improvement after the practicality trial is by increasing the number of question cards which are one of the components in monopoly media.

### **3.2. Discussion**

The learning outcomes of fourth grade students at SDN Kauman 2 are classified as low due to student motivation and limited learning media. Student motivation is related to student curiosity which can affect learning outcomes. Students who are active during learning because they have curiosity about the material taught by the teacher or what they learn themselves will produce more knowledge than students who passively accept explanations from the teacher alone [9]. Students' curiosity when learning can be increased by using interesting learning media and actively involving students during learning activities. Monopoly learning media can foster a sense of fun and interest in learning; increase the activity and social interaction of students; hone problem-solving skills and focus on learning [17], [18]. One form of development and modification of the monopoly game is monopoly style material science, in which there are materials, pictures, quizzes, and challenges to practice or demonstrate activities according to the material. The results of the development of science monopoly learning media style material with the strengthening of the character of curiosity are included in the category of very valid, very practical, and effective for improving student learning outcomes in class IV SD. Therefore, this media should be used in schools for students' curiosity.

Product validity is assessed based on several aspects, namely material, media display, presentation, language, and product usability. The material used in monopoly media is adjusted to KD, indicators and learning objectives. Monopoly media in its use has various missions, such as quizzes, matchmaking, and practicums to improve learning outcomes and strengthen the character of student curiosity. The questions used are in the HOTS category to hone students' abilities in the realm of analyzing, evaluating, and creating so that they can improve student learning outcomes [19].

The appearance of monopoly media is made as attractive as possible by paying attention to integration indicators which include the suitability of colors and writing used on monopoly media, layout elements that look harmonious/consistent, and the attractiveness of using images. The selection of colors in the media is more emphasized to show the differences in each plot with attractive colors. This is done by using a plain or graded background color to create a contrast between the image and the background so that it can be easily seen and looks attractive [20]. The presentation of monopoly media is more in the form of images located on monopoly squares. The existence of various images can make the presentation of material more interesting in order to increase motivation, interest, and quality of learning so that students can think and understand the subject matter well and in fun learning situations [21].

The aspect of language needs to be considered because it affects students' understanding so that simple language is needed so that elementary school students can more easily understand the process. This is because the language skills of elementary school age students are still in the developing stage from the very simple to the complex [22]. Instructional media should be structured in short, concise and clear language as well as communicative delivery so that students can easily accept and understand them. Based on the usability aspect, this monopoly media is able to make students actively carry out learning activities with a game model in which there are educational activities. This statement is in line with research from Kurniawan (2020) which states that the use of monopoly learning media can increase student motivation and learning outcomes because students can learn while playing. Thus, monopoly media can be an alternative in creating learning with games but it also needs to be considered that these games contain educational activities, such as identifying pictures, answering questions, and conducting experiments.

The practicality of monopoly media is assessed using indicators which include media presented in an attractive way, can reduce boredom during the learning process, easy to use, material on monopoly media is easy to

understand, using monopoly media provides new experiences and knowledge, creates fun learning, and can generate motivation for students to study. According to students, monopoly media is very fun and not boring. Monopoly media is also felt to be better used in learning than having to learn alone. Monopoly games that require playing with other people can trigger activity, creativity and make students happy because they don't just learn to listen to the teacher or just do tasks in the subject matter [24].

The effectiveness of monopoly media can be seen from the results of student tests. The test is done before and after using monopoly media in learning. The results of the analysis of student learning outcomes test data using descriptive statistics and inferential statistics can be seen that learning using monopoly science learning media style material by strengthening the curiosity character of fourth grade elementary school students is said to be effective in improving student learning outcomes.

Previous research by Koeswanti (2021) proved that the learning outcomes of elementary school students increased because monopoly learning media was an attractive medium. This is in line with the opinion of Maesaroh (2013) which suggests factors that influence the improvement of student learning outcomes, one of which is through an interesting learning model. Learning through game models using monopoly media is quite interesting in terms of media and activities in the game. This statement is supported by statements from the results of media monopoly validation by experts and the results of media practicality tests. Improved learning outcomes are also influenced by the teacher's ability to condition the class, teach material according to the applicable curriculum, and organize varied learning so that students are not easily bored following the learning process [27]. Monopoly media is an alternative in creating varied learning, not boring for students and able to improve student learning outcomes.

Improved student learning outcomes are inseparable from effective learning. Effective learning shows the realization of the quality of learning that is the responsibility of the teacher by providing meaningful learning experiences and facilitating learning that students will receive [28]. Based on the observation sheet, the observer during learning received a positive response from students, as seen by students who were enthusiastic when carrying out learning using monopoly learning media. This is because learning with game models with the help of monopoly media consists of various activities that actively involve students during learning. The use of monopoly media can trigger student activity because it provides a positive learning atmosphere, such as assignments, questions and answers, and guidance so that learning is fun, meaningful, and able to achieve learning goals [29]. The achievement of learning objectives using monopoly media is an indicator that this style of monopoly science learning media is effective in improving student learning outcomes. Achievement of learning objectives can be measured through tests.

Monopoly media not only improves learning outcomes, but also affects the character of students' curiosity. Based on the observation of the character of students' curiosity with the indicators of asking, enthusiasm, attention, trying, and demonstrating writing skills, the attention indicator obtained the highest percentage of 100% so that it was included in the very strong category. One indicator of the character of curiosity is the presence of focused attention to obtain information [30]. Learning activities while playing in educational monopoly games with a fun learning atmosphere can attract students' attention so that they help shape and strengthen students' curiosity characters [31]. Learning activities use monopoly media that can strengthen the character of student curiosity, namely activities when completing missions on each plot in science monopoly. These missions include matching pictures with cards of various styles and their influences, answering quizzes, and carrying out challenges in the form of experiments. Each group has the opportunity to complete each mission that is obtained according to the square it occupies. The questions and experiments carried out by each group were different in order to increase students' curiosity about something new.

The advantages of science monopoly learning media in style material, include: 1) the cost of making is relatively cheap, 2) it lasts a long time because the media is printed not with paper but with materials such as banner, 3) can attract students' attention and interest in learning because learning media is collaborated with a game, 4) material is presented in the form of pictures, questions, commands, and challenges so that it can trigger student curiosity and can improve student learning outcomes, 5) hone the soul social and communication between students because the game is done in groups. Implementation of learning using monopoly media is carried out in groups, it is necessary to prepare a place that is large enough so that each member of the group can see the game clearly.

## 4. CLOSURE

Based on the research and development that has been done, monopoly science learning media style material with the strengthening of the character of curiosity is included in the category of very valid, very practical, and effective for improving student learning outcomes in class IV SD. In conclusion, learning using science monopoly learning media style material by strengthening the curiosity character of fourth grade elementary school students is said to be effective in improving student learning outcomes.

Based on this research and development, there are suggestions for the use of the following: 1) development of science monopoly learning media style material can be used as a learning support and can be further developed on different materials, 2) development of game-based learning media must be creative and innovative and in accordance with abilities and characteristics of students, 3) the development of monopoly science learning media will be better if it is supported by the school so that it is maximized in its development, 4) the packaging and presentation of learning media ensures that it is practical and safe and pays attention to its supporting components, and 5) For further research, it is expected can conduct research with more participants.

## AUTHORS' CONTRIBUTIONS

Zulfia Khoirunnisa contributed as a data collector in the field. M. Anas Thohir participated as an analyst and technology. Candra Utama participated as a proofreader.

## ACKNOWLEDGMENTS

The researcher would like to thank PGSD FIP UM for supporting the implementation of this research so that it can run smoothly. The contents are fully the responsibility of the author.

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