

The Application of The “Ludo” Media on The Human Digestive System on Student Learning Outcomes in Elementary Schools

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ABSTRACT

The Ludo game is a teaching tool used in science education. This study aims to explore the effectiveness of using the ludo game in teaching the digestive system to students and its impact on their learning outcomes. The study was conducted in the fifth-grade class at SDN 005 Tarakan. It employed a one-group pretest-posttest design, with data analyzed using a t-test. The researcher administered a pretest before the instructional activities began. After the implementation of the Ludo game was completed, a posttest was administered at the end of the learning process. The result showed a significant difference between the pretest and posttest scores for the digestive system Ludo game, as well as an excellent student response with a score of 82.08. the game encourage student to compete and collaborate in achieving learning objectives simultaneously.



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INTRODUCTIONS

A curriculum is a framework used to plan instruction and assessment within the education system. According to Lubis et al. (2023), the curriculum is developed to help students achieve educational goals; the curriculum plays a crucial role in all educational activities (Anisa & Aryani, 2024). Education in the 21st century emphasizes the importance of students' skills, including the cognitive, social, and emotional skills necessary for success in today's society. The Merdeka Curriculum is a highly significant educational approach in the context of modern education. Through personalized learning, the development of 21st-century skills, teacher empowerment, fostering innovation, building student independence, and real-world relevance, the Merdeka Curriculum is designed to create a more effective and relevant education.

The implementation of the Merdeka Curriculum integrates several subjects, one of which is the teaching of science and social studies in elementary school, which are combined into the Natural and Social Sciences (IPAS) subject. The goal is to encourage students to manage their natural and social environments in an integrated manner. Through IPAS learning, students can gain hands-on experience and training to discover concepts in a meaningful, authentic, and effective way. To design learning activities that encourage active student participation, an effective medium is needed to deliver learning materials during the teaching-learning process. Here, teachers are expected to design learning activities that are

beneficial, interactive, enjoyable, and motivate students to think critically and creatively and to solve problems.

The researcher will introduce a game called Ludo. Ludo is a game that has been modified to support the learning process in the classroom so that students enjoy learning activities (Ulhusna et al., 2020). Ludo is a flexible game that can be easily adapted to students' learning needs. This game can be easily created and reproduced. Ludo is a classic game that can be played by 2-4 people by applying strategies to move four pawns using dice (Ningsih & Pritandhari, 2019).

The researchers will utilize a Ludo game medium that has been designed and validated by subject matter experts and media experts (Susanti et al., 2025). In addition to content validation by media experts, several relevant studies provide references regarding Ludo game research conducted by (Hasanah et al., 2020); Siregar et al., 2023), which indicate that the use of Ludo media influences learning outcomes; thus, it can be concluded that research incorporating the Ludo game has an impact on learning outcomes.

Therefore, the researchers will test the effectiveness of the product they have developed-a Ludo game featuring content about the human digestive system. This material is often difficult for students to understand without the aid of visual aids.

RESEARCH METHOD

The type of research employed is quantitative experimental research. Quantitative research is a method for acquiring knowledge that uses numerical data analyzed statistically to test predetermined hypotheses. Djollong (2014) states that quantitative research is a process for acquiring knowledge that utilizes numerical data as a tool to analyze information about the subject of interest. Quantitative research is characterized by a strong emphasis on numerical data in its field data collection methods. Sugiyono (2013) states that quantitative research can be understood as a research approach rooted in the philosophy of positivism, used to investigate specific populations or samples. Here, the researcher will apply a pre-experimental design, namely the One-Group Pretest-Posttest Design. In this design, the researcher involves only one experimental class without a control class. This design compares conditions before and after the treatment by comparing pretest scores and posttest scores. The research design can be seen in Table 1.

Table 1
One-Group Pretest-Posttest Experimental Design

Group	Pre-test	Treatment	Post-test
Experiment	O ₁	X	O ₂

In a one-group pretest-posttest design, the dependent variable is measured in a single group before (pretest) and after (posttest) the intervention is administered. After the intervention is administered to the group, the pre- and post-intervention scores are compared. The advantage of this design is that it allows us to compare pre- and post-intervention conditions in the same participants using the same measurement tools. The subjects in this study were students in class V-A at SDN 015 in Tarakan City, with a total of 24 students.

The researchers developed an assessment tool consisting of competency indicators on the topic of the Human Digestive System, comprising 15 multiple-choice questions and 5 essay questions. This tool was used to assess students' conceptual mastery, both before the learning process (pretest) to determine students' initial abilities, and after the learning

process (posttest) following the use of the Ludo game as a learning medium. Furthermore, a student response questionnaire was administered to measure students' reactions and views regarding the use of the Ludo game as a learning medium in the Human Digestive System curriculum. This tool was designed to evaluate how effective the medium was in capturing attention, facilitating understanding, and providing a fun and meaningful learning environment for students.

Student response data was collected from a questionnaire assessing student responses to learning activities and was then analyzed quantitatively. This analysis involved calculating the number of students who gave positive responses based on the aspects surveyed, and then calculating the percentage. This percentage can be calculated using the formula:

$$P = \frac{F}{N} \times 100\%$$

Notes:

P = Percentage Questionnaire

F = Score obtained

N = Number of students who completed the questionnaire (Kartini et al., 2020)

Table 2
Student Performance Categories

Score Range (%)	Category
81-100	Excellent
61-80	Good
41-60	Fair
21-40	Poor
0-20	Very Poor

In data analysis subsection, the author(s) is required to process data from previous stage. Different method used may result on different model of data processing. For a quantitative study, author(s) should show how s/he calculated derived variables (to deal with outlying values and missing data).

RESEARCH FINDINGS AND DISCUSSION

The Ludo game materials used in this study consist of the following main elements:

1. Ludo board; featuring a game board modified with symbols of the human digestive system, so that each game move is linked to a concept of the digestive system.
2. Question cards and challenge cards, containing questions about the organs, functions, and processes of digestion that players must answer when landing on specific spaces.
3. Game pieces and dice, used to determine players' turns and moves, ensuring the learning process is dynamic and competitive.
4. Game instructions, containing a brief guide on the rules of play, how to answer question cards, and the criteria for determining the winner.

The appearance of the Ludo educational game media following validation by media experts and subject matter experts can be seen in the image below



Figure 1. Ludo Game Interface

Before the game begins, the teacher explains the rules. The class is divided into four groups: the mouth, throat, stomach, and intestines. A representative from each group stands at the “start” point and rolls the dice. The group moves according to the number rolled. Each group takes turns, and when they land on the “question mark” space, they pick up a question card and can discuss with their group members to answer it. The winner is determined based on the highest score and the farthest distance covered within the allotted time. Azizah & Fitriawanati (2020) also state that the questions presented through the Ludo game keep students enthusiastic and engaged in learning.

In the first session, the researcher administered a pretest; in the second and third sessions, the Ludo game was used; and in the fourth session, a posttest was administered at the end of the lesson. The researcher then analyzed the data using SPSS, and the results obtained were as follows.

Table 3
Paired Samples Tes Statistics

	Nilai	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Learning Outcomes	Pretest	.120	26	.200*	.964	26	.486
	Posttest	.116	26	.200*	.950	26	.237

Based on the Shapiro-Wilk test output table, the Sig. values for the pretest and posttest scores were significant, as they were greater than (>) 0.05; therefore, it can be concluded that the pretest and posttest data are normally distributed.

Table 4
Paired Samples Tes Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	58.62	26	9.811	1.924
	Posttest	70.0000	26	9.78162	1.91833

The average pretest score was 58.62, while the average posttest score was 70.00. Since the average pretest score (58.62) is less than the posttest score (70.00), this indicates a descriptive difference in average learning outcomes between the pretest and posttest. To determine whether this difference is truly significant, a paired-sample t-test was conducted.

Tabel 4
Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest & Posttest	26	.452	.020

The output shows the results of the correlation test between the two datasets, or the relationship between the pretest variable and the posttest variable. Based on the output, the correlation coefficient is 0.452 with a significance level of 0.020. Since Sig = 0.020 < the probability level of 0.05, it can be concluded that there is a relationship between the pretest and posttest variables.

Table 5
Uji Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	11.38462	10.25701	2.01156	-15.52751	-7.24172	-5.660	25	.000

H0: There is no difference in the mean learning outcomes between the pretest and posttest. H1: There is a difference in the mean learning outcomes between the pretest and posttest. The decision criterion is that if the Sig (2-tailed) value is < 0.05, then H0 is rejected and H1 is accepted. Conversely, if the Sig value is > 0.05, then H0 is accepted and H1 is rejected. Based on the output table, the Sig value is recorded as 0.000 < 0.05, so H0 is rejected and H1 is accepted, meaning that there is a difference in the mean scores between the pretest and posttest. Additionally, the average student response reached 82.08, falling into the "very good" category. Participants showed enthusiasm while playing Ludo. Students competed with other groups and collaborated with their peers in answering the question cards they received. Students were expected to collaborate within their own groups while still striving to defeat other groups in the competition (Saputri et al., 2024). Ludo is an educational game medium that supports engaging learning, thereby inspiring students to learn and understand the material to achieve learning objectives effectively (Munawarah et al., 2024). The use of the Ludo game medium influences increased student enthusiasm and engagement, and offers a more interactive, enjoyable, and meaningful learning medium, thereby encouraging efficient collaboration among students (Melinda et al., 2025). Therefore, the Ludo medium attracts students' attention because this game has competitive elements.

CONCLUSION

The research results indicate a significant difference between pretest and posttest learning outcomes, showing that the use of the Ludo game in teaching the digestive system was effective in improving learning outcomes and eliciting a very positive response from students, with a score of 82.06. Students became enthusiastic and engaged in the learning process. They competed with other groups and collaborated with their group members to answer the question cards they received.

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