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DEVELOPMENT OF SNAKES AND LADDERS GAME MEDIA 3D BASED ON SUB-MATERIAL HUMAN INFLUENCE ON THE ECOSYSTEM TO INCREASE MOTIVATION FOR STUDYING SCIENCE IN JUNIOR HIGH SCHOOL STUDENTS

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ABSTRAK

In the implementation of the current media, teachers still need to improve in innovating the media, because the media used still cannot increase student learning motivation. Researchers developed learning media to increase student learning motivation. The purpose of this research is to produce 3D-based snakes and ladders game media on the subject of human influence on ecosystems. The research method used is development research (Research & Development). The development model in this study is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The subjects in this study were seventh grade students of SMP Negeri 4 Lamongan with a sample size of 64 students, the sampling technique used was probability sampling technique with simple random sampling type. Data analysis techniques in the form of media validation to determine the feasibility of 3D-based snakes and ladders game media, increased student learning motivation and student responses after using 3D-based snakes and ladders game media. Data collection techniques in this study are validation, motivation questionnaire and student response. The results of the validation of the feasibility of 3D-based snakes and ladders game media obtained a percentage of 96% with the criteria "Very Feasible" or valid. The results of increasing learning motivation obtained an N-gain value of 0.78 or 78% classified as "High" criteria. The results of the percentage of the overall value of student responses obtained 85% and classified as a "Very Good" category. Suggestions from this study so that other researchers can be explored with other variables can also be developed more creatively and innovatively on pawns and dice to use a larger size, snake ladder board materials can be printed using art carton paper so that the design image is good when used.

Keywords: Learning media, learning motivation, snakes and ladders

INTRODUCTION

The development of human civilization at this time has been very rapid, this development quickly has an impact on various aspects that have developed and changed in proportion to the times. One of the areas that has also experienced development is education. In order to remain relevant, education also needs to adapt, including in Indonesia (Subur & Rahayu, 2021). Education today continues to evolve with the widespread adoption of technology (Ramadhan, 2022). Distance learning and online platforms are increasingly common, enabling wider and more flexible access to education, digital skills, data literacy and critical thinking are increasingly emphasized in curricula to prepare students for future challenges, inclusive education and diversity awareness are increasingly in focus in efforts to build supportive learning environments for all students (Amelia, 2023 ; Sarnita & Andaryani, 2023).

Learning often utilizes media as an intermediary to explain material so that it can be understood by students (Wulandari *et all*., 2023). Learning using learning media can significantly increase student interest and motivation, foster stimulation and enthusiasm for learning, besides that students are also

carried away by psychological influences (Sholikah, 2022). There are five very important components during the learning process, including goals, learning materials, methods, media, and evaluation (Erfan Muhammad *et all*., 2020). Specific teaching methods can be impacted by appropriate types of learning media, while considering learning objectives, materials, and evaluation, important because the media serves as a teaching aid that affects motivation, conditions, and the learning environment (Febrita & Ulfah, 2019).

Learning media that can make students actively involved and enjoy the learning process can increase student participation in learning activities (Aji *et al*., 2020). Snakes and ladders media is a learning tool that adapts traditional games with the aim of conveying information to students according to the desired learning characteristics (Wati, 2021). Efforts to create an active and enjoyable learning experience for junior high school students can be done by combining learning with play. In this play process, students will naturally experience the learning process and gain fun and valuable experiences (Hardiansyah *et al*., 2021).

This snakes and ladders learning media will be developed with the behavior and needs of grade VII junior high school students, determining suitable media for student learning is not easy. It requires a close analysis by reviewing various directions so that the media used is very meaningful and balanced with the learning objectives. The nature in question is relevance, effectiveness, efficiency, and productivity (Djatmika *et al.,* 2012).

Based on interviews conducted at the State Junior High School 4 Lamongan, there are several problems in the learning process, teachers still often use teacher-centered learning models, learning activities are monotonous, and the level of teachers still needs to be improved in innovating media and managing the learning process, teachers also feel that the media used still cannot increase student motivation, this can be seen when the teacher teaches in class, where some students are less focused when the teacher explains the material and student participation in discussions is also still low. This is why the use of snakes and ladders media was chosen because students have not been fully motivated in learning.

Motivation is a stimulus that encourages a person to achieve goals or success (Ariyanto, 2020). Setting goals that students can achieve in the game, and providing rewards for achievement can increase students' drive to actively participate in the learning process (Asti *et al.*, 2023). When students feel satisfied with the learning experience they get, their motivation to learn will naturally increase (Indarini & Abidin, 2021). In addition, students' learning motivation with 3D-based snakes and ladders media can increase because 3D graphics can create a realistic and interesting visual experience for students, captivate their attention and change learning to be more enjoyable (Firdiana, 2020).

The development of a 3D-based snakes and ladders game media can be an effective tool to increase student learning motivation and support the achievement of learning objectives (Widiana *et al.*, 2019). This media includes stronger interactions, such as animations and compelling visual effects, making students feel more involved in the learning process (Pratama *et al.*, 2023). Students today grow up in a rich digital environment, so 3D-based snakes and ladders media can be more easily accepted by them and help create a stronger connection between classroom learning and their daily lives (Salassa *et al*., 2023). Thus, 3D-based snakes and ladders media can be an effective tool to increase students' learning motivation and support the achievement of learning objectives (Rikawati & Sitinjak, 2020).

Human influence on ecosystems is one of the sub-materials in junior high school, which explains about human activities on the existence of an ecosystem. There are four discussions on this material, namely agriculture and food production, habitat destruction, pollution, and conservation (Inabuy *et al*., 2021). To increase motivation in science learning, researchers will develop a 3D-based snakes and ladders game media on the subject of Human Influence on Ecosystems.

Researchers developed a 3D-based Snakes and Ladders game media. Previous research conducted by Reka Nur Wahida (2023) "Development of Science Ladder Snake Game as a Junior High Science Learning Media on Human Respiratory System material" shows that the use of snakes and

ladders learning media is feasible to use and can also make learning more interesting and fun. Similar research results were also conducted by Nur Rizqo (2020) "Development of Mathematics Snakes and Ladders Media to Increase Learning Motivation of Grade 2 Elementary School Students" the media can increase learning motivation and increase the score to 68.5 which was previously a score of 45.9 with this flat building media worth using as learning media and can improve learning outcomes.

The novelty in this research is the development of 3D-based snakes and ladders game media to increase student learning motivation. The development of snakes and ladders game media is an alternative media during learning, and can be an interesting solution. Students in junior high school will be more interested in learning because using the concept of learning while playing with snakes and ladders media can increase student interest and motivation, creating a more interactive and fun learning experience. Making media is also easy and practical in use, so that educators are more creative in making other media. Researchers tried to develop a 3D-based learning media through a study entitled "Development of 3D-based Snakes and Ladders Game Media on the Material of Human Influence on Ecosystems to Increase Junior High School Students' Science Learning Motivation".

RESEARCH METHODS

The research method used is development research (Research & Development). The development model in this study is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) (Darma Wisada *et al*., 2019). The stages of development research can be seen in Figure 1.

Figure 1: Stage of Development Research

The variables used in this study, namely the independent variable, in the form of 3D-based snakes and ladders game media, the dependent variable in the form of learning motivation, and the control variable, namely the material used in the study, namely the material on human influence on ecosystems. This research was conducted in the even semester, namely in May of the 2023/2024 school year located in one of the junior high schools in Lamongan Regency, namely at the State Junior High School 4 Lamongan.

Targets/objectives

This study aims to determine the feasibility of 3D-based snakes and ladders game media on the subject of human influence on ecosystems that have been developed by measuring learning motivation and student responses.

Research subjects

The subjects of this study were seventh grade students in one of the junior high schools in Lamongan Regency, with a population of 224 students. The sampling technique used simple random sampling technique, namely determining the sample without looking at the strata in the population. The number of research samples was 64 students.

Procedures

The steps in this research involve 5 stages, namely the Analysis, Design, Development, Implementation, Evaluation stages. The initial stage is analysis, conducting interviews to find problems that exist where the research objectives are. The second stage is design, designing product design and systematic determination, designing game tools, questions, materials, and answers, designing game tools, questions, materials, and answers, and compiling product assessment instruments. The third stage, namely, Development, conducts Learning Media Production, media validation, validation of learning motivation questionnaires, and validation of student response questionnaires.

The third stage is implementation, conducting field trials using 3D-based snakes and ladders game media, the last stage is evaluating by processing data to find out whether the media is effective in

increasing student learning motivation and how students respond to the media. Here below is figure 2 instructions for using 3D-based snakes and ladders game media.

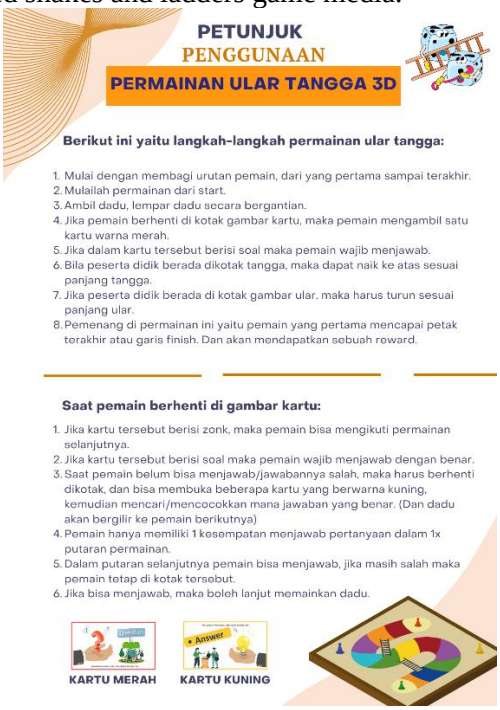

Figure 2. Instructions for using the media

Here are the steps for using the 3D-based snakes and ladders game media:

1. Start forming groups, 1 team consists of 8 students.
2. Divide the players, from the first to the last.
3. Start the game from the start.
4. Take the dice, roll the dice alternately.
5. If the player is in the card picture box, then the player takes one red card (question card / zone).
6. If the card contains a question then the player must answer.
7. If the player is in the ladder box, then they can go up according to the length of the ladder.
8. If the player is in the snake picture box, then must go down according to the length of the snake.
9. The winner in this game is the first player to reach the last plot or finish line. And will get a reward.

Rules if the player stops at the card picture:

1. If the card contains zonk, then the player can immediately follow the next game.
2. If the card contains a question, the player must answer correctly.
3. If the player cannot answer or the answer is wrong, then they must stop at the box, and may open the yellow card (answer), then look for or match which answer is correct.
4. The dice will rotate to the next player.
5. Players only have 1 chance to answer a question in 1 round of the game.
6. In the next round the player can answer again, if still wrong then the player stays in the box.
7. If you can answer, then you can continue to play the dice.

Data and instruments

The data in this study were collected through two stages of measurement, namely pretest and posttest. The instrument used was a questionnaire. The learning motivation questionnaire was used to measure the increase in student learning motivation after using the media and student responses were used to determine student responses after using the 3D-based snakes and ladders game media. The instrument in the questionnaire items with a Likert scale.

The learning media feasibility test questionnaire and research instruments use Likert scale assessment criteria, with a score range of 1 to 4. After calculating the overall score for each aspect of validator validation, the score is converted into percentage form by dividing the score obtained by the maximum

score and multiplying by 100%. Then, the resulting percentage is categorized according to the eligibility criteria shown in table 1.

Table 1. Eligibility categories

Interval (%)	Criteria
81 – 100	Very high/very feasible
61 – 80	High/viable
41 – 60	Medium/quite feasible
21 – 40	Low/less feasible
0 – 20	Very low/not feasible

Table 2. Grid of science process skills test instrument

No	Indicator	Descriptor	No question
1.	The existence of interesting learning activities	a. Engaging learning b. Curiosity c. Interaction between students d. Student creativity e. Student activeness	16, 19, 20, 22
2.	The existence of desire and desire to succeed	a. Ability to ask questions b. Paying attention to the teacher's explanation c. Diligent in learning independently d. Responding to questions e. Thorough f. Willingness to recall material	1, 2, 3, 4, 5, 24
3.	The existence of encouragement and needs in learning	a. Willingness to learn b. Discipline c. Responsibility to the task d. Awareness of the importance of knowledge	6, 7, 18, 21
4.	The existence of future hopes and aspirations	a. Desire for achievement b. Willingness to report learning results to parents	8, 9, 10, 17
5.	Conducive learning environment	a. Supportive atmosphere b. Safe & comfortable environment c. Participate in learning	23, 25
6.	The existence of appreciation in learning	a. Rewards b. Learning effort and achievement c. Praise, recognition of achievement d. Rewards	11, 12, 13, 14, 15
Total questions			25

The student response questionnaire to the 3D-based snakes and ladders game media also uses Likert scale criteria, which consists of four alternative answer choices, namely 1 to 4. After calculating the overall score of student responses for each aspect of the statement, the score is converted into a percentage by dividing the score obtained by the maximum score and multiplying by 100%. Then, the resulting percentage is categorized according to the eligibility criteria according to Sugiyono (2019) as shown in table 3.

Table 3. Response questionnaire percentage categories

Interval (%)	Criteria
81 – 100	Verry good
61 – 80	Good
41 – 60	Fair
21 – 40	Verry poor

The N-Gain test was conducted to compare the scores of student learning motivation results before and after the application of 3D-based snakes and ladders game media (Rostina Sundayana, 2018). The N-Gain test was tested with the help of Microsoft Excel, with the value criteria referring to the following:

Table 4. Criteria Score N-Gain

Score	Categori
0<g>0,3	Low
0,4-0,6	Moderate
0,7<g>0,9	Moderately Moderate
<g>1,00	High

(Rostina, 2018)

RESULTS AND DISCUSSION

This research implements 3D-based snakes and ladders game media on the subject of human influence on ecosystems to increase student learning motivation. The results and discussion of this research are as follows:

Result

Validation by validators is carried out to ensure feasibility and obtain suggestions on learning media that will be used by students. media validity is tested by language, material, and media experts. The validation value obtained by the media expert was 99, by the material expert was 90, and by the language expert was 100. The validation value of the three validators is included in the very high validity category, so that the 3D-based snakes and ladders game media can be used in the learning process. The results of the validated media are illustrated in Figure 3.

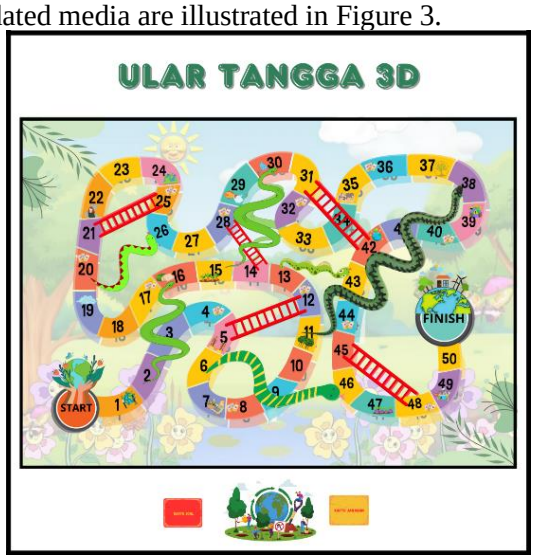

Figure 3. 3D-based snakes and ladders game media

The questionnaire results show that there is an increase in student learning motivation after participating in learning by using 3D-based snakes and ladders game media. This increase was analyzed using the N-gain test.

The results of increasing student learning motivation obtained on average, seen in table 5.

Data Source	Student	Average				
		Pretest	***Posttest***	***Gain***	***N-gain***	**Categori**
Motivation	64	62%	91%	29	**0.788697366**	High

Source: Processed Development Research Data

From the calculation results, namely: 0.78 or 78.86% is classified as "High". Based on the results of using 3D-based snakes and ladders game media, the percentage of student learning motivation before using the media is 62% and after using the media is 91%. This means that in the hypothesis there is a significant difference between the learning motivation scores before and after using the 3D-based snakes and ladders game media. It can be seen that the development of 3D-based snakes and ladders game media can increase student learning motivation.

The following is a recapitulation of indicators of learning motivation questionnaire results, can be seen in table 7.

Table 7. The results of the calculation of learning motivation indicators

No	Indicator	Before	After
1.	The existence of interesting learning activities	62%	89%
2.	Desire and desire to succeed	63%	92%
3.	The existence of encouragement and needs in learning	62%	92%
4.	There are hopes and dreams for the future	60%	94%
5.	Conducive learning environment	64%	81%
6.	There is appreciation in learning	60%	90%
Total		**62%**	**91%**

Source: Processed Development Research Data

The table above is the percentage score per child on the indicator, known through the overall score of each divided by the maximum score value. Based on the results of the learning motivation score after the use of 3D-based snakes and ladders game media, it is known that the highest percentage of 94% is found in the 4th indicator, namely "There are hopes and aspirations for the future." This shows that the 3D-based snakes and ladders game media is very influential in increasing student learning motivation, each percentage can be seen in table 7.

Point 4, which relates to future hopes and aspirations, shows the most significant increase from 60% before using the snakes and ladders game media and to 94% after using.

The response questionnaire was given to respondents/students with the aim of knowing students' responses about the 3D-based snakes and ladders game media used during the learning process. From the table of the percentage results of student responses obtained, calculated by the number of students responding, student answers are in the 81-100 interval or in the "very good" category. A total of 46 students responded "very well", 17 students responded "well", and 1 student responded "moderately."

The results of the overall percentage value obtained 85% are classified as "Very Good" category. So it can be concluded that the students' response to the 3D-based snakes and ladders game media is very good.

Table 8. Total presentase response frequency

INTERVAL	CATEGORI	FREQUENCY	%
81-100	Verry good	46	71,875%
61-80	Good	17	26,5625%
41-60	Fair	1	1,5625%
21-40	Poor	0	0
TOTAL		64	100%

Discussion

This research aims to develop a 3D-based snakes and ladders game media to increase students' learning motivation and see students' responses. The 3D snakes and ladders game media in this study was tested for feasibility by three experts, namely media experts, material experts, and linguists. The validation results showed an overall score percentage of 96%, with the category "very feasible". This finding is in line with Fitriana Nur Syifa's (2018) research on "Development of Asmaul Husna Integrated Snakes and Ladders Game Media in Thematic Learning", which also shows the feasibility of snakes and ladders game media as learning media.

Based on the measurement of learning motivation before and after the implementation of 3D-based snakes and ladders game media, the percentage score is 62% to 91%. The N-gain test was conducted at the field trial stage. The magnitude of N-gain 0.788697366 is included in the high N-gain category. The n-gain test results in table 6 can be concluded that the use of media can increase the enthusiasm for learning because with learning media students understand more easily and focus on learning. From the validator's assessment, the 3D-based snakes and ladders game is a "Very Feasible" learning media used in science learning. The results of this study are in line with the research of Rizqo Nur, Hamsi Mansur, Mastur (2020) with the title "Development of Mathematics Snakes and Ladders Media to Increase Learning Motivation of Grade 2 Elementary School Students" which can increase student learning motivation.

Students' responses to the 3D-based snakes and ladders game media received a response percentage of 72% in the "Very Good" category, 26% in the "Good" category and 2% in the "Fair" category, seen in table 8. The overall score percentage obtained was 85% in the "Very Good" category. The results of research on student responses can also be seen when students are enthusiastic in the learning process, students ask lots of questions, and are enthusiastic about the learning process. The students' enthusiasm during the learning process using the 3D snakes and ladders game media was clearly visible. This is proven by the many questions asked by students and their enthusiasm in participating in the learning process. This finding is in line with research by Wahyuningsih (2021) which states that students' interest will increase when they are faced with something that is needed, learned and meaningful to them. The interesting and interactive 3D snakes and ladders game is able to meet students' needs and interests, so that they are more enthusiastic in learning.

CONCLUSIONS

This research proves that the 3D-based snakes and ladders game media is effective in increasing the learning motivation of class VII students at SMP Negeri 4 Lamongan for the 2023/2024 academic year. The 3D-based snakes and ladders game media has been tested for its suitability and is classified as "Very Appropriate" for use in learning, with a percentage of 96%.

A significant increase in student learning motivation after using this media in learning, with an N-gain of 0.78 which is included in the "High" category. The percentage of students' learning motivation before using media was 62%, while after using media it increased to 91%. This shows that the 3D-based snakes and ladders game media is able to increase students' learning motivation significantly.

The student response to the 3D-based snakes and ladders game media was 85% in the "Very Good" category, meaning that the learning media contains aspects that students need during the learning process.

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