International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Effectiveness of Using Snakes and Ladders Media In Algebra Mathematics Learning to Improve Students' Motivation and Learning Outcomes in Class VII of Junior High School

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Abstract

This study aims to determine the effectiveness of using snakes and ladders media in algebraic mathematics learning to improve motivation and learning outcomes of class VII students at SMP Negeri 6 Sorong City. The problem raised in this study is the low learning motivation and learning outcomes of students in algebra material due to less interactive learning methods. This study uses a mix method approach with a one group pre-test and post-test design. The research subjects were 29 class VII students. The instruments used included observation of learning implementation, student activity observation sheets, tests (pre-test and post-test), and motivation questionnaires. The results of the study showed that learning with snakes and ladders media with a research instrument percentage of 91% was in the "Very low" category with the results of the N-Gain test showing an increase of 0.4086 in the "Medium" category. Based on these data, snakes and ladders media has proven to be potentially effective in increasing motivation and providing a positive impact on student learning outcomes in algebra material. Thus, snakes and ladders media can be used as an innovative alternative in mathematics learning.

Keywords: Effectiveness, Learning Media, Snakes and Ladders, Algebra, Learning Motivation, Learning Outcomes.

INTRODUCTION

Mathematics is a basic subject that plays a crucial role in developing logical, systematic, and critical thinking skills (Karso 2019). However, the reality on the ground shows that

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mathematics is often perceived as a challenging and boring subject by students (Asiva Noor Rachmayani 2015). One of the subjects that poses a significant challenge for junior high school students is algebra. According to students, this subject challenges understanding symbols, variables, and abstract relationships between mathematical elements. If students do not understand basic concepts well, they will have difficulty understanding advanced mathematics material, as each concept is interconnected (Sakiah & Effendi, 2021; Prambudi & Yunianta, 2020).

The mathematics learning process should foster meaningful understanding and increase student motivation. Teachers play a crucial role in creating an interactive and enjoyable learning environment, encouraging students to actively engage, not just listen. However, many teachers still use the conventional lecture method. While effective for delivering material, this method can leave students bored and unmotivated, particularly in algebra (Amri & Bahri, 2016; Sihotang, 2020; Mea, 2024).

Observations at SMP Negeri 6, Sorong City, showed that even though students paid attention to their teachers' explanations, they still experienced difficulties in solving algebra problems. Teachers cited a lack of accuracy, hasty responses, and a lack of thorough understanding of the problem-solving steps. Furthermore, poor mastery of basic concepts, peer interference, and minimal learning motivation were also factors that impacted student learning outcomes (Wulansari Novenia Hizkia and Manoy Janet Trineke 2020).

To address this, learning innovations are needed that can capture student attention and increase motivation. One approach that can be implemented is the use of interactive learning media. Learning media serves as a tool to assist teachers in delivering material in a more engaging manner, thereby increasing student focus, understanding, and active participation (Pane & Dasopang Darwis, 2017; Devi et al., (2023)).

One potential media is the snakes and ladders game, modified into a learning tool. This tool was developed by inserting algebra problems into the game board, allowing students to learn while playing. This approach not only makes learning more enjoyable but also fosters a healthy competitive spirit among students (Wati, 2021).

Several previous studies have shown that educational games like this can increase students' interest and motivation in learning (Herlina et al. n.d.);(Sabila et al. 2021). However, the use of snakes and ladders as a medium for learning algebra in seventh-grade students is still rare and has never been implemented at SMP Negeri 6, Sorong City. Furthermore, most previous studies have focused only on increasing motivation and have not comprehensively examined learning outcomes.

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International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Learning motivation and learning outcomes are two crucial aspects of the educational process. Motivation serves as both an internal and external driver that influences students' enthusiasm for learning (Ellis and Diantra Sampe 2022), while learning outcomes reflect students' successful understanding of the material being taught (Indah Wijayanti, Shokib Rondli, and Hilyana 2022). herefore, a learning approach that enhances both is essential, particularly in mathematics, which is considered challenging (Suryani and Lestari 2019).

Based on this background, this study aims to determine the effectiveness of using snakes and ladders media in improving student motivation and learning outcomes in algebra material for class VII of SMP Negeri 6 Kota Sorong. This study is expected to provide an alternative solution for teachers in implementing innovative, applicable and enjoyable learning.

METHODS

This study used a mixed methods approach with a one-group pretest-posttest design. A quantitative approach was used to statistically measure the effectiveness of the snakes and ladders media on student learning outcomes and motivation, while a qualitative approach was used to describe student activities and responses during the learning process. The subjects in this study were 29 class VII students at SMP Negeri 6 Sorong City in the even semester of the 2024/2025 academic year.

The instruments used consist of: (1) Teaching modules/RPP, (2) Learning outcome tests (pretest and posttest), (3) Student activity observation sheets, (4) Learning implementation observation sheets, (5) Student learning motivation questionnaires, (6) Activity documentation. One of the supporting instruments in the learning process in this study was a modified snakes and ladders learning media with algebra problems. This media was designed to increase student engagement and motivation through a play-while-learning approach. Each square on the game board contained instructions related to the problem, activity, or emotional encouragement, such as "Smile first" and "Say good luck."

This media is printed in color in the form of a banner measuring 2 x 2 meters and used in groups divided into 6 groups of 4 or 5 students. Snakes serve as penalties (going down to a lower square), while ladders serve as rewards (climbing to a higher square), creating an educational competitive atmosphere. If students get a box containing a question, students are required to answer the question through group discussion

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Figure 1. Snakes and Ladders Media

Data collection technique

(1) Test: given before and after treatment (pretest-posttest) to measure improvements in learning outcomes; (2) Questionnaire: given after treatment to determine changes in students' learning motivation; (3) Observation: used to record student activities and the implementation of learning during the use of snakes and ladders media; (4) Documentation: in the form of photos and videos of the learning process to support qualitative data.

All instruments were validated by three validators from the subject matter and learning media experts. Based on the validity interpretation criteria in Table 1 below.

Table 1. Interpretation of Instrument Validity

Indicators of the Suitability of Using Snakes and Ladders Media in Algebra Mathematics Learning to Improve Student Motivation and Learning Outcomes (%)	**Category**
81-100	Highly Appropriate
61-80	Appropriate
41-60	Moderately Appropriate
21-40	Less Appropriate
0-20	Not Appropriate

Source: (Setyo et al. 2023)

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Data Collection

Data collection was conducted in three stages: preparation, implementation, and analysis.

1) The preparation stage included the development of learning materials such as lesson plans (RPP), snakes and ladders learning media, and research instruments in the form of pretest and posttest questions, student activity observation sheets, learning implementation observations, and a learning motivation questionnaire. All instruments were then validated by three experts.
2) The implementation stage began with a pretest administered to students to determine their initial abilities in learning mathematics and algebra. Subsequently, learning using the snakes and ladders media was conducted over three sessions. In the fourth session, students were given a posttest and completed a learning motivation questionnaire. Throughout the learning process, observations were made by observers to record student activities, ensure the learning implementation was in accordance with the lesson plan, and document the activities photographically.
3) The analysis stage was carried out by processing the pretest and posttest data using the Wilcoxon test and N-Gain calculation to determine the effectiveness of learning using SPSS Statistics version 21 which can be seen in table 2. Questionnaire and observation data were analyzed using percentage techniques to assess student learning motivation and activities during the learning process which can be seen in table 3. Based on the interpretation of the N-gain and Motivation Questionnaire values in table 2 and table 3 below.

Table 2. N-gain Criterion

Category Range (%)	Interpretation
$g > 0{,}7$	High
$0{,}3 \leq g \leq 0{,}7$	Moderate
$0{,}3 < g > 0{,}7$	Low
$g \leq 0$	Failed

Source: (Wahab, Junaedi, and Azhar 2021)

Table 3. Classification of Student Learning Motivation

Persentase (%)	Interpretasi
81-100	Very High
61-80	High

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41-60	Moderate
21-40	Low
0-20	Very Low

Source: (Pradilasari, Gani, and Khaldun 2019)

In addition, to strengthen the analysis of the effectiveness of learning media, an analysis of student learning outcomes was also conducted based on posttest scores. Learning completion was determined based on the Minimum Completion Criteria (KKM), which is 71, and the categories can be seen in Table 4 below:

Table 4. Student Learning Outcome Completion Category

Percentage (%)	**Interpretation**
$> 85\%$	Very High
$75 - 84\%$	High
$70 - 74\%$	Sufficient
$60 - 69\%$	Low
$0 - 59\%$	Very Low

Source: (Pradilasari et al. 2019)

With a quantitative and qualitative approach, this method is believed to be able to provide valid data to test the effectiveness of using snakes and ladders media in algebraic mathematics learning to increase the motivation and learning outcomes of class VII students at SMP Negeri 6 Kota Sorong.

RESULTS AND DISCUSSION

The results of the study indicate that the use of snakes and ladders media in algebra mathematics learning has a positive influence on learning motivation and improved learning outcomes for class VII students at SMP Negeri 6 Kota Sorong. The instruments used included pretests and posttests, student activity observation sheets, observations of learning implementation, and student learning motivation questionnaires. The results and discussion are explained as follows:

1. Instrument Validation

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All instruments were validated by five experts. The validation results showed an average instrument feasibility of 91%, which falls into the "Very Feasible" category. The validated instruments included the snakes and ladders media, pretest and posttest questions, observation sheets for learning activities and implementation, and a student motivation questionnaire. These results indicate that the instruments used met the requirements for feasibility in content, language, and structure. This can be seen in Figure 1.

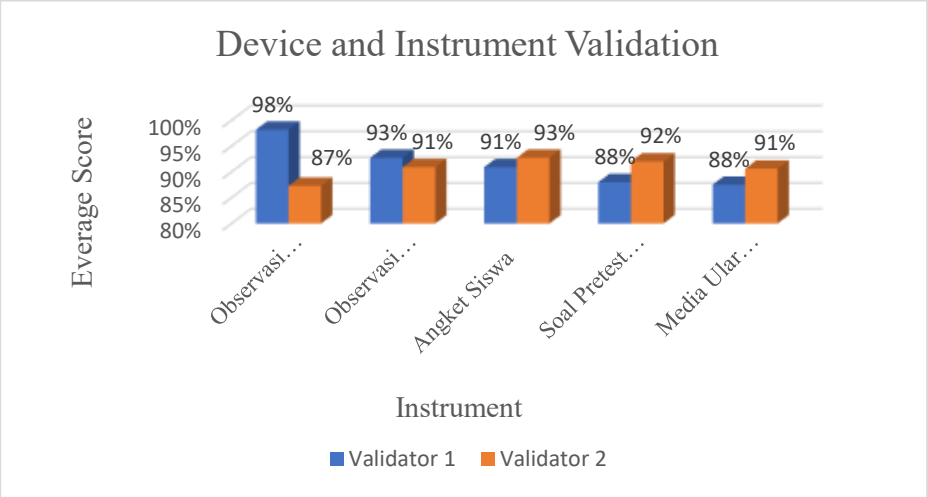


Figure 2. Expert Validation Result

Based on the image above, the results of the validation of the devices and instruments by experts indicate that all validated components have met the eligibility criteria for use in research. The Student Activity Observation Instrument obtained a validation score of 98% from Validator 1 and 87% from Validator 2, while the Learning Implementation Observation obtained a score of 93% and 91%. The student questionnaire was validated with a score of 91% by Validator 1 and 89% by Validator 2. Furthermore, the pretest and posttest question instruments obtained a score of 93% and 92%, while the snakes and ladders media was validated with a score of 88% by Validator 1 and 91% by Validator 2. These results indicate that each instrument has achieved an average score of 91%, which indicates that the devices and instruments developed have been considered very appropriate and feasible to use.

2. Observation of Learning Implementation

Based on the results of observations of the implementation of learning during three meetings, the average percentage of implementation was 74%, which is classified as "Good". This can be seen in Table 5 below.

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Table 5. Observation of Learning Implementation

Aspect	D-1	D-2	D-3	D-4	Total
Opening Session	4	4	4	5	17
Apperception	5	4	5	5	19
Explanation of Snakes and Ladders Game Rules	1	4	5	5	15
Student's Enthusiasm	1	3	4	4	12
Teacher's Guidance During Student Difficulties	4	4	5	5	18
Group Callaboration	1	3	4	5	13
Students' Activeness in Asking and Answering Questions	3	3	4	5	15
Conceptual Understanding	3	3	3	4	13
Group Discussion Outcome	1	4	5	4	14
Feedback Provision	2	3	3	4	12
Closing Session	2	4	4	4	14
Actual Total					162
Max Total Score					220
Percentage					74%

Based on Table 5, the total actual score was 162 out of a maximum score of 220. This indicates that the learning implementation reached a percentage of 74%, which is included in the "Good" category. This percentage was obtained from the results of observations on various aspects such as the opening, apperception, media explanation, teacher guidance, student enthusiasm, group cooperation, and closing of learning during four meetings.

These results show that in general learning activities using snakes and ladders media can be implemented well, although there are still several aspects that need to be improved, especially in student participation and understanding which varies between individuals and groups.

3. Observasi Aktivitas Siswa

Based on the results of observations of student activities during algebraic mathematics learning using snakes and ladders, the indicator for student activity is said to be effective if during learning the average percentage of students as a whole is at least in the active category

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(60%). Student activity data is obtained through activity observation instruments by observing the learning process (60%). The percentage of student activity can be seen in table 6.

Table 6. Percentage of Student Activity Observations

Overall Total				
Day	**Student Learning Engagement**	**Concept Understanding**	**oblem Solving Skills**	**Group Collaboration**
D-1	83	82	79	77
D-2	96	96	100	100
D-3	121	121	116	118
Percentage	69%	69%	68%	68%
verall Average	**68%**			
Category	**Active**			

Based on the results of observations of student activities during the learning process shown in table 6. The table shows the percentage of each student's activities in three meetings which are assessed based on indicators of involvement, conceptual understanding, problem-solving skills, and group cooperation.

First, student engagement in learning has shown daily improvement. On D-1, the score was 83 (69%), increasing to 96 on D-2, and reaching 121 on D-3. This indicates that students are increasingly active in the learning process. This improvement reflects the teacher's success in creating a fun learning environment and encouraging student active engagement.

Second, conceptual understanding. This aspect also showed a score of 82 (69%) on D-1, indicating that students' understanding was still in the active stage but not yet optimal. The score increased to 96 on D-2, and reached 121 on D-3. This indicates that most students are beginning to grasp the material being taught. This increase in scores may be influenced by the use of learning methods or media that facilitate students' understanding of mathematical concepts.

Third, problem-solving skills. Students' problem-solving skills increased from 79 on D-1 (68%) to 100 on D-2, and reached 116 on D-3. This indicates that as the learning progresses, students are beginning to be able to apply the concepts they have learned to solve the given questions or problems. This improvement indicates that the applied learning strategy has successfully trained critical thinking skills.

Fourth, group collaboration. Group collaboration increased from 77 (68%) on D-1, to 100 on D-2, and again to 118 on D-3. This indicates that students' ability to collaborate, discuss, and

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complete group assignments is improving. This improvement may reflect students' adjustment and comfort in interacting with peers through consistent group activities.

The results of the level of student activity can be seen in table 6. The following are the results of the classification of student activity:

Table 6. Student Activity Classification Result

Category	**Percentage Range**	**Number of Students**	**Percentage(%)**
Very Active	80% ≤ A ≤ 100%	5 Students	17%
Active	60% ≤ A < 80%	13 Students	45%
Moderately Active	40% ≤ A < 60%	9 Students	31%
Less Active	20% ≤ A < 40%	2 Students	7%
Inactive	0% ≤ A < 20%	0 Student	0%

Based on the table above, it can be concluded that the majority of students are categorized as Active (45%) and Quite Active (31%), which indicates that the effectiveness of learning with snakes and ladders media has succeeded in increasing student participation in the learning process. In addition, there are 5 students (17%) who are categorized as "Very Active", which indicates very high involvement in the learning process. Only 2 students (7%) are categorized as "Less Active", and no students are categorized as "Inactive". So the overall percentage is classically 68%, so student activity is categorized as "Active".

The average value of learning outcomes calculated from the pretest and posttest values can be seen in table 7.

Table 7. Pretest and Posttest Score Statistics

No	Category	Pretest	Postest
1.	Number of Student	29	29
2.	Lowest Score	0	0
3.	Highest Score	48	83
4.	Total Score	224	1257
5.	Average Score	7,72413	43,34482
6.	Standard Deviation	10,23	24,47

Based on Table 7, the number of students who took the pretest and posttest was the same, namely 29 people. The lowest score on both tests was 0, indicating that there were still

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students who were unable to answer the questions correctly, both before and after the learning was implemented. One reason why there were still students who received a score of 0 on the posttest was because there were students who took the pretest but did not take the posttest, thus automatically receiving a score of 0. This absence can be caused by various factors, such as health conditions, personal permission, or other reasons that prevent students from participating in the evaluation activities. This impacts the final results and needs to be noted in evaluating the effectiveness of learning.

However, there was a significant increase in the highest score, from 48 on the pretest to 83 on the posttest. This indicates an improvement in the abilities of the highest-achieving students after the instruction was provided.

The total number of students' scores also experienced a significant increase, from 224 to 1257. This increase was in line with the increase in the average student score, from 7.72 in the pretest to 43.34 in the posttest. Thus, it can be generally concluded that student scores improved after participating in the learning process.

The standard deviation also increased, from 10.23 to 24.47. This indicates that the variation or spread of student scores after the learning process increased. This means that although many students improved, there are still differences in ability among them.

Overall, these data show that after learning there was an increase in student learning outcomes, although there were still differences in abilities between students.

The analysis of the completeness of student learning outcomes was carried out based on the Minimum Completeness Criteria (KKM) applicable at SMP Negeri 6 Sorong City, especially in the subject of mathematics, namely 71, so the level of achievement of students' mathematical learning outcomes in a classical manner can be seen in Figure 2 below.

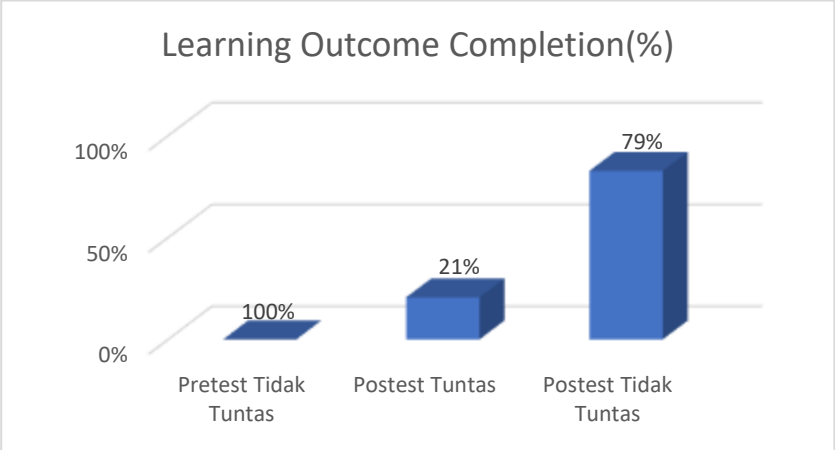


Figure 3. Student Learning Outcomes Completion

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Based on Figure 3, of the total 29 students, only 6 students (21%) achieved learning completion, while 23 students (79%) were still below the Minimum Completion Criteria (KKM). This percentage indicates that the level of student learning completion is still in the "Very Low" category.

However, the data shows an improvement from the initial pretest, where no students achieved completion (0%), to 21% of students completing the posttest after learning using the snakes and ladders model. This means the model has had a positive impact on improving student learning outcomes.

However, overall, these results did not meet the expected completion standards. Therefore, improvements to learning strategies or further mentoring are needed to ensure that the majority of students can optimally understand the algebra material.

Knowledge Improvement is used to determine the extent of student achievement after receiving a specific treatment or learning process. The analysis data includes the sample class average, standard deviation, minimum score, and maximum score. This improvement is also supported by the N-Gain results, as seen in Table 8.

Table 8. Output SPPS N-gain

Deskriptif Statistik Skor Pretest-Postest					
	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_score	29	-.03	.79	.4086	.22705
Ngain_persen	29	-3.09	79.38	40.8640	22.70514
Valid N (listwise)	29				

Based on the results of the descriptive analysis shown in table 4.5, it was obtained that the minimum value of Ngain_score is -0.03 and the maximum value is 0.79 with an average (mean) of 0.41 and a standard deviation of 0.23. Meanwhile, the minimum value of Ngain_percent is -3.09 and the maximum is 79.38 with an average value of 40.86 and a standard deviation of 22.71. This value averages N-Gain of 0.41 so that quantitatively it falls into the "Medium" category.

4. Students Motivation Questionnaire

This study used a student motivation questionnaire to determine the effect of the snakes and ladders media on student learning motivation in algebra learning. To obtain this data, the researcher distributed a learning motivation questionnaire consisting of 12 statements using a

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5-point scale (very high, high, medium, low, and very low). The results of the student motivation questionnaire can be seen in Table 9 below.

Table 9. Distibution of Student Questionnaire Results

Persentase	Kategori
81 – 100%	Very High
61 – 80%	High
41 – 60%	Moderate
21 – 10%	Low
0 – 20%	Very Low

Source: (Pradilasari et al. 2019)

Based on table 9 of the percentage categories of results achieved by students, it can be concluded that most students are in the "High" category with a percentage range of 61–80%. Of the total of 12 statements analyzed, 2 statements (16.67%) fall into the Very High category (range 81–100%). This means that students gave a very positive response to the two motivational aspects measured, indicating that the snakes and ladders media is very motivating on certain indicators. Furthermore, 9 statements (75%) fell into the High category (range 61–80%). This indicates that most motivation indicators fell into the High category, indicating that the Snakes and Ladders learning model was quite successful in increasing students' interest and enthusiasm for learning.

On the other hand, only 1 statement (8.33%) fell into the Medium category (range 41–60%). This means that there is one aspect of motivation whose response is still adequate, but not optimal. This indicates that some students still require additional attention and support to advance to a higher category. Although small in number, students in this category still require additional attention and support to catch up and match the achievements of their peers.

Interestingly, no students fell into the "Low" (21–40%) or "Very Low" (0–20%) categories. This indicates that no students were at a particularly worrying level of achievement. Overall, the distribution of these data indicates that all students were above the minimum threshold, indicating a basic understanding of the material being taught.

Overall, these data reflect positive student achievement, with the majority already in the "High" category (75%). However, efforts are still needed to improve the quality of learning so

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E-ISSN: 2986-0733

that students in the average category can advance to a higher level, and to retain and encourage students in the high category to reach the very high category more evenly.

The normality test is used to determine whether the obtained sample is normally distributed or not. The formula used is the Kolmogorov-Smirnov or Shapiro-Wilk test to ensure normal data distribution using the SPSS (Statistical Package for Social Sciences version 21) application. The normality test criteria are: if the significance value is >0.05, then the distribution is normal. Conversely, if the significance value is <0.05, then the distribution is not normal. The results of the normality test can be seen in Table 10 below.

Table 10. Normality Test Result

Test of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	**Sig.**
pretest	.285	29	.000	.708	29	**.000**
postest	.133	29	.200*	.946	29	**.148**
***. This is a lower bound of the true significance.**						
a. Lilliefors Significance Correction						

Based on Table 10, the Shapiro-Wilk significance value for the pretest data is 0.000 and for the posttest data is 0.148. The significance value for the pretest data is less than 0.05 (0.000 < 0.05), so it can be concluded that the pretest data is not normally distributed. Meanwhile, the significance value for the posttest data is greater than 0.05 (0.148 > 0.05), so the posttest data is normally distributed. Because one of the data (namely the pretest) is not normally distributed, the overall data in this study does not meet the assumption of normality. Therefore, further hypothesis testing is carried out using a non-parametric test, namely the Wilcoxon Signed Rank Test.

The prerequisite test with data results does not meet the assumptions, then the hypothesis test will be carried out using a non-parametric test, namely the Wilcoxon Signed Ranks Test, the Wilcoxon Signed Ranks test will be carried out using SPSS statistical software 21. The results of the Wilcoxon Signed Ranks test analysis can be seen in the following table 11.

Table 11. SPSS Wilcoxon Signed Ranks Test Result

Test Statisticsa	
	Postest pretest-postest
Z	-4.683b

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Asymp. Sig. (2-tailed)	.000
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Based on the results of the Wilcoxon test in table 4.8 above, the Asymp. Sig. (2-tailed) value was 0.000, which means it is smaller than the significance level of 0.05. This indicates that there is a significant difference between the students' pretest and posttest. Thus, it can be concluded that there is a significant increase in mathematics learning outcomes after students participated in learning using snakes and ladders media. In addition, the negative Z value (-4.683) indicates that most students obtained higher posttest scores than pretest scores, which indicates an increase in students' understanding of the material after being given treatment.

The results of this study indicate that the use of Snakes and Ladders media in teaching algebra had a positive impact on the motivation and learning outcomes of Grade VII A students at SMP Negeri 6 Kota Sorong. This finding is evidenced by the increase in the average pretest score from 7.72 to 43.34 in the posttest, as well as an improvement in students' learning motivation, which fell into the "High" category. In addition, the N-Gain test showed a score increase of 0.41, which is categorized as "Moderate." Although the classical learning mastery rate remained low at 21%, the improvement in students' scores and enthusiasm reflects the effectiveness of Snakes and Ladders as an innovative learning tool.

These findings are in line with the study by (Arifuddin 2022) which demonstrated that the Snakes and Ladders game media can create an enjoyable learning atmosphere and increase student engagement in mathematics learning. Research by Nurussofa & Astuti, (2023) also found that the use of game-based media was effective in enhancing students' motivation and comprehension of abstract materials such as algebra. Furthermore, (Aziza and Mandailina 2024) concluded that educational game-based learning is effective in fostering students' self-confidence and competitiveness in understanding mathematical concepts.

Furthermore, a study by Masrukah et al, (2020) stated that learning strategies involving game-based media have proven effective in increasing student activeness and learning outcomes, particularly at the junior high school level. These results strengthen the conclusion that innovative learning through contextual and enjoyable media such as Snakes and Ladders can enhance students' intrinsic motivation. Overall, the findings of this study support previous empirical evidence and offer a meaningful contribution to the implementation of simple educational games to improve the quality of mathematics learning.

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CONCLUSION

Based on the research conducted in Class VII A of SMP Negeri 6 Kota Sorong regarding the effectiveness of using Snakes and Ladders media in algebra mathematics learning to improve students' motivation and learning outcomes, it can be concluded that the Snakes and Ladders media has a positive impact on both variables. This is evident from the increase in students' learning motivation questionnaire results, which reached the "High" category with a percentage of 75%, indicating enthusiasm, self-confidence, and student interest in material that may have previously been perceived as challenging. In addition, the average learning outcome score increased from 7.72 to 43.34 after the implementation of the Snakes and Ladders media, indicating improved student understanding of the subject matter.

Although classical learning mastery was not achieved only 21% of students met the minimum mastery criteria, falling into the "Very Low" category the N-Gain score showed a moderate improvement in learning outcomes. This suggests that while the media may not fully achieve uniform mastery, it contributes positively to learning progress. From the motivational aspect, questionnaire data revealed that students responded positively to the use of the media, feeling more enthusiastic, confident, and interested in understanding previously difficult material.

Therefore, the Snakes and Ladders media can be considered potentially effective in enhancing students' motivation and understanding, and is suitable as an innovative alternative in mathematics instruction particularly in algebra. To achieve more optimal learning outcomes, this media should be used over a longer and more sustained period, so that its impact on student achievement can be maximized.

ACKNOWLEDGMENT

The author would like to express sincere gratitude to Mr. Muhammad Ruslan Layn, S.Pd., M.Pd. and Mrs. Hidayani, S.Pd., M.Pd. for their guidance, support, and direction throughout the research process. The author also extends appreciation to the teachers and students of Class VII at SMP Negeri 6 Kota Sorong for their assistance and participation during the learning activities throughout the study. Special thanks are also conveyed to the lecturers of the Mathematics Education Study Program, Universitas Muhammadiyah Sorong, for the knowledge and encouragement they have provided. Lastly, the author is deeply thankful to family and friends for their continuous motivation and support, which made the completion of this research possible.

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