



Development of Ludo Media in Mathematics Learning on Two-Dimensional Figure in Second Grade of Madrasah Ibtidaiyah

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Abstract

This research is motivated by the lack of innovation among educators in the development of learning media, as well as the teaching models used by teachers, which are still teacher-centered. This condition leads to students easily getting bored in learning, resulting in a decline in their interest and learning outcomes. To address this issue, the researcher developed Ludo media. This study employs a Research and Development (R&D) approach using the Borg and Gall model, which consists of 7 adjusted stages. The subjects of this research are students in class IIa of MI Al Ihsan Jeru Turen. Validity tests were conducted with experts and practitioners, followed by field trials with students. The results showed that the media expert 1 rated the media at 90%, categorized as "very suitable," while validator 2 rated it at 93.75%, also categorized as "very suitable." According to content expert 1, the media received a score of 88.3%, with the designation "suitable," while validator 2 rated it at 93.33%, with the designation "very suitable." Therefore, it can be concluded that this learning media is appropriate and valid for use with students, as evidenced by the improvement in pretest and posttest results during the field trials, with a medium group showing an increase of 56.25%.

1. Introduction

The position of education in today's technological development era shows improvement. People in various regions are increasingly aware that education directs the future of the younger generation. This phenomenon has led families to enroll their children in favored and quality educational institutions. Educational institutions are also welcoming this opportunity by competing to enhance the quality of learning implementation and supporting facilities.

The educational process is closely related to learning and teaching. Learning is a stage undertaken by individuals to create changes within themselves, reflected in improved behavior (Festiawan, 2020). Teaching, on the other hand, is an interactive process between students and educators that occurs in a school environment. Through this learning process, reciprocal interactions can lead to the acquisition of new insights, as well as changes in attitudes and self-belief among students. To achieve these goals, educators are required to create effective and conducive learning environments by improving supporting facilities for learning activities, the school learning environment, and the use of information technology-based teaching aids or media.

The use of learning media can assist educators in explaining material and serving as a support tool during the learning process, with the hope that the material presented can be understood by students (Nurita, 2018). Appropriate use of learning media can make the learning atmosphere enjoyable, thereby increasing student engagement. One type of media that can be used is game-based media, specifically Ludo.

Ludo is a game played with a board and dice, involving 2 to 8 players. The rules dictate that pawns are used as players aiming to reach the end point of the game. This game positively influences students, allowing them to apply values related to peace education. Imam Machali (2013) states that in peace education, there are values to be learned, such as the values of peace, non-violence, human rights, democracy, and tolerance. One of the values that can be applied is tolerance and democracy. During the process of completing the game in the classroom, it is expected that students can develop a sense of tolerance and mutual respect for other groups, avoiding a self-centered attitude in the game. Democratic values can also be applied through

discussions and listening to input from group members to arrive at correct answers to problems encountered. This Ludo game is developed as a tool to explain subjects taught in school, particularly mathematics.

Mathematics is a subject present at many educational levels, from elementary school to higher education. At ages 7-12, children are in the concrete operational stage, where they should first experience tangible things to apply directly. However, its implementation is still not optimal, especially in mathematics education. Many students struggle to interpret mathematical concepts due to educators' less innovative teaching methods and a lack of detailed connections between lessons and everyday problems, leading to difficulties in application.

This aligns with a pre-survey conducted by the researcher on August 7, 2023, in class IIa of MI Al Ihsan Jeru Turen. The researcher found several obstacles related to mathematics learning: students in class IIa were not attentive to what their educators said. The researcher also observed that student participation in the learning process was low. When educators posed questions, only a few students provided answers. Similarly, when educators invited students to ask questions, only a few participated. This situation arises from external factors, such as the educators' lack of innovation in media to support the learning process, resulting in student difficulties. Consequently, learning becomes less conducive, and students fail to meet the Learning Achievement Criteria (KKTP). Additionally, learning is still teacher-centered, preventing active student engagement, particularly in mathematics.

Therefore, to address these issues, educators must innovate their media to stimulate students in developing their abilities to meet the desired goals. Thus, to achieve this objective, the researcher aims to develop a learning product by creating enjoyable and engaging learning media that can dispel students' perceptions that mathematics is difficult to understand. One way is to apply flat shapes material using Ludo game media supplemented with question cards containing exercises and informational cards. These question cards include flat shapes material. Through this media, it is hoped that students will participate actively during the learning process.

This is supported by previous research conducted by Syifa et al. (2021) titled "Development of Ludo Game for Social Studies Learning in Elementary Schools." This study also used Ludo as a media tool and employed a Research and Development (R&D) approach. However, the differences from the previous research include the implementation location, subject matter, type of research applied, and specifications of the product. Given that previous studies have been shown to be effective and efficient, the author believes that this learning media is essential to develop in order to enhance students' interest and learning outcomes. Therefore, the researcher is interested in developing LUDO Learning Media for Mathematics Subject on Flat Shapes Material for Class II at MI.

2. Method

This research focuses on developing LUDO mathematics learning media at MI Al Ihsan Jeru Turen and refers to the type of Research and Development (R&D) by creating a game-based learning media, specifically the Ludo game, which is modified to include flat shapes material. The research and development model used by the researcher is Borg & Gall. The steps in this research and development follow the Borg & Gall model adapted by Sugiyono, consisting of 10 steps: a) Potential and problems, b) Data collection, c) Product design, d) Design validation, e) Design revision, f) Initial testing, g) Product revision, h) Usage testing, i) Product revision, j) Mass production. However, the researcher limited the study to the seventh step, which is product revision, due to time constraints.

The researcher conducted this trial in two stages. The first stage involved a validity test conducted by media experts who are lecturers with expertise in design from the Faculty of Islamic Studies at Raden Rahmat Islamic University Malang, material experts who are lecturers in mathematics for MI at the same faculty, and practitioners who are teachers of class IIa at MI Al Ihsan Jeru Turen. They provided feedback using a questionnaire. The second stage involved field trials divided into two groups: a small group with 8 students and a medium group with 16 students in class II at MI Al Ihsan Jeru.

The field trials included testing by administering pretest and posttest questions with 10 multiple-choice items to assess the effectiveness of the designed LUDO learning media. The type of data used is qualitative, derived from feedback and suggestions from experts and practitioners, while quantitative data is obtained from questionnaires distributed to experts, practitioners, and students. Data collection instruments included administering tests to students via pretest and posttest questions, direct observation of the learning process, documentation through photography, and questionnaires given to experts and practitioners.

3. Results and Discussion

The initial step determined is to analyze the potential and problems or constraints present so that a solution can be provided based on the needs identified. This step was carried out at MI Al Ihsan Jeru Turen through observations of mathematics learning activities in class IIa. Some information obtained indicates that the learning activities are still teacher-centered, and there is a lack of innovative learning media provided by the educator during the lessons.

It was also noted that students in class IIa MI Al Ihsan Jeru enjoy games, leading the researcher to develop game-based LUDO media. Games are activities governed by rules that have been collaboratively established, providing a learning experience for the players (Nurhayati et al., 2021). Therefore, a game should offer an experience that facilitates learning for the players while maintaining an enjoyable atmosphere. Thus, through this game-based media, it is hoped to enhance students' knowledge and engagement in learning in a fun way. Following the observations, the researcher prepared an initial design for game-based mathematics learning media focused on flat shapes for class IIa of Madrasah Ibtidaiyah. The initial design is themed around the underwater world, which is expected to attract students' attention.

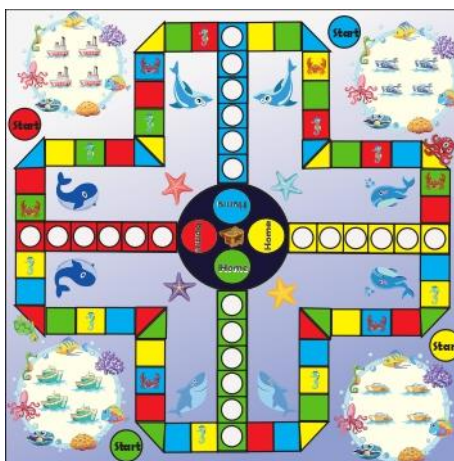


Figure 1. Ludo Early Design

The development of this game-based Ludo media involves a game where players compete to move four pawns using dice. This game-based media teaches responsibility and honesty in playing, and it is expected to provide a fun learning experience. The researcher developed this media with the following components:

- a. Ludo media packaging: This is a container used to store all components of the LUDO media.
- b. LUDO board: This is a board used for the game, designed as a banner printed in a size of 3 x 3 meters. The board includes images of pencils as question cards and books as information cards.
- c. Game cards: These are cards used to accumulate points. There are two types of game cards: question cards and information cards.
- d. Instruction card: This card explains the procedures or rules of the game and is printed in a larger size.
- e. LUDO dice: These are dice that contain numbers for gameplay and consist of dots.
- f. Pawns: These are game pieces used to play the game. In this media, the pawns represent the students in class IIa of MI Al Ihsan Jeru Turen.

The following are the components of the LUDO learning media that have been described above:



Figure 2. LUDO Component

Next, after creating the product design, the researcher conducted a validity test on experts and practitioners aimed at assessing the validity of the media and materials that will be used for students at the elementary level. While the validation carried out by practitioners aims to assess the feasibility of the LUDO learning media product in class IIA MI Al Ihsan Jeru Turen. To be able to determine the level of validity developed, an analysis technique is needed to be able to process the data that has been obtained from the results of the validity test, either in the form of descriptive data or questionnaire data in the form of numbers. The data obtained from the questionnaire in the form of numbers will then be calculated in the form of a percentage with the following formula (Prasetyo et al., 2017):

$$P = (\sum x \times 100\%) / \sum xi$$

Description:

P = Percentage

$\sum x$ = Number of respondents' answers in 1 item

$\sum xi$ = Number of ideal values in an item

100% = Constant

1. Media Validity Test

The media validity test is a test conducted to measure the instrument in the questionnaire to be able to measure the feasibility of a product in the form of LUDO learning media. In this media validity test, the person asked to provide a response regarding the development of this LUDO media was Aan Sulthon M.E.I as validator 1, as one of the media learning lecturers at the Faculty of Islamic Sciences, Raden Rahmat Islamic University of Malang. While for validator 2 is Ana Maghfiroh, S.Pd. as a mathematics subject teacher for class II of Madrasah Ibtidaiyah Al Ihsan Jeru Turen. The results of the media validation test stage 1 obtained a score of 48.75% with a category of quite feasible and the media is not feasible to be tested. The input from the validator is: a). the design does not match the material. So the researcher made a revision by improving the design and replacing the theme related to mathematics.

Meanwhile, according to validator 2, a score of 58.75% was obtained with a category of feasible and feasible to be tested according to the revision according to the suggestion, while the input and suggestions from validator 2 were: a). the color on the background of the game board looks dark, b). the design on the board is not attractive. Therefore, the researcher made a revision based on input from validator 2, the following are the steps the researcher took: a). change the background color to be more colorful, b). change the design to be more attractive by adding pictures. By revising the design of the LUDO media board display, it will look more attractive so that later students will be more interested in game-based learning activities, this is in line with Aditya's opinion which states that an attractive physical appearance will affect learning, so if the media display is attractive it will make students more motivated to learn (Aditya et al., 2019).

Then after going through the revision in stage 1, it will be continued with the validity test in stage 2 with the results of the media validation test obtained a score of 67.5% with a feasible category and the media is feasible to be tested with revisions according to suggestions. Therefore, it is still necessary to revise the media. The input and suggestions from the validator are: a). adding an outline, b). tidying up each box that is not neat, adding an arrow as a guide to start the game, c). replacing the "Start" shape with a more attractive one, replacing the dice box material with cardboard. So the researcher made a revision with the following steps, a). Adding an outline, b). Tidying up boxes that are not neatly arranged, c). Adding an arrow as a guide to the game, d). Replacing the "Start" shape with a more attractive one, e). Replacing the dice box material. Therefore, by adding these important elements, it will make it easier for students to understand the game, not only that, by using the instruction elements, it can direct them to certain parts of a game (Husein Batubara, 2020). Meanwhile, validator 2 obtained a score of 93.75% so that the product can be categorized as very feasible and worthy of being tested in the next stage.

After revising the input from validator 1, a validation test will be carried out in stage 3 to media experts, which obtained a score of 90% with a very feasible category and the media is worthy of being tested. Therefore, the media can be tested in the next stage. Thus, it can be qualified that this learning media does not need any revision, and the media is worthy of being tested in the field. Researchers can improve the product through all considerations of criticism and suggestions from experts and practitioners.

2. Material Validity Test

The material validity test is a test carried out by providing an instrument in a questionnaire to be able to measure the feasibility of a product in the form of material that will be used in the LUDO learning media. The results of the material validation test stage 1, The following is a presentation of the results of data analysis from the material expert validation questionnaire through several stages including: In stage 1, the material validity test according to validator 1 obtained a percentage of 56.7% with a category of feasible and the material is feasible to be tested with revisions according to suggestions. While by validator 2, a score of 73.33% was obtained so that the product can be categorized as feasible and feasible to be tested with revisions according to suggestions. From the total percentage that has been obtained through validators 1 and 2, in stage 2 there was an increase with a percentage of 88.3% while in stage 1 it was 56.7% (validator 1). In validator 2, there was also an increase with a percentage in stage 2 of 93.33% while in stage 1 it was 73.33%.

This happened because the researcher had made revisions in line with the criticism and suggestions submitted by validator 1 and validator 2, the revisions that the researcher made were: Remaking the learning objective flow which would then be adjusted to the learning outcomes, b). Making a new LKPD to be adjusted to the game cards on the LUDO learning media. After making the revision, it can be seen that the learning objective flow and learning outcomes are important aspects in learning so that during learning activities it can take place in a directed manner, these two aspects are elements of the learning instrument that must be planned so that learning activities take place interestingly and organized (Putriainingsih, et al., 2021).

3. Discussion

The next stage is a comparative analysis of field trials used to measure the effectiveness of the media to be developed by providing Pretest and Posttest questions to students in class IIA MI Al

Ihsan which are divided into 2 scales, namely small scale and medium scale. The following is a presentation of the results of the field trial:

In the first stage, a small-scale trial was carried out which was a trial conducted on 8 students in class II MI Al Ihsan Jeru on March 19, 2024. The following are the results of the data analysis of pre-posttest values on a small scale by getting a total pretest score of 400 with an average of 50 and a percentage of classical learning completion of 25%, while the posttest score got a score of 590 with an average of 73.75 and classical learning completion of 75%. So based on the results of the recapitulation, the increase in student learning increased by 50% so that it can be said that this LUDO learning media is very interesting to use as a learning medium. This happens because after using the media, students can understand what is conveyed and the material is not only abstract (Wulandari et al., 2023).

To determine the practicality test of this LUDO learning media, students are given a student response questionnaire sheet, which is given at the end of learning, so that it can be seen that the student response questionnaire was obtained with a score of 89.37% so that it can be said that this LUDO learning media is very suitable for use as a learning medium, but there is input and suggestions from students, namely: replacing the dice box to use more sturdy materials.

In the second stage, namely the medium-scale trial, which is a trial conducted to determine the feasibility of the media after going through stage 1 revision in small groups by testing it in a medium group, namely 16 students in class II of MI Al Ihsan Jeru on March 20, 2024. While on a medium scale, the values obtained were from the total pretest score of 790 with an average of 49.47 and a percentage of classical learning completion of 18.75%, while the posttest score got a score of 1240 with an average of 77.5 and a percentage of learning completion of 87.5%. So based on the results of the recapitulation, the increase in student learning increased by 68.75% so that it can be said that this LUDO learning media is very interesting to use as a learning medium. Based on the results of the pretest and posttest obtained, there has been an increase, because there is interesting media so that students can focus on delivering the material. Not only that, with interesting learning media, it can increase student activity. This is supported by the idea that through the use of varied, colorful, and meaningful media, it will make it easier for educators to explain the material and students will be more enthusiastic in learning (Wahyudi, 2019)

The student response questionnaire that can be seen got a total score of 564 with an average of 35.25 so it can be said that this LUDO learning media is very interesting to use as a learning medium, but there is input and suggestions from students, namely, changing the card size to be larger.

4. Conclusion

From the results of the development and testing of LUDO media, the results of the research analysis stated that this LUDO learning media is appropriate and can be used as a learning media by conducting revisions from experts and practitioners. The feasibility and effectiveness given from the results of the media expert validity test are 90%, media practitioners 93.75% and material experts 88.3% and material practitioners 93.33%. It can be seen that this learning media is appropriate and valid for use on students, this is evidenced by the increase in pretest and posttest results in the medium trial of 56.25%. Thus, the researcher concluded that LUDO media is appropriate and effective for use in class IIa MI Al Ihsan Jeru Turen on flat shape material.

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