



The Development of Monopoly Characters in Science Learning Materials with Environmental Inspections of Human Images to Improve Science Learning Results in Grade V SD

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Abstract

This study aims to develop the character monopoly game in science learning with environmental insight into digestive organ material into a suitable learning medium for use in the science learning process so that the monopoly on the environmentally sound character in digestive organ material can be used to improve science learning outcomes for fifth-grade elementary school students. This research uses research and development methods or more commonly known as research and development. The data collection techniques used by researchers in developing the Monopoly Character game media in science content in grade V elementary schools are using questionnaires, observations, interviews, and tests. The results of this study are the environmentally sound character Monopoly game media that can improve science learning outcomes in grade V elementary schools. The average percentage result of the assessment of material experts, media experts, and linguists on the environmentally sound character monopoly game reaches 90%. The one-to-one questionnaire evaluation results obtained were 98%. The results of the evaluation of the small group questionnaire were 97%. The game of environmentally sound character monopoly in science learning human digestive organ material is also carried out pretest before using game products and posttest at the time after learning to use the product. The result of the average score of the pretest during the one-to-one evaluation was 66, while the post-test during the one-to-one evaluation was 79. The result of the average score of the pretest at the time of the small group evaluation was 62, while the small group at the time of the one-to-one evaluation was 82. However, the field test, which must involve a large number of respondents, was not carried out by researchers due to the imposition of restrictions on community activities (PPKM). The imposition of restrictions on community activities is carried out because of the covid-19 virus. PPKM aims to reduce the spread of the covid-19 virus. Therefore, researchers limit this research to be implemented in one-to-one and small groups only.

Keywords: *Learning Media; Game Media; Character Building; Environmental Education; Science Learning Outcomes; Environment; And Human Digestive Organs*

Introduction

Learning outcomes appear after the learning process. The learning process has several supporting factors. The learning process and learning outcomes affect several factors such as subjects, the allocation of learning time, learning media, or the conditions of the learning environment (Marton, 2014; Wahono et al., 2020). Learning outcomes are not only focused on a cognitive form. Learning outcomes vary, namely the attitudes, motivation, and skills of students (Iasha et al., 2020). A process is said to be successful when the defined competencies can be achieved by all students who follow the learning process. This means that there is a change in behavior towards students both in cognitive, affective, and psychomotor in a better direction than before (Sari et al., 2020). With the existence of a meaningful learning process, students can excel academically and make behavior changes to be able to produce a big benefit in the learning process at school (McMillan, Johnson, Parker, Hunt, & Boyd, 2020).

The teacher has an important role in determining meaningful and quality learning (Juniorso et al., 2020). A teacher must be able to make learning plans to support the achievement of learning objectives to support students' understanding of the scope of the material to be provided (Al Kandari & Al Qattan, 2020). In addition, the teacher must be able to manage the class by using learning strategies that are following the needs of students. This is done to create effective learning conditions. In line with research conducted by (Coklar & Sahin, 2014; Al Kandari & Al Qattan, 2020) said that learning activities that are supported by supporting factors, such as parents and teachers, will increase higher learning outcomes.

There is previous research that says that media can improve student learning outcomes. According to (van Alten, Phielix, Janssen, & Kester, 2020) in the results of his research, it was found that students carrying out learning using learning media would achieve higher learning outcomes. Ideally, it is the teacher who makes learning media according to what students need. This is because of the importance of the media as a tool to support the learning process (Acesta et al., 2021). However, the reality is that teachers still ignore the media needed by students. Teachers only rely on teacher books and student books issued by the government only. Without making supporting learning media that can support the achievement of the desired competencies (Bramianto Setiawan et al., 2021). Many factors make teachers not use learning media.

The 2013 curriculum emphasizes character building as stated in KI-1 and KI-2. In KI-1, it contains spiritual values, then KI-2 contains ethical values. Competencies related to religious attitudes and social attitudes are developed indirectly (indirect teaching), namely when students carry out learning activities about knowledge (Core Competency 3) and the application of knowledge (Core Competency 4). The characters referred to here are those that conform to the rules and values contained in Indonesian life oriented to Pancasila. The 2013 curriculum on science learning content has a direct relationship with the environment. Every level from grade 1 to grade 6 has a direct relationship with the environment. This is indicated by the existence of a theme that is directly related to the environment at each grade level (Yetti et al., 2021).

According to Grecmanova, the role of the environment in the learning process will appear in the feelings created through experience and evaluation of the environment in the learning process by students. Feelings are what construct students' perceptions about the material being studied (Gonda, 2020). In line with this, Rogoza stated that the function of the environment is as a provider of various resources that can be used in the learning process to produce certain kinds of potential (Rogoza, 2020). Human digestion is the organs that are specialized for processing food in humans. The digestive organs in humans work every day without human awareness. The importance of knowing and understanding the digestive organs. The digestive organs consist of the mouth, stomach, esophagus, stomach, small intestine, large intestine, anus. From the digestive organs, there are different functions of each digestive organ. When the digestive organs are not properly maintained, it will cause disease. For that students need to understand related to

the digestive organs, various diseases to how to maintain the digestive organs through eating 4 healthy 5 perfect foods.

According to (Montenegro and Jankowski 2017; McMillan et al., 2020) it shows that learning outcomes are a statement that discusses what students should know and show after completing an academic program. This statement of learning outcomes must be in line with the learning objectives. This shows that each learning outcome describes an evaluation and a measure of the achievements that have been achieved by students after completing the academic program that has been designed. Learning outcomes always refer to the learning objectives of the intended academic program (Bramianto Setiawan, Rachmadtullah, et al., 2020).

According to (Duncan, Bisz, Boyle, & Offenholley, 2020) games are activities that are structured by rules when the player is given a mission to win the game by obeying the structured rules that have been made in the game to be played. Winning the game requires grouping and cooperation between players in a team. Therefore, a collaborative game is needed to win the game. Collaborative that shows the strength of the team against other teams so that it can result in victory. This is similar to the opinion (Scurati et al., 2020) which states that games are collaborative and competitive. The game is also collaboratively characterized by the cooperation between players in a team against other teams. The competition in the game can motivate the players. Collaborative and competitive always exist in games that are done in groups. Each group that has a high level of collaboration will have higher motivation and a sense of competitiveness in the game so that it will be easier to win the game. This is also in line with the opinion (Levy, 2019) which states that games are used as learning media used in class. The game encourages communication activities between players with one another. Communication is focused on the goal as a means of victory in an ongoing game (Pramujiono et al., 2020). The existence of communication between players will motivate players to communicate so that it becomes one victory. This shows that the game can increase the motivation of players who play certain games.

According to (Ribble, 2020) character education is a medium for teachers to provide learning to students how to become compassionate citizens following moral values in Indonesia. Character education is defined as the process of developing students' understanding to behave following the prevailing character values. The process of developing this understanding requires a commitment from each student to be more likely to behave following the prevailing character values. To bring up the tendency of students to behave, it is necessary to have habituation carried out by the teacher (Bramianto Setiawan, 2015).

In line with this (Hermino, 2018) says that character education is not only related to right or wrong but how to instill habits about good things so that they have awareness in students as well as concern and commitment to implement goodness in everyday life. day. This shows that character education is the cultivation of character values that are instilled through the habits of students in everyday life. At the same time (Jason Baehr, 2017; Ribble, 2020) states that the importance of connecting academic learning and character education is carried out through character building. This is one of the duties of the teacher to instill character education. Teachers can try to implement character education by being a model of expected behavior (Bramianto Setiawan, 2015). It is expected that students see directly the role model, namely the teacher himself to always imitate what the teacher does, which is always following the prevailing character values. The purpose of learning character education in the classroom is to help students connect the learning they get with everyday life (Ribble, 2020).

Science is a scientific discipline that uses the scientific method to study a natural event (Maharani, Suratno, & Sudarti, 2020). Natural events are studied in science learning which is closely related to human survival. According to (Kurniawan, Astalini, Darmaji, & Melsayanti, 2019) states that the essence of science learning is learning that makes students involved in investigations. Scientific research can help improve the attitudes and skills of students (Bramianto Setiawan, Juniarso, et al., 2020).

Scientific research is not only limited to scientific activities but also develops when conducting experiments, games, and activities that are directly related to the surrounding environment. Activities that are directly related to the life around them can hone the knowledge, attitudes, and skills of students. This is stated in the competencies that exist in the 2013 curriculum which contains attitude competencies, knowledge competencies, and skills competencies. In the implementation of the 2013 Curriculum, learning on science content is required to use interactive, inspirational, fun, creative, challenging, and motivating methods so that students are active in the learning process (Rahajeng Lintang Cahyaningrum & Parmin, 2018). Interactive learning of natural science content can be carried out using the help of media. The media used in science knowledge learning is expected to be able to help support the achievement of predetermined learning objectives (B Setiawan et al., 2017).

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Science learning is an activity that involves creativity and imagination. Imagination and creativity in every science lesson raise scientific ideas. Scientific ideas are the extraordinary intellectual achievements of a person (Hetherington et al., 2020). This shows that every occurrence of the science learning process carried out by students has a scientific idea that is illustrated through the creativity of each individual. In line with this, Sumanto in Putra revealed that science is a way of finding out about nature systematically to know knowledge, facts, concepts, principles, the process of discovery, and to have a scientific attitude (Putra, 2018).

The primary school curriculum focuses on students learning events in everyday life to provide direct experience to students. Through the learning of science, students have provided provisions to solve problems in everyday life, because natural science learning is a science that seeks to answer the questions of what, why, and how natural phenomena are related to the structure of funds, changes, and dynamics of nature (Kurniawan et al., 2019). Activities developed in science learning aim to encourage students to have sensitivity to the environment around them. So that it can maintain and care for the preservation of the environment around students. Teachers are facilitators who help students to be able to find problems and their concepts from phenomena in the environment (Estiani, Widiyatmoko, & Sarwi, 2015). Therefore, the cultivation of insight into the environment carried out by the teacher is very important for students. With the planting of insights about the environment, it is expected that students will embed a culture of protecting the environment and caring for the environment.

Environmental learning begins with direct experience with the natural surroundings so that later it is hoped that this direct experience can shape behavior, values, and habits to respect the environment around them (Tarbiyah & Kendari, 2018). Environmental education carried out in learning on science content is expected to be able to make meaningful experiences by students so that they can form behaviors and habits to respect the environment around them (Bramianto Setiawan & Iasha, 2020a,

2020b). Through the concept of environmental learning, students are required to understand the importance of the environment for life. Students are accustomed to protecting the environmental ecosystem, for example by throwing garbage in the trash, saving energy, replanting trees, etc.

Monopoly is a game that uses the famous board game and is a collection of family games. This is what makes generations aware of the monopoly game. Not only in Indonesia, but in all parts of the world, monopoly has been well known from generation to generation. Monopoly is played with Skill, strategy, and luck all put to the test as players compete against each other to win the monopoly game. The monopoly game still pleases the participants despite the very tight competition in the monopoly game. Monopoly started in 1903 with Elizabeth Magie (Pilon, 2017; Al Kandari & Al Qattan, 2020). Elizabeth Magie has developed a game known as The Landlords Games, a self-published and circulated game for nearly thirty years, namely until 1932. The game was created as a tool intended to teach the benefits of de monopolization. Monopoly has changed a lot, but most of the changes are aesthetic. The aesthetic in question is an often developed monopoly board game. The core rules of the monopoly game remain the same as they have been used before.

Method

The purpose of this study was to develop the Character Monopoly Game in environmental science learning with digestive organ material into a suitable learning medium for use in the science learning process so that the monopoly of environmentally sound character in digestive organ material can be used to improve science learning outcomes for fifth-grade elementary school students. This research was conducted in class V SDN Bahagia 06 which is located in the Bekasi area. The place of research in the homes of individual students was carried out online or in person, this was due to the Covid-19 Pandemic. This research was conducted in the 2020/2021 academic year, namely October 2020 to April 2021.

This study aims to produce a product in the form of learning media in the form of Character Monopoly games which will later be linked to environmental materials. This research uses research and development methods or more commonly known as research and development. Research and Development is a method that can be used to produce a product and test the effectiveness of the product (Sugiono, 2011). Every product that wants to be developed needs a needs analysis to find out what is needed, then it is necessary to test the effectiveness of the product that has been made so that what is produced can be right on target and effective for its users. The data collection technique used by researchers in developing the Monopoly Character game media in science content for grade V elementary schools was to use questionnaires, observations, interviews, and tests.

Monopoly character game media on Theme 3 about Healthy Food. Researchers used a development model with ADDIE which consisted of five steps, namely: Analyze, Design, Development, Implementation, and Evaluation. The stages will be discussed in the model development steps section. The data analysis technique of the research results aims to determine how effective the learning activities are using environmentally sound game media in grade V elementary schools. The data obtained from this research are qualitative and quantitative. Qualitative data in the form of suggestions or input given by the validator and descriptions of the implementation of the trial. Meanwhile, the quantitative data in the form of an assessment questionnaire score from the validator and the results of the scores obtained by students at the pretest and posttest. Data on the pretest and posttest values of the analysis researcher used the SPSS program through the Shapiro Wilk normality test stages first using the following formula:

$$T_3 = \frac{1}{D} \left[\sum_{i=1}^k a_i (X_{x-i+1} - X_i) \right]^2 \quad (\text{i})$$

Information

D : the value result on the formula (ii)

a_i : Shapiro Wilk coefficient test

X_{n-i+1} : number $n-I + 1$

X_i : The i number in the data

$$D = \sum_{i=1}^n (X_i - \bar{X})^2 \quad (\text{ii})$$

X_i : The i number in the data

\bar{X} : Average

$$G = b_a + c_a + \ln \left(\frac{T_3 - d_a}{1 - T_3} \right) \quad (\text{iii})$$

G : Identical to the Z value of the normal distribution

T_3 : the value result on the formula (iii)

b_a, c_a, d_a : Konversi Statistik Shapiro Wilk Pendekatan Distribusi Normal

To compare the average pretest and posttest values tested using the Home Paired Samples t-Test as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2} - 2r \left(\frac{S_1}{\sqrt{n_1}} \right) \left(\frac{S_2}{\sqrt{n_2}} \right)}}$$

\bar{x}_1 : average of sample 1

\bar{x}_2 : average of sample 2

S_1 : standard deviation of sample 1

S_2 : standard deviation of sample 2

S_1^2 : Variance of sample 1

S_2^2 : Variance of sample 2

r : Correlation between two samples

The normality test aims to determine whether the residual value is normally distributed or not, with the following hypothesis:

1. If the significance value is > 0.05 , the residual value is normally distributed
2. If the significant value < 0.05 , the residual value is not normally distributed

Meanwhile, the Paired Samples t-test aims to determine whether there is a difference between learning outcomes in the pretest and posttest data and the research hypothesis as follows:

H_0 : There is no difference between learning outcomes in the pretest and posttest data

H_1 : There is a difference between learning outcomes in the pretest and posttest data

While the basic basis for decision making in the Paired Samples t-Test based on significance is as follows:

- 1.If the value is Sig. (2-tailed) <0.05, then H1 is accepted / Ho is rejected, that is, there is a significant difference between learning outcomes in the pretest and posttest data.
- 2.If the Sig. (2-tailed)> 0.05, then Ho is accepted, that is, there is no significant difference between learning outcomes in the pretest and posttest data.

Result and Discussion

This study developed a game of Monopoly Character with an environmental insight into the science learning material of Human Digestive Organs in fifth-grade elementary school in this development, it refers to the ADDIE model. This research was conducted to find out the use of the Monopoly Character game based on the environment of science learning on Human Digestive Organs in improving science learning outcomes in grade V elementary schools.

The results of the product feasibility assessment from media experts conducted by Dr. I Made Astra, M.Si, as a postgraduate lecturer at the State University of Jakarta, obtained a percentage data of 83% which shows that the game of environmentally sound character monopoly in science learning on human digestive organs material in grade V elementary school is very good and can be used after several revisions are made. conducted by researchers. The results of the product feasibility assessment of the linguist conducted by Dr. Gusti Yarmi M.Pd, as a lecturer at the State University of Jakarta, obtained a percentage data of 91% which shows that the game of environmentally sound character monopoly in science learning material of human digestive organs in grade V elementary school developed is classified as very good and can be used after several revisions by researchers. The results of the product feasibility assessment from material experts conducted by Dr. Sri Handayani, MM as a professional in the field of education obtained a percentage of 96% which shows that the game of environmentally sound character monopoly in science learning of human digestive organ material in grade V elementary school which has developed a very good product and can be used after several suggestions and suggestions. comments that have been given by material experts.

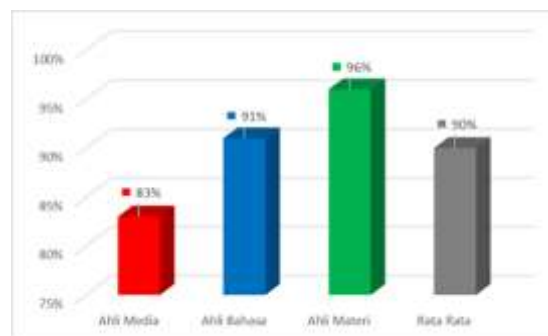


Figure 1. Validation of material experts, media experts, and language experts

The results of the questionnaire assessment at the small group evaluation stage showed that 98% of the monopoly of environmentally sound character in science learning human digestive organ material for class V was classified as "very good" in learning activities.

The following is a diagram of the results of the questionnaire assessment on the one-to-one evaluation and the small group evaluation:

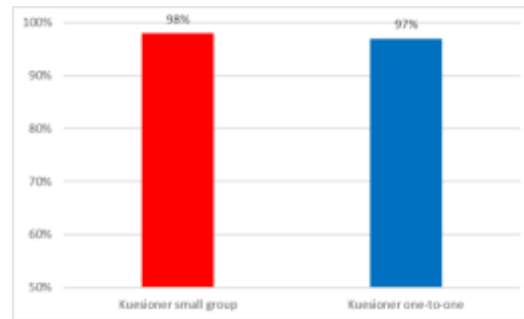


Figure 2. The results of the questionnaire assessment at the one to one evaluation stage and the small group evaluation

The results of the pretest and posttest assessments above can be seen that the respondents have increased with an average pretest score of 62, while at the posttest it increased to 82. This shows that the monopoly of environmentally sound character in science learning human organ material for grade V elementary schools Terselong is effectively used as a support for learning activities. The following is a diagram of improving learning outcomes in the pretest and posttest scores in the one to one evaluation and the small group evaluation:

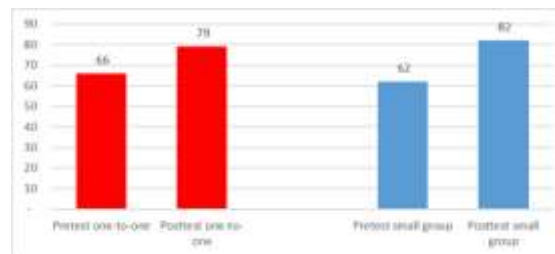


Figure 3. Improved learning outcomes at the pretest and posttest scores at the one to one evaluation stage and the small group evaluation

The results of the normality test with the SPSS program at the one-to-one evaluation stage above can be concluded that the pretest significance value is $0.985 > 0.05$ from the posttest significance value $0.272 > 0.05$, so the residual value is normally distributed. The results of the Paired Sample t-Test with the SPSS program at the one-to-one evaluation stage above, it can be concluded that the Sig. (2-tailed) $0.019 < 0.05$, then H_1 is accepted / H_0 is rejected. This shows that there is a significant difference between learning outcomes in the pretest and posttest data.

The results of the normality test with the SPSS program at the small group evaluation stage above, it can be concluded that the pretest significance value is $0.471 > 0.05$ from the posttest significance value $0.662 > 0.05$, so the residual value is normally distributed. The results of the Paired Sample t-Test with the SPSS program at the small group evaluation stage above, it can be concluded that the Sig. (2-tailed) $0.000 < 0.05$, then H_1 is accepted / H_0 is rejected. This shows that there is a significant difference between learning outcomes in the pretest and posttest data.

Based on the results of the analysis of experts, one to one evaluation, and small group evaluation, it can be concluded that the Character Monopoly Game in environmental science learning, digestive organ material becomes a suitable learning medium for use in the science learning process so that the monopoly of environmentally sound characters in the digestive organ material can be used to improve the science learning outcomes of grade V SD students.

Conclusion

The conclusion of this research is the Game of Monopoly Character with an environmental insight learning the science of Human Digestive Organs material in grade V elementary school. This development refers to the ADDIE model. Monopoly Game Character with Environmental insight Natural science learning material Human Digestive Organs was tested on three experts consisting of material experts, media experts, and linguists. The average percentage result of the assessment of material experts, media experts, and linguists on the environmentally sound character monopoly game reaches 90%. The one-to-one questionnaire evaluation results obtained were 98%. The results of the evaluation of the small group questionnaire were 97%. In addition, the game of environmentally sound character monopoly in science learning material for human digestive organs is also carried out pretest before using game products and posttest at the time after learning to use the product. The result of the average score of the pretest during the one-to-one evaluation was 66, while the post-test during the one-to-one evaluation was 79. The result of the average score of the pretest at the time of the small group evaluation was 62, while the small group at the time of the one-to-one evaluation was 82. Based on the results of the analysis of experts, one to one evaluation, and small group evaluation, it can be concluded that the Character Monopoly Game in environmental science learning, Digestive Organs material becomes a suitable learning medium for use in the science learning process so that the monopoly of environmentally sound characters on Digestive Organ used to improve science learning outcomes of grade V SD students.

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