JSER 2021, 5(1), 14-20

JSER

Journal of Science Education Research

Journal homepage: www.journal.uny.ac.id/jser

Development of snake ladder instructional media using STAD cooperative model for class VIII MTS students

Een Ibrahim

Institut Agama Islam Muhammadiyah Kotamobagu. Jalan Teuku Umar, No.56, Kotamobagu, Sulawesi Utara, Indonesia
Corresponding Author. Email: een.ibrahim05@gmail.com

Keywords:
Snake Ladder media, STAD cooperative model,

ABSTRACT

This study aimed to determine the effectiveness of snake ladders learning media that was developed using Student Teams Achievement Divisions (STAD) cooperative learning model in Physics learning with Sound material in class VIII MTs. This research was conducted at MTs Cendekia Muhammadiyah Kotamobagu in the 2018/2019 academic year. The research method used was the research and development (R&D) method consisted of seven stages, i.e.: planning, initial design media, development of media, validation of media, revision, test, and analysis and final revision. In the validation stage, the learning media is validated by media and material experts. The learning media was tried out to students in class VIII MTs as many as 28 students. The result showed that the learning media was viable with averages of 4.03 and 4.54 with percentages of 80.6 (good) and 90.8 (very good) from the material and media experts, respectively. The effectiveness of the learning model can be seen in students' attractiveness to the snake ladder media with the percentage value above 61% (srongly agree). This means that the snake ladder media obtained an outstanding response on students' completing the learning, which reached 89.29%. Hence, the snake ladder learning media was eligible for use in the learning process.

INTRODUCTION

The teaching and learning process can be said to be successful if, in learning, students can understand the concepts being taught and among students, teachers, learning media, and learning models support each other for learning completeness and the optimal learning process. The observation with a teacher of MTs in Kotamobagu showed that the learning model used was conventional and the teachers were the learning resource; there was no variation in the learning media used. The technology use in the learning media had not been optimally utilized. Certainly, this had a direct impact on students, namely the reduction of students' learning interest and understanding of the learning material. Moreover, the advancement in technology and the discovery of the dynamics of the learning process make the implementation of educational and teaching activities increasingly demanding in order to obtain various educational media.

Here, a learning media supported by an appropriate teaching strategy is created. The teaching strategy used is Student Teams Achievement Division (STAD) cooperative learning model. STAD's main idea is to encourage students to help each other to master the skills taught by the teacher (Slavin, 2014; Tohamba, 2017). Thus, a learning media combined with STAD cooperative model can enhance students' activity and learning outcomes (Handayani, 2015, p. 133; Murniningsih, 2019; Soedarnadi, 2019).

In this research, the learning media chosen to be developed is the snake ladder game. The snake ladder media in the form of a game can (1) attract students to continue learning because learning is fun and exciting, (2) train students' cooperation; (3) train students' cognitive ability, and many more. In the game of snake and ladder, the teacher acts as a facilitator (Arfani & Sulistia, 2019; Nugroho et al., 2013).

In the learning process, it is necessary to use a learning media that supports the implementation of learning. Thus, the main criteria in selecting the media is the accuracy of learning objectives. This means that in determining the media to be used, the consideration is that the media must meet the desired goals (Sundayana, 2016). Thus, based on the selection criteria a learning media of snake ladder was developed

using the STAD cooperative learning model. Hence, it is necessary to develop snake ladder media using the STAD cooperative model in the Sound material for class VIII MTs.

METHOD

This study used the Research and Development (R&D) method developed by Gall et al. (2003). The subjects were 24 students of class VIII MTs Cendekia Muhammadiyah Kotamobagu, in the academic year 2018/2019. The R&D procedure is presented in Figure 1.

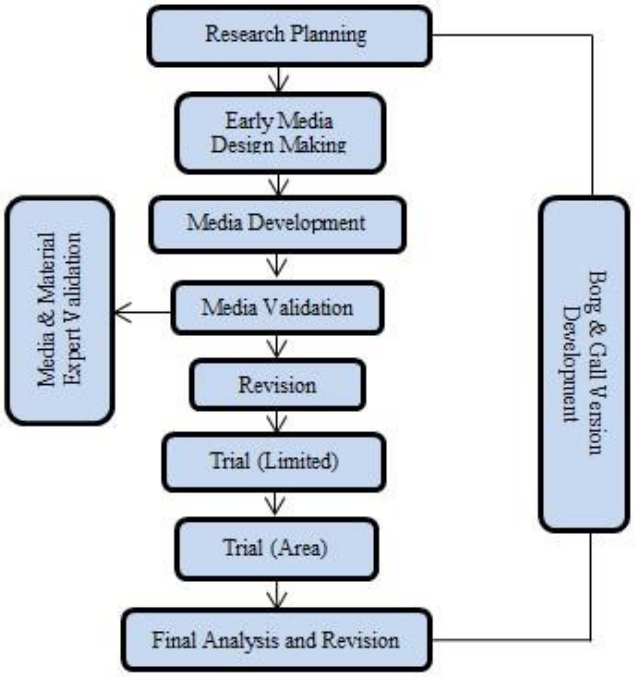

Figure 1. Schematic of R&D activities

The data consist of quantitative and qualitative data. Quantitative data were obtained from the validation of media and material experts, students' interest in the media, and student learning outcomes tests. The qualitative data were comments, suggestions, criticism, and opinions from the media development validators. The data collection instruments were (1) the media validation sheet used to measure the feasibility of the content or material and media design; (2) a questionnaire used to determine students' interest in using the media in Sound material; and (3) learning outcome tests used to measure the ability of students after the use of the media learning.

RESULT

This research produces a learning media called Sounds in Snake Ladder. The development of this learning media goes through several stages, i.e.: planning stage, initial design, media development, media validation, revision, limited trial, extensive trial, and final revision analysis. The media is designed before the revision. Based on the validator's suggestions the learning media created can be shown in Figure 2 and Figure 3.

Figure 2 and Figure 3 are the initial designs for the learning media based on the following the validators' suggestions. The first validator commented that there are concenpts that were not entered in the snake ladder media; only an outline of each concept is entered. Moreover, in the start section, the problem is that each student must first anwser a question before starting the game. Next, the second validator commented that the snake ladder must not be placed in a position that passes through the box so that the students who occupy the ladder box can not jump a certain material. Hence, it is necessary to make material equality of each concept entered in the snake ladder media. Finally, the third validator suggested that the concept contained in the snake ladder media must adjust to the Sound material. The validators' suggestions are used to revise the media. The revised media is presented in Figure 4 and Figure 5.

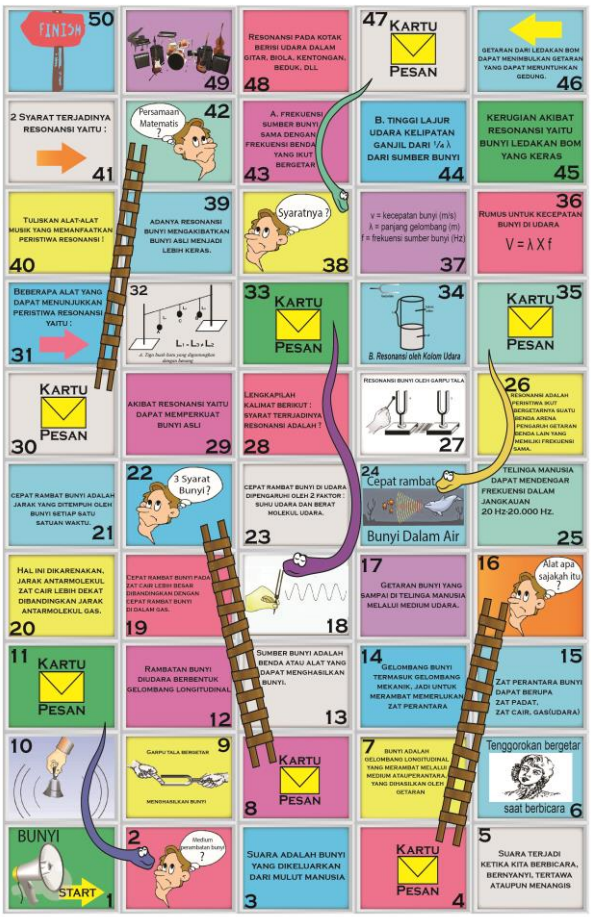

Figure 2. Initial media design for meeting 1

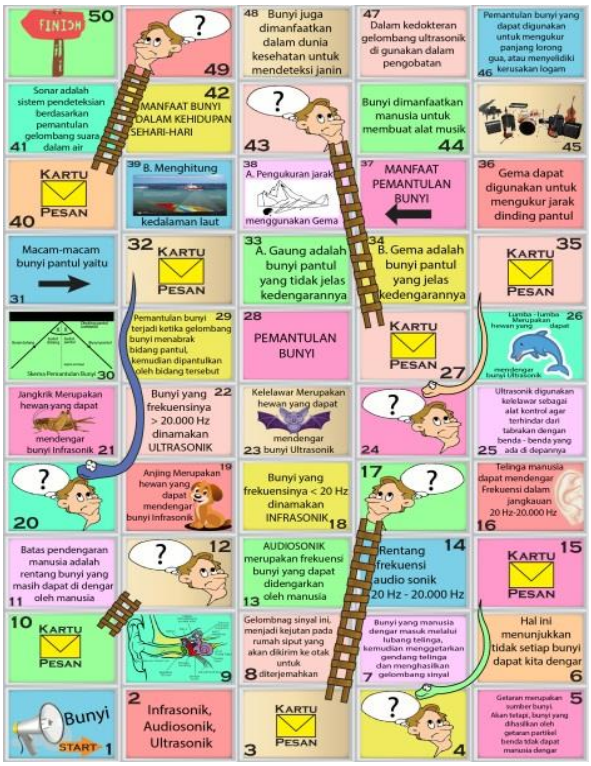

Figure 3. Initial media design for meeting 2

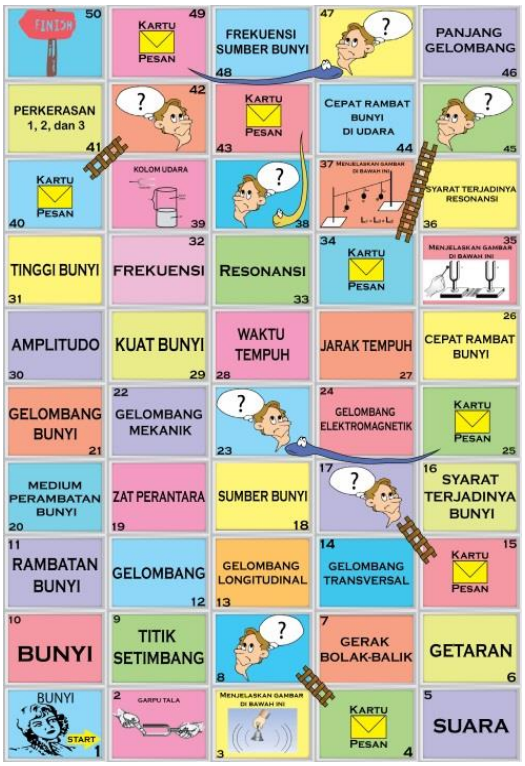

Figure 4. Final media design for meeting 1.

After designing the learning media, the media is then validated by experts on the aspects of content and media design. These are presented in Table 1 and Table 2.

Media Eligibility by a Material Expert

The assessment results of the validation sheet are given in Table 1. Based on Table 1, the assessment results are included in the range of $3.4 < X \leq 4.2$, which are in the good category and a percentage of 80.6%, which means that the snake ladder media in term of the material is feasible for use in the learning process.

Figure 5. Final media design for meeting 2

Table 1. Material expert validation results

No.	Assessment Aspects	Total Value	Average Value	Category
1.	Content of the material	96	4.00	Good
2.	Language	65	4.33	Very Good
3.	Presentation of Questions	34	3.77	Good
	Total	195	4.03	Good

Media Eligibility by a Media Expert

The assessment results of the media validation sheet are given in Table 2. Based on Table 2, the assessment results are higher than 4.2, which are in the very good category. The results also show a percentage of 90.8%, which means that the snake ladder media is very feasible to use in the learning process.

Table 2. Validation results of the media expert

No.	Assessment Aspects	Total Value	Average Value	Category
1.	Media Design	39	4.33	Very Good
2.	Display	128	4.74	Very Good
3.	Media Completeness	41	4.55	Very Good
	Total	208	4.54	Very Good

After the assessments by the experts and meeting the criteria of feasible to use, the learning media is implemented in two stages, i.e.: limited and extensive trials. The results of these trials are given below.

Limited Trial

The trial was conducted on 24-25 April 2019, taking place in class VIII MTs Cendekia Muhammadiyah Kotamobagu with ten students. The tests were conducted by dividing the students into two groups with each group consisting of five people. Then, the learning media was used by the two groups in the learning process to discuss i) the conditions for sound propagation, ii) the medium for sound propagation, iii) the speed of sound propagation, and iv) resonance. For the second meeting, the learning media was used to discuss i) infrasound, ii) audiosonic, iii) ultrasonic, iv) sound reflection, and v) the benefits of sound reflection.

In the limited trial, analysis of the test items was carried out for students' learning outcomes. Analysis of the test items was carried out by giving the tests to all the limited trial students. Based on the analysis results, 11 items were valid and 1 item was invalid. The invalid question was revised. The reliability test results was 0.897, which means that the test was reliable.

Table 3. Validity test results

No. Item Questions	Correlation coefficient Value		Criteria
	r_{count}	r_{table}	
1	0.836	0.632	Valid
2	0.669	0.632	Valid
3	0.697	0.632	Valid
4	0.689	0.632	Valid
5	0.716	0.632	Valid
6	0.669	0.632	Valid
7	0.578	0.632	Not Valid
8	0.729	0.632	Valid
9	0.668	0.632	Valid
10	0.724	0.632	Valid
11	0.736	0.632	Valid
12	0.772	0.632	Valid

Extensive Trial

The trial was conducted on 8 to 9 May 2019, taking place in class VIII MTs Cendekia Muhammadiyah Kotamobagu on a one-class scale. The learning media used in the learning process was carried out by dividing the students into five groups.

Data obtained from this extensive trial is the students' interest in snake ladder media. At this stage, the data is obtained in the form of the percentage of students' interest in the use of the learning media in the learning process, especially in Sound material. The results of the research show that the average percentage of students' interest in the learning media is positive.

There is also the data on students' learning outcomes. The data on the test scores of students' learning outcomes after learning using the media is obtained at this trial stage. Students are said to have completed the learning if, in learning, they can meet the minimum completeness criteria (MCC) according to the science competency standards for the Sound material, which is above 75%. Graphs of students' learning outcomes after using the media can be seen in Figure 6. The figure shows that 89.29% and 10.71% of students meet and do not meet the MCC requirement of above 75%, respectively.

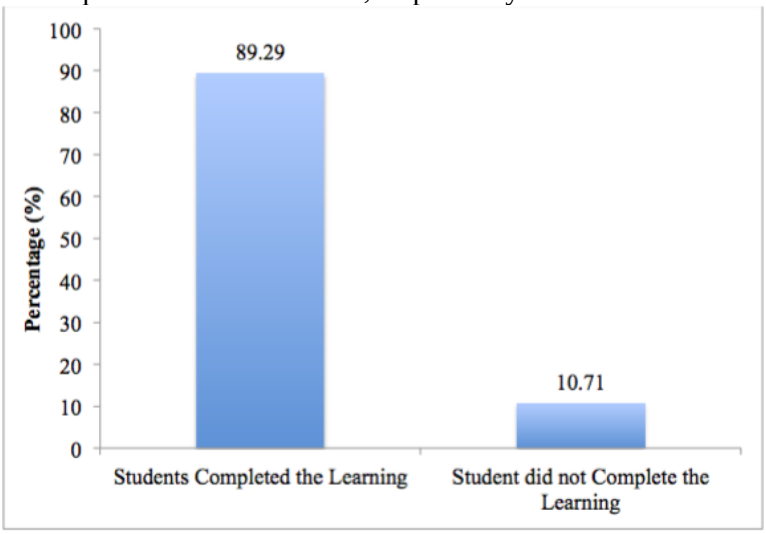

Figure 6. Students' learning outcomes

CONCLUSION

The development of snake ladder media using the STAD cooperative model fulfills the effectiveness criteria. From the evaluation of the material and media experts, the learning media obtains averages of 4.03 and 4.54 with percentages of 80.6% and 90.8%, respectively. This means that the learning media is feasible for use in the learning process. Also, the effectiveness of the learning model seen from the results of questionnaires of students' interest towards the use of the snake ladder media is above 61% (strongly agree). This means that the media obtains a good response from the students. From the learning outcomes, out of 28 students, 25 and 3 students complete and do not complete the learning, respectively. The students who complteed the learning has an average of 89.29%, which meets the MCC above 75 %.

Based on the results of the study, the researchers suggest that the learning media can be used and socialized for other schools and used as an alternative learning media.

ACKNOWLEDGMENTS

The author would like to thank the Kotamobagu Muhammadiyah Islamic Institute for being the sponsor of this research. The author would also like to acknowledge the principal, teachers, and students of MTs Cendekia Muhammadiyah Kotamobagu. They have allowed and provided opportunities for the author so that this research can be carried out smoothly.

REFERENCES

Arfani, S., & Sulistia, A. (2019). Teaching speaking using a "Snake and Ladder" board game: A teacher story. *Research and Innovation in Language Learning, 2*(1), 65–72.

Gall, M. D., Gall, J. P., Borg, W. R. D., & Gall, J. P. (2003). *Educational research: An introduction* (7th ed.). Pearson Education Inc.

Handayani, S. (2015). Penerapan model pembelajaran kooperatif tipe student teams-achievement division (STAD) berbantuan media gambar untuk meningkatkan hasil belajar siswa kelas IV pada materi panas. *Jurnal Pendidikan*, *15*(2), 125–133. https://doi.org/10.33830/jp.v15i2.422.2014

Murniningsih, I. (2019). Model pembelajaran student teams achievement divisions untuk meningkatkan motivasi belajar ekonomi. *Teacher in Educational Research, 1*(1), 9–17. https://doi.org/10.33292/ter.v1i1.5

Nugroho, A. P., Raharjo, T., & Wahyuningsih, D. (2013). Pengembangan media pembelajaran Fisika menggunakan permainan ular tangga ditinjau dari motivasi belajar siswa kelas VIII Materi Gaya.

Jurnal Pendidikan Fisika, *1*(1). https://jurnal.fkip.uns.ac.id/index.php/pfisika/article/view/1769

Slavin, R. E. (2014). *Educational psychology: Theory and practice*. Pearson College Div.

Soedarnadi, E. W. (2019). Peningkatan motivasi belajar matematika melalui model think pair share materi trigonometri pada siswa. *Teacher in Educational Research*, *1*(2), 66–75. https://doi.org/10.33292/ter.v1i2.22

Sundayana, R. (2016). *Media dan alat peraga dalam pembelajaran matematika*. Alfabeta.

Tohamba, C. P. P. (2017). The use of STAD technique to improve the students' reading achievement at class XI Ia1 of SMAN 7 Kendari. *Journal of English Education*, *2*(2), 105–112.