



## Development of Ludo Game as Learning Media in Circular Motion

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Received: May 6, 2019

Accepted: June 29, 2019

Published: June 30, 2019

**Abstract:** This research aims to develop a medium of learning physics ludo game of the subject of the circular motion. One of the problems of education is the lack of facilities and infrastructure, so that teachers are required creative in improving the quality of learning in class, such as developing learning media. One interesting learning media and boredom of students in learning activities that game-based learning, such as the application of instructional media ludo game. The method used is research and development are adopting from Borg and Gall which has been modified by Sugiyono of 10 stages to 7 stages. The collection of data used in this study a questionnaire given to subject matter experts, media specialists, classroom teachers and learners class X. The resulting data type is qualitative data and quantitative data to determine the feasibility of product research and development resulted in physics teaching media in the form of the game ludo valid to be used based on those ratings of validator penilaian 82,2% gain material experts, media expert validator obtained 93.70% votes, ratings teachers gained 82.76% votes. Assessment test responses of participants trained in small groups obtain a percentage value of 86.69% and uji field trials of each school (I) 84.50% (II) 81.12%, (III) of 82.67%, which means that the media can be accepted by learners.

**Keywords:** games, Ludo, learning media, physics learning

**DOI:** <http://dx.doi.org/10.23960/jpf.v7.n1.201903>

## INTRODUCTION

Learning is a process of obtaining information from various sources or activities carried out to learn something in order to achieve the desired goals of the experience gained, so that there is a change in behavior (Afandi, 2015). The learning process can occur anywhere and anytime, both in the school, home, and community. Changes in the behavior of students can be seen from the learning outcomes obtained, both in the realm of knowledge (cognitive), attitudes (affective), and skills (psychomotor) (Diani & Yuberti, 2016).

Physics is a branch of science that studies symptoms, events or natural phenomena, and reveals all the secrets and laws of the universe. Most students assume that physics is difficult to understand because physics contains many formulas and theories that require fundamental understanding (Irwandani et al., 2017). Therefore the solution to these problems needs to be sought by a physics teacher. One of the right solutions is the use of media in teaching and learning activities (Mustari, 2015). Learning media is defined as all forms of physical communication equipment in the form of software and hardware which is a small part of learning technology that must be created or developed, used and managed for learning needs in achieving the effectiveness and efficiency of the learning process (Lubis, 2015).

Learning media is a tool or intermediary that is useful to facilitate the learning process in order to streamline communication between teachers and students. Besides being able to increase student learning motivation, the use or use of media can also increase students' understanding of the lesson (Rahman & Hidayat, 2017). In addition, learning media can also help students improve understanding, present data interestingly and reliably, facilitate data interpretation, and compact information (Herawati, 2017).

The learning process can be said to be meaningful if it contains interactive, fun, and motivating aspects. Meanwhile, the learning media used today still use textbooks and student worksheets which are only in the form of writing and two-dimensional images that cannot move. This certainly makes students tend to get bored, passive, and less interactive (Haryanto, 2013). Good media is a media that is fun and easy to understand (Kasih, 2017).

The benefits of using media are expected to attract students' attention and make it easier for students to understand the material (Sohibun & Ade, 2017). The choice of media for learning needs must be relevant and in accordance with the characteristics and needs of students (Triastuti & Akbar, 2017). Therefore interesting learning media, make students not feel bored, and easily understand the material is very necessary. However, the presence of learning media certainly does not reduce the content of the material.

A media can be said to be an inseparable part of the learning process in order to achieve an educational goal in general and learning objectives in schools in particular (Arsyad, 2013). Various types of media have come as a means of creativity, effective learning, and fun. One of the learning media that can be utilized is learning media in the form of games. The game is known as a fun activity both physical and cognitive (Latief, 2017). Game media play a role in the learning process so as to make students as if they were playing. Thus feeling tense and saturated in students can be reduced. This certainly has an impact on the smoothness and optimal results of the learning process in school (Muharrami & Abdi, 2016).

The game is a tool for children to explore their world, from something they did not recognize until they were known, and from what they could not do until they were able

to do it. Suyadi explained that "the game in question is not just a toy, but a game that can stimulate children's learning interest" (Jawati, 2013).

Sadiman et al. (2011) said that as a medium of education, the game has several advantages, namely: (a) the game is something fun to do, something that is entertaining and interesting, (b) the game allows active participation of students to learn, (c) the game can provide feedback directly, (d) the game allows students to solve real problems, (e) the game provides real experiences and can be repeated as many times as desired, operational errors can be corrected, (f) games can shape students in improving their cognitive abilities, (g) games can help students who have difficulty learning with traditional methods. (h) the game is flexible, can be used for various educational purposes, (i) the game can be easily made and reproduced.

One of the game media that can be applied in the learning process is Ludo. Ludo is a traditional game that has been widely known and easy to play. This game utilizes a modified plank board (Rahmawati & Abdi, 2016). The use of Ludo in learning can increase learning interest and motivation for students (Purwanto & Sari, 2012). Thus the hope is that students are more enthusiastic in participating in teaching and learning activities. Based on the results of research conducted by researchers, there is no learning product ludo physics developed for learning media. Therefore this media research and development needs to be done.

Pre-research results through questionnaires and interviews with physics teachers provide information that in general the physics learning process that has been going on so far has been good. But there are still many students who are still afraid of physics learning, boring, difficult subjects because many use formulas that must be memorized and difficult to understand the material, even though some students already have their own handbook. In addition, information was also obtained that the learning media used by physics teachers was still simple, such as textbooks, student worksheets, and Liquid Crystal Display (LCD). The researcher also has not found any teacher who uses ludo game learning media to convey circular motion material. Therefore researchers feel the need to develop ludo game learning media on circular motion material.

## **METHOD**

This research uses research and development methods. The purpose of this development research method is to produce new products or develop pre-existing products (Emzir, 2012). The development research method used in this study refers to the method developed by Borg and Gall, namely (1) initial information collection, (2) planning, (3) initial media design, (4) media validation, (5) media revision, (6) media trials, (7) stage two media revisions, (8) field trials, (9) media revisions, (10) mass production. However, the researcher limits the development steps from ten steps to seven steps above because of the limited time available and opportunities (Sugiyono, 2017).

The research began with conducting preliminary research to determine the type of media that will be developed based on needs in the field. Next the researcher designs and develops the product. Products that have been made will then be tested for validation by material experts and media experts to find out the feasibility aspects. After being declared feasible, the product was tested in a small group involving 16 students, in a field trial involving three schools and taking one class from each school.

The data used to collect data during this study are (1) data in the form of criticism and suggestions obtained from both media validators, material experts, and responses from students and teachers, (2) data from the validator in the form of validation instruments and participant responses students through questionnaires. The instruments in this study were the validation sheets of media experts, material experts, and teachers, as well as students' response sheets to the physics learning media in the form of Ludo games. The data obtained were analyzed using quantitative data analysis techniques and qualitative data analysis techniques. Data analysis on the validation of media experts, material experts, and teachers using a Likert scale with a scale of 1 to 5.

## **RESULT AND DISCUSSION**

### **Initial Information Collecting**

This development research is developing learning media in the form of Ludo physics games. At this stage the important thing to do is to analyze the needs of the products that will be developed through preliminary research that has been done to students. The use of games as learning media can clarify learning material with a brief presentation of material that can be used easily so that it is practical to be brought and opened anytime. The results of the pre-research or field observations obtained are physics learning in the classroom tend to be boring because teachers rarely use learning media so that the interaction between teachers and students in learning is less active.

### **Research Planning**

After the problem is identified, further research planning is carried out based on the stages according to Borg and Gall. This is done by considering the ease of development.

### **Product Design Results**

Based on the data from the pre-research or field observations, the product specifications that will be developed are learning media that can help educators and students in the learning process and independent learning of students. The next stage is planning the development of physics learning media in the form of a game of Ludo physics, the subject of circular motion. The initial design of physics learning media in the form of ludo games was designed by arranging the design of the material to be made. The next step is looking for images related to the material, then making Ludo game designs using the photo shop application, printing the design of Ludo physics with sticker paper measuring 48 cm x 48 cm, making pawns, dice and question cards, giving the design to the Ludo board. , and color the dice to make them more attractive.

### **Product Validation**

An assessment of the media feasibility of the Ludo game was carried out by material experts and media experts. The media that is developed is worthy of being used to be tested if the average score is in the proper category and is very feasible. The data from the validation results are as follows.

**Tabel 1.** Validation score recapitulation

Product development	Content validation	Media Validation	Average	Criteria	Conclusion
Ludo game media	82.16%	93.79%	87.97%	Very feasible	The developed product fulfills the criteria very feasible so that it can be continued at the product test stage.

Based on Table 1, it can be seen that the average percentage of feasibility of the products developed is 87.97%. The feasibility score is categorized as very feasible. This means that the product can be used without revision. However, improvements or revisions will still be made based on suggestions from the validator of material and media experts for product improvement.

The first goal of this product development was to find out how to develop the Ludo game learning media on circular motion material. While the second goal is to find out the feasibility of ludo learning media in circular motion material. Based on the results of research conducted by researchers by conducting validation by experts, it can be concluded that the media learning game Ludo can be used in physics learning for circular motion material with a very feasible category.

### Product Revision

Products that have been assessed by experts are then revised. Revisions are made based on suggestions and comments provided by experts during the validation process.

**Table 2.** The description of contents and media experts

Content Expert	Suggestion		Revision
	Revision	Media Expert	
Questions must vary, don't look monotonous (add pictures)	There are several questions that use images related to material	Apply according to the procedures that have been designed	It has been applied in accordance with procedures and suggestions
Questions must have levels	Questions that are made have difficulties from ordinary, moderate, and difficult	Must have differences in the question free column	In the free column the question is given in the column
Give the student learning instrument grid	There is an instrument grid to make it easier to see the questions that will be used	Questions for the counseling room and committee room must be made 16 questions	On the question of the committee and counseling room the questions have been made 16 each and have different levels of difficulty

## Field Test

After the product is revised based on expert advice, the product will be field tested in students. The following is the assessment graph of the product users, in this case the response of students from three schools.

An assessment of media attractiveness is carried out at the field stage. Data are obtained from recapitulation of student response scores from field trials. The product attractiveness data can be seen in Table 3.

**Table 3.** Recapitulation of product attractiveness scores

Assessment aspects	Small group test	Field test	Average	Criteria	Conclusion
Contents quality	88%	82.42%	85.21%	Very interesting	Because it fulfills very interesting criteria, the learning media in the form of "ludo" can be used.
Contents	88.33%	83.36%	85.84%	Very interesting	
Ease of use	83.75%	82.49%	83.12%	Very interesting	

Based on the data in Table 3 it is known that the results of product attractiveness analysis obtained a percentage of 85.21% for aspects of content quality, material aspects of 85.84% and 83.12% aspects of ease of use. Then from the results of the percentage of product attractiveness it can be decided that the developed media is included in the very interesting criteria for use in learning.

The final product of this development process is in the form of Ludo game media for circular motion physics learning. Ludo's board media consists of 1 game board, 16 sheets of committee room cards, 16 sheets of BK room cards, 30 sheets of general question cards and a guide to how to play the Ludo game. The wooden board is like a chess board with a size of 48 cm x 48 cm. The look of the game board design is made of basic white colored sticker paper.

There are 4 main boxes for aiming 16 because 1 box has 4 sights. If the player wants to complete the game then the player must pass through the boxes and obstacles that have been provided.

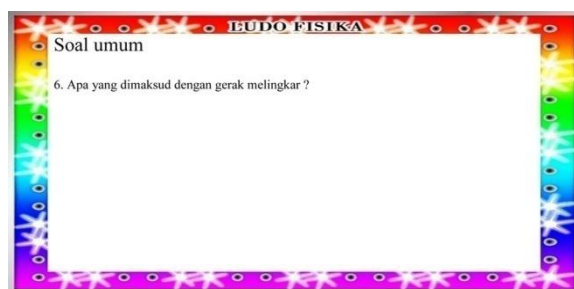


**Figure 1.** Ludo Game Design

How to play Ludo physics is the same as Ludo in general, namely:

1. Prepare in advance the Ludo game board
2. When starting the game, four ludo pawns are arranged in the house that matches the color in the corner of the board.
3. To issue a ludo from the house, each player must get the same dice result or number point, which is the number '6'.
4. After getting the number 6, the player is in the box with a star and is given one more chance to get a dice whisk that will continue the player to play to the next stage.
5. When 2 players meet in the same box, the player will repeat the game to the starting point.
6. When a player stops at the BK room box, committee room, general inquiry room, the player must be able to answer the questions provided.
7. When the player stops in the zonk box, the player must repeat from the beginning of the game
8. The winner is determined by looking at who first puts all the Ludo points to the end point or into the trophy picture box.

The following are examples of questions from the counseling room, committee room and general questions



**Figure 2.** Problem in Ludo Game

Overall, the developed media is feasible and effective in the learning process. This can be seen from the percentage of feasibility by material experts and media validators, in addition to getting evaluations from experts, the media also get ratings from teachers and students as users through small group test activities and field tests.

## CONCLUSION

Based on the results of the research that has been done it can be concluded that the game Ludo as one of the products of this development research in the form of a chess board can be used as a practical and easy learning media to convey circular motion material. The feasibility of physics learning media in the form of a game of ludo in the subject of circular motion based on the assessment of material experts included in the "Very Feasible" category, the assessment of media experts get the "Very Feasible " category, the teacher's assessment belongs to the "Very Interesting" category. The trial responses of students conducted in small groups and field trials received the category "Very Interesting". This shows that the learning media developed can be accepted as a medium that can be used in learning.

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