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Research Article

Development of snakes and ladders media to enhance grade IV Javanese reading and writing skills

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Abstract: Javanese language learning especially Javanese script material poses several challenges, so the utilization and implementation of concrete learning media is a promising solution to offer a more interactive learning experience and increase student success. The purpose of this project is to create, test the feasibility, and evaluate the efficacy of employing snake and ladder learning media. Javanese script material in elementary schools. The subjects of the study were 30 grade IV students of SDN 03 Jaten, Karanganyar, Central Java. Research and Development (R&D) uses the Borg and Gall model and collects data through observation, interviews, and tests. The feasibility results of material expert validation obtained a score of 94% which indicates the media is suitable for use and trial. Then the results of media expert validation showed a 93% gain with criteria worthy of trial according to the revision submitted. The result of students' responses to snakes and ladders media was 94.5%. Pretest and posttest values were analyzed to get the normal category, followed by a t-test with a sig (2-tailed) value of 0.000 < 0.05. The use of Snakes and Ladders learning media is stated to have a significant effect on Javanese script material in elementary schools. The N-Gain score shows a mean value of 0.5213 which is included in the medium category. Based on the research objectives and problem formulation, it can be concluded that the development of the Snakes and Ladders learning media has an effect on the learning outcomes of class IV students on Javanese script material in accordance with the results of research that researchers have conducted.

Keywords: learning media; learning outcomes; reading and writing skills; snakes and ladders

1. Introduction

Education is a major priority for many parties in the present globalization age (Sudarmin et al., 2023). Language is a communication tool that humans have to express opinions in the form of speech to interact with social creatures (Ochs & Schieffelin, 2017; Yulianto et al., 2023). In addition, language is the identity of a particular region and is a liaison between family and society. The regional language in this study is Javanese which is part of Indonesia's living national culture and is still used by the people of East Java, the Special Region of Yogyakarta, and Central Java. Javanese is the native language of Indonesia and is spoken by 75.5 million people which should be preserved from early childhood until elementary school (Ibda et al., 2022).

A person is encouraged by education to reach their full potential and improve themselves (Saputra & Putra, 2021; Setiawan & Soniya, 2023; Sujana, 2019). Education requires optimal suitability of learning objectives by building good interactions (Anis Rahmawati, 2016; Kadir et al., 2020; Senen et al., 2021). Students can develop their skills and knowledge through education as well as the formation of a good personality (Isrokatun, 2023). At this time, creative learning is needed to increase the sense of pleasure in always learning and the formation of critical thinking (Engkizar et al., 2018; Syafril et al., 2021; Yusnita et al., 2018). Article 37(1) of Law Number 20 of 2003 outlines the obligation for the government to provide free education for all Indonesian children at the elementary and secondary levels"The primary and secondary education curriculum must have local content", so that as an effort to develop, foster, and preserve Javanese Language, Literature and Culture, develop moral character and personality among

primary and secondary education students, a local content curriculum is needed as a reference in teaching and learning activities of Javanese language learning (Cidar, 2019; Setianingrum, 2021).

Language learning comprises four language skills: listening, speaking, reading, and writing (Istiqoh, 2021). One of the skills taught in Javanese language learning content is the skill of reading and writing Javanese script (Wibowo, 2018). Reading skills are the process of understanding ideas both implicitly and explicitly in reading material. Javanese script reading skills are the skills to pronounce words according to written texts written using Javanese script, while writing skills are skills to convey ideas in written form to others. Javanese script writing skills are defined as a way of conveying written messages that are realized using Javanese script (Istianah & Setyasto, 2023).

Since elementary school, Javanese language subjects have been introduced to students as local content. As Javanese, of course, we must participate in preserving and maintaining the Javanese language either from the exclusion or marginalization of Javanese people as conveyed by figures (Andriyanti, 2019). Javanese language learning is still a scourge for students and is also a marginalized subject, has not progressed, and is considered unimportant to learn. Even based on the opinion of Harwati (2020) that "The text mentions that there is a discussion or debate about the existence of the Javanese language." threatened condition is evidenced by the existence of a young generation of Javanese ethnicity There are individuals who are gradually losing their capability to speak Javanese.

To attain an optimal teaching and learning process, harmony between models, methods, or media must be engaged in the process of increasing the quality of learning (Leny et al., 2021). In Central Java, Indonesia, elementary schools hardly ever use games to introduce students to Javanese culture, Javanese script, Macapat songs, puppet stories, Javanese ethics, and other local wisdom (Mutia, 2020; Hermita, 2020). The above opinion is in line with research Kusnulyaningsih et al (2022) the underutilization of media in the classroom is the reason why student learning results are not at their best. This opinion is consistent with that research. To deliver instructional content from educators to learners, learning media is required (Mustafa, 2023). One way to make learning more comfortable is to employ educational media (Rezeki, 2023). The purpose of learning media, according to the book (Kun Astuti, 2019; Lindasari et al., 2019), is to inspire students and spark new interests and wants. gaming-based learning activities, including using Snakes and Ladders gaming media, are one engaging type of learning material that can help students become engaged in their studies (Wati, 2021). Based on the results of previous research on the use of the Snakes and Ladders game media, the researcher chose the Snakes and Ladders game media as an effective means of supporting learning because concrete forms of media are more able to help students learn, especially Javanese script material. Apart from that, the game of snakes and ladders is a game that is commonly played by children and can be played in groups.

Based on observations and discussions with grade IV teachers, it is known that SD Negeri 03 Jaten likewise has similar issue. That said, students' learning motivation in following Javanese language lessons is still very low in reading Javanese script material. The number of grade IV students of SD Negeri 03 Jaten is 35 people, consisting of 15 male students and 20 female students. Of these, 27 students (72%) have low ability to read and write Javanese script. The application of learning using media should be a solution to overcome low student learning outcomes (Astutik et al., 2020; Khoiriyah, 2023), revealing that the value of educational games in language education is increasing because it helps make language education entertaining. One of the many experiential learning modalities, games, can pique students' emotions and senses and demonstrate their active participation in the learning process. Syawaluddin et al (2020) stating that the reason game-based learning is so great is because it forces kids to make decisions, strive toward goals, and deal with the fallout from those decisions.

Law No. 14 of 2005 affirms that "teachers must have pedagogic competence", and be able to master the learning process, and learning strategies and create innovative

learning media according to the needs of the classroom (Khairi, 2023). The development of Javanese snakes and ladders media can create fun, interactive, and active learning. In addition, this learning medium is easy to use and can build student cooperation in groups because it cannot be played individually (Marhaeni, 2022). This is by research (Fadila, 2021) which states that snakes and ladders media can be successfully tested on students with excellent results with a feasibility of 94%. Then researchers obtained t-test results with a significance value of 0.000 (0.000 < 0.05) so that there is a significant difference in media use on learning interest (Fardani, 2020). According to research conducted by Wulansari and Azizah (2018), snakes and ladders media are said to be effective to be able to increasing English vocabulary for children aged 4 to 5 years.

Based on the existing background, researchers want to develop snakes and ladders media for learning Javanese script which of course has also been done by several previous studies. From this study, the author wants to examine more deeply the three problem formulations that are the main objectives, including: (1) the design of the snake and ladder learning media, (2) the feasibility of the snake and ladder learning media, and (3) the effectiveness of the snake and ladder learning media to improve the learning outcomes of Javanese reading and writing skills for grade IV students of SD Negeri 03 Jaten.

2. Research Methods

2.1 Research Design

This learning media development research is included in the Research and Development (R&D) research category. The methodologists of R&D in educational research are obliged to produce effective and efficient products or services related to pedagogical or educational practice (Gustiani, 2019). information gathering and research; (2) planning; (3) initial product form development; (4) preliminary field trials; (5) main product revision; (6) main field testing; (7) revision of operational products, (8) operational field tests, (9) revision of final products, (10) socialization and implementation (Alias, 2019). The description of this model can be seen in Figure 1.

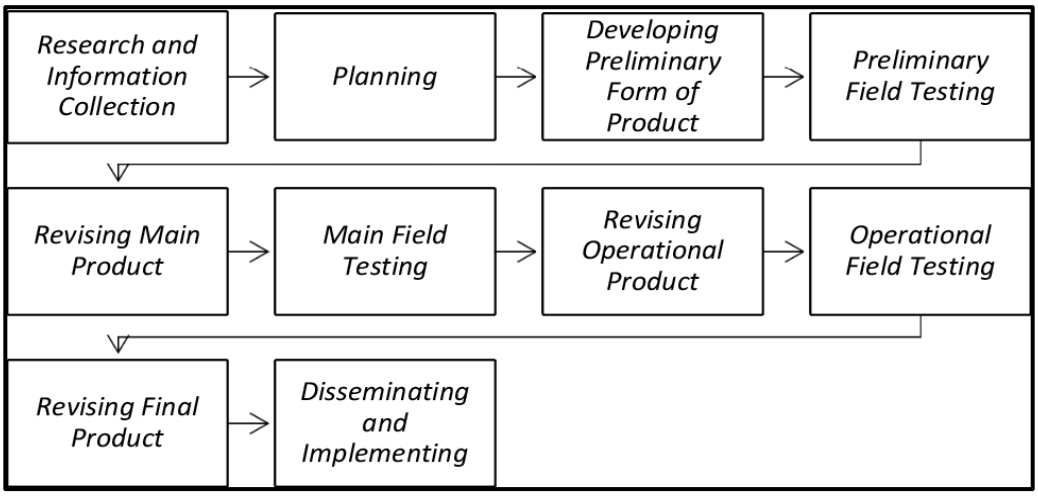

Figure 1. Borg and Gall models

2.2 Research Subjects

A grade IV teacher at SD Negeri 03 Jaten and 35 grade IV pupils served as the study's subjects.

2.3 Research Variables and Instruments

According to Sugiyono (2021) research variables, everything related to research is set by the researcher to be analyzed and studied for conclusions.

2.3.1 Free Variable

According to Sugiyono (2019), the independent variable is the variable that affects the occurrence of changes so it gives rise to the dependent variable (bound). The independent variable in this study was the use of snakes and ladders learning media.

2.3.2 Bound Variables

According to Sugiyono (2019), a dependent variable is a variable that arises as a result of the existence of an independent variable. Related variables in this study are improving learning outcomes of Javanese script reading and writing skills in grade IV students of SD Negeri 03 Jaten.

2.3.3 Research Instruments

The data collection instruments used by researchers are in Table 1.

Table 1. Research Instruments

No.	Data	Data Collection Techniques	Data Collection Instruments	Data Sources
1.	Potential Problems	Nontest	Guidelines for interviews, observations, questionnaires, and documentation	Principals, teachers, and students
2.	Media Needs	Contest	Questionnaire sheet for teacher and student needs	Teachers and students
3.	Media Eligibility	Contest	Media expert and subject matter expert validation sheet	Media expert validators and subject matter experts
4.	Media Effectiveness	Test	Pretest *and* post-test *questions*	Student
		Contest	Questionnaire of teacher and student responses	Teachers and students

2.4 Procedures and Data Analysis

The research procedure used is the development of snakes and ladders learning media, the development evaluation process becomes the main series in the form of teacher response questionnaires, which are then used as a benchmark for the success of development. Product data analysis consists of two parts, teacher and student needs questionnaires. As well as analyzing questionnaires of teacher and student media responses.

Likert scale analysis of the Teacher and Student Needs Questionnaire Five categories are employed: 1 denotes strongly disagree, 2 disagree, 3 agree, 4 agree, and 5 highly agree. The Formula 1 is applied (Arikunto, 2014) and the criteria for teacher and student needs questionnaire as in Table 2 (Wulandari et al., 2023).

$$P = \frac{\sum x}{\sum xi} \times 100 \quad (1)$$

Where P: Score Percentage; Σx: Number of respondents' answer scores in one item; and Σxi : The number of ideal scores in one item.

Table 2. Criteria for Teacher and Student Needs Questionnaire

Percentage (%)	Criterion
81% – 100%	Agree
61% – 80%	Agree
41% – 60%	Disagree less
21% – 40%	Disagree

0% – 20%	Strongly disagree

The questionnaire of students' responses to the media used the *Guttman* scale with 2 answer choices, namely a score of 1 (agree) and a score of 0 (disagree). The Formula 2 used is as follows (Arikunto, 2014) and criteria for teacher and student response questionnaire in in Table 3.

$$P = \frac{F}{N} \times 100 \quad (2)$$

Where P: Percent value of interest in learning using media; F: The frequency with which the percentage is searched and N: Maximum number of scores.

Table 3. Criteria for Teacher and Student Response Questionnaire

No.	Score Percentage (%)	Criterion	Information
1.	81% – 100%	Excellent	The media is very feasible, it does not need to be revised
2.	61% – 80%	Good	Decent media does not need revision
3.	41% – 60%	Good enough	Less decent media needs revision
4.	21% – 40%	Not good	Inappropriate media needs revision
5.	< 20%	Very unfavorable	The media is very unworthy of revision

(Anesia et al., 2018)

Analysis of the effectiveness of student cognitive learning outcomes can be done by calculating the pretest and posttest results that students have taken before, and testing the normality of pretest and posttest results. The normality test that part used in this determination before understanding whether the principal distributed inputs or not (Table 4). Priyatno (2018) channeling that verification of input normality is important before it is done because input that is distributed in the subject matter of written input can be representative of the population.

Table 4. Normality Test Test Criteria (Priyatno, 2018)

Result	Information
If the significance value is 0.05≤	Ho was rejected
If the significance value > 0.05	Ho accepted

Then there is the Paired Samples T-Test or paired sample t-test which is done to find out the average difference test between two paired samples. Priyatno (2018) states that paired samples are used on sample groups that include the same subject but receive two different treatments (e.g. before and after treatment). In this study, researchers used SPSS version 23 to test students' pretest and posttest results with paired samples t-tests. This t-test can be used on parametric normally distributed data (Table 5 and Table 6).

Table 5. Test Criteria Paired Samples T-Test (Priyatno, 2018)

Result	Information
If -t calculate -t table or t calculate t greater table greatergreatertable≥≤	Ho accepted
If -t calculates -t table or t catheners t table<>	Ho was rejected

Table 6. Decision Making Based on the Significance of the Paired Samples T-Test (Priyatno, 2018)

Result	Information
If the significance value is 0.05≤	Ho was rejected
If the significance value > 0.05	Ho accepted

Analysis of the gain index is used to calculate the score between the pre-test and post-test results. In this study, the profit in question is normalized gain (N-gain). N-Gain is normalization obtained by comparing the difference in pretest and posttest scores of art class material after using snakes and ladders learning media. The normalized gain is in Formula 3 and Test Average Gain (N-Gain) is in Table 7.

$$N - Gain = \frac{Skor\ posttest - skor\ pretest}{Skor\ maksimal - skor\ pretest} \quad (3)$$

Where N-gain: magnitude of gain factor; posttest score: final test score after treatment; Scoreposttest: initial value before treatment; and score: maximum value.

Table 7. Test Average Gain (N-Gain)

Interval	Criterion
N-Gain 0.7≥	Tall
0.3 N-Gain 0.7≤≤	Keep
N-Gain < 0.3	Low

3. Results

This study on the creation of snakes and ladders learning materials to enhance Javanese reading and writing learning outcomes was carried out at SD Negeri 03 Jaten. This study focuses on three main areas: (1) the design of the learning materials; (2) the viability of the materials; and (3) the efficiency of the materials in terms of improving the learning outcomes of Javanese script reading and writing skills for grade IV students at SD Negeri 03 Jaten.

3.1. Product data analysis

3.1.1. Analysis of Teacher and Student Needs Questionnaire

This subject was aimed about teacher and student necessary of the media that will used in the classroom. To do the analyze, researcher using Gutman scale with option of the answer Yes or No. Table 8 shows the results of the questionnaire of teacher and student needs. The average result in the questionnaire of teacher and student needs was 82% and included in the category of strongly agree.

Table 8. Results of the Teacher and Student Needs Questionnaire

Respondent	Percentage
Teacher	89%
Student	75%
Average	82%

3.1.2. Analysis of Teacher and Student Responses to the Media

According to the results of Table 9, the responses of teachers and students related to snakes and ladders media obtained a score of 97%, so the media can be categorized as very good and very feasible and does not need to be revised.

Table 9. Results of Teacher and Student Response Questionnaire

Respondent	Percentage
Teacher	100%
Student	94%
Average	97%

3.2. Initial Data Analysis

A normality test is performed to determine whether learning outcomes before and after the test are normally distributed. Normality testing helps researchers decide which data analysis techniques to use based on the data they have. Parametric statistical methods are used for normally distributed data. The normality test was performed using the Shapiro-Wilki test formula using SPSS application version 23.

3.2.1. Normality Test

Table 10 shows normality test results with small-scale trial test activities. Based on the output table of the Shapiro-Wilk sig column. The value before treatment was 0.658 > 0.05 and the post-treatment value was 0.385 > 0.05. Since both values are greater than 0.05, we can conclude that they are normally distributed and the t-test requirements are met. Because the results of the normality test show that the data has a normal distribution, the t-test can be performed. The t-test results were obtained from the pretest and post-test data processed through SPSS 23.

Table 10. Normality Test Results on Small-Scale Trials

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	Df	Sig.	Statistics	Df	Sig.
Before treatment	.205	5	.200*	.939	5	.658
After treatment	.218	5	.200*	.895	5	.385

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 11 shows normality test results with large-scale trial testing activities. Based on the output table of the Shapiro-Wilk sig column. The pre-treatment value was 0.129 > 0.05 and the post-treatment value was 0.175 > 0.05. Since both values are greater than 0.05, we can conclude that they are normally distributed and the t-test requirements are met. Because the results of the normality test show that the data has a normal distribution, the t-test can be performed. The t-test results were obtained from the pretest and post-test data processed through SPSS 23.

Table 11. Normality Test Results on Large-Scale Trials

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	Df	Sig.	Statistics	Df	Sig.
Before treatment	.147	30	.095	.946	30	.129
After treatment	.134	30	.178	.951	30	.175

a. Lilliefors Significance Correction

3.2.2. Uji T-Test

Table 12 shows the t-test results in small-scale trials showing sig values. (2-tailed) 0.0064 < 0.005 then on large-scale trials obtained the results of SIG values. (2-tailed) 0.000 < 0.005. From these two tests, it can be concluded that H_0 was rejected and Ha was accepted, so there was a difference in the average results before treatment and results after treatment, meaning that the effect of using snakes and ladders media on Javanese script material was found to improve the learning outcomes of grade IV elementary school students.

Table 12. T-Test Results in Small and Large-Scale Trials

		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Before treatment – After small-scale treatment	-22.600000	9.685040	4.33128	-34.625566	-10.57443	-5.218	4	0.006437
Pair 2	Before treatment – After large-scale treatment	-16.20000	8.37237	1.52858	-19.32629	-13.07371	-10.598	29	.000

3.2.3. Uji N-gain

The average improvement test is performed to determine the average increase before treatment and after treatment. The calculation of the average increase before and after treatment was carried out using the N-Gain analysis method. N-Gain is a gain normalization determined by comparing the difference between the values before and after treatment with the difference between the SMI values before the treatment. Gain is the average increase in learning outcomes on presentation material and data collection after the use of snakes and ladders media. Based on the results of test calculations (N-Gain) in small-scale trials, it is known that there is an average increase of 0.75 which is included in the high criteria. In large-scale trials, it was found that there was an average increase of 0.52 which was included in the moderate criteria (Table 13).

Table 13. N-gain Test Results on Small Scale and Large Scale Trials

	N	Minimum	Maximum	Mean	Std. Deviation
Small-scale NGain	5	.35	1.00	.7563	.26797
Large-scale NGain	30	-.14	1.00	.5213	.24221

4. Discussion

4.1. Gathering Information on Potential and Problems

The first step that researchers must take is to collect information on the potential problems contained in SD Negeri 03 Jaten. Information collection is carried out by observation, interviews, questionnaire dissemination, and documentation. Based on the information obtained, there are several problems, namely in learning Javanese, teachers have not fully developed and implemented learning media, so that based on student learning interests cause students' Javanese learning outcomes to tend to be low.

4.2. Data Collection

Techniques for gathering data are one way to get the information and data required for study. This research and development use a variety of data collection techniques,

including surveys, interviews, and observation. When employing the Snakes and Ladders learning media, observations were performed to find out how instructors and students responded. Researchers who also function as observers when the media is employed carry out conservation work. After employing snake and ladder learning media Javanese script material, teachers and students were surveyed to get their opinions, comments, and suggestions. The interview method was selected because it allows researchers to get up close and personal with the source, resulting in more detailed information. Ten pupils in grade IV and the class instructor were interviewed of SDN 03 Jaten.

Questionnaires are another method that researchers in this development research are using to obtain data. A questionnaire is a tool used to collect data; it is named after the method it is used for. A questionnaire sheet may consist of multiple printed questions, the purpose of which is to obtain information from respondents. Researchers choose questionnaires in data collection to obtain free data without being influenced by the relationship between researchers and assessors, and the data obtained can be collected more easily because the type is the same.

Data collection techniques use the feasibility of a product through the results of validation carried out by expert validation in the form of questionnaires using the Likert scale to find out which instruments are designed to be valid or not. The results of the trial were carried out by subject educators using questionnaires or questionnaires.

4.3. Initial Product Development

The initial product development design was carried out based on the analysis of media needs questionnaires to teachers and students. At this stage, researchers design learning media products that contain an attractive combination of snakes and ladders displays. There is a suitable color combination equipped with the right font selection. Font arrangement and all fields in learning media need attention. So, the appearance of snakes and ladders is an attraction for students. The appearance of the product is in Figure 2, Figure 3, Figure 4, and Figure 5.

Figure 2. Pawn Products

Figure 3. Javanese snakes and ladders board

Figure 4. Question cards, zonk cards, and gift cards

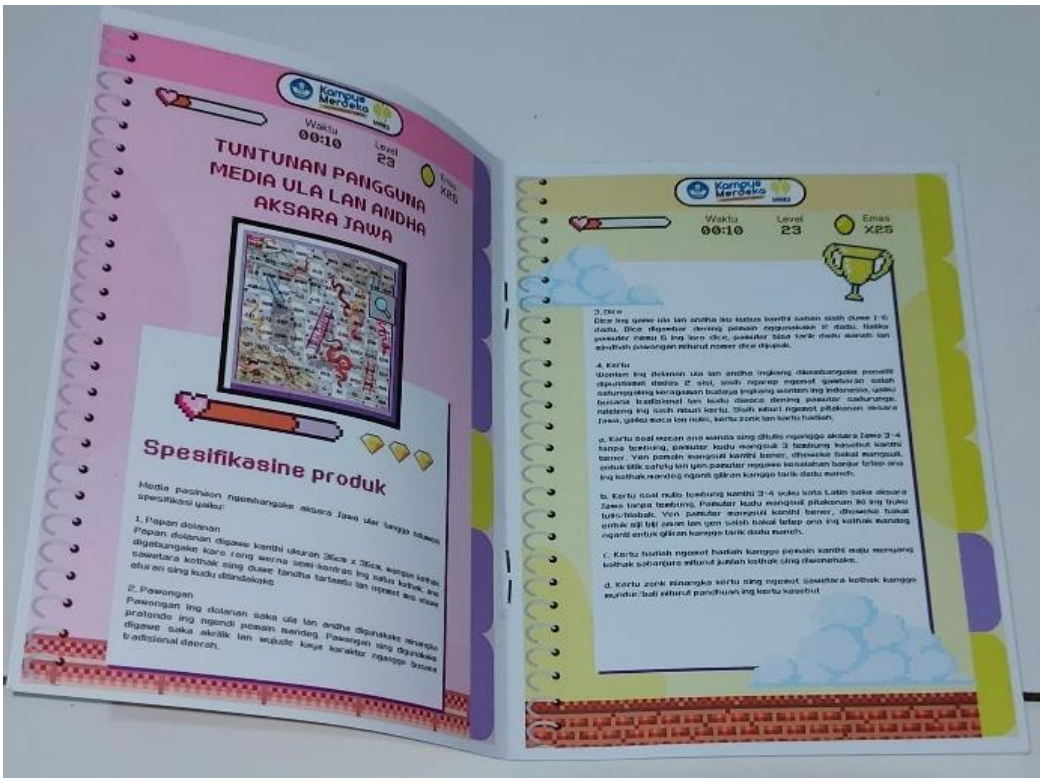

Figure 5. Manual for use of snakes and ladders media

4.4. Product Validation

The feasibility results of material expert validation obtained a score of 94% which indicates the media is suitable for use and trial. Then the results of media expert validation showed a gain of 93%. The average score of both is 93.5% in the very decent category (Tabel 14).

Table 14. Feasibility Test Results of Snakes and Ladders Media

Expert Validators	Earned Score	Criterion
Media	93 %	Very decent
Material	94 %	Very decent
Average	93.5 %	Very decent

At this stage, of course, some media designs need revision. Here's how the media looks before revision and after revision (Figure 6 and Figure 7).

Figure 6. Snakes and ladders media products before revision

Figure 7. Snakes and ladders media products after revision

4.5. Small-Scale Trials

After the product design is developed, it will be tested on a small scale on several grade IV students of SD Negeri 03 Jaten totaling 5 students. This trial is used to prove the effectiveness of the product to be developed. Product effectiveness tests are carried out using testing instruments so that complete data related to the application of the product is obtained.

4.6. Large-Scale Trials

After successful small-scale product trials, it was followed by large-scale trials on all grade IV students of SD Negeri 03 Jaten totaling 30 students. The aim is to test the feasibility and effectiveness of snake and ladder learning media products that have been made.

5. Conclusions

The results of research and discussion on the development of snakes and ladders learning media to improve the learning outcomes of reading and writing Javanese script material for grade IV students of SD Negeri 03 Jaten were declared valid, practical, and effective. The effectiveness of the developed learning media reached an average value of 93.5. Then based on small-scale validity tests reached 0.006437<. 0.05 and on a large scale obtained a value of 0.000 < .0.05 so it can be concluded that there is a significant difference between the results before and after the use of snake and ladder learning media. In addition, in the average increase test, the N value was obtained in small-scale trials, it was found that there was an average increase of 0.75 which was included in the high criteria. In large-scale trials, it was found that there was an average increase of 0.52 which was included in the moderate criteria.

Implication is the result or direct result of the results of scientific research. The findings of this study are related to factors that are learning outcomes in Javanese script material which is categorized as low. Based on research, bound and control variables are known to have a significant influence on improving learning outcomes in Javanese script material, especially in reading and writing.

Based on the results of research and development of snakes and ladders, the development of learning media is limited to only one material, namely reading and writing Javanese script, so researchers have not developed more deeply related to the use of clothing and pairs of Javanese script. For further research, it is recommended to further deepen the development of snakes and ladders media and the scope of material delivered

is wider so that it can expand knowledge about Javanese script subjects and be able to improve student learning outcomes.

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