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## The Effect of Crossword Puzzle Learning Media on Student Learning Outcomes in IPAS Class IV SD Karuna Dipa Palu

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### ABSTRACT

This study aims to determine the effect of the Crossword Puzzle learning media on students' learning outcomes in the IPAS subject for fourth-grade students at SD Karuna Dipa Palu. This research employed a pre-experimental method with a one-group pretest-posttest design. The sample consisted of 17 students. Data were collected through observation and a multiple-choice test consisting of 25 items. The test instrument was validated using Pearson correlation analysis and its reliability was measured using Cronbach's Alpha, yielding a score of 0.920, which indicates a highly reliable instrument. The data were analyzed using descriptive statistical analysis, the Shapiro-Wilk normality test, the N-Gain test, and hypothesis testing using the Paired Sample T-test with the assistance of IBM SPSS Statistics version 27. The results showed an increase in the average score from 62.59 in the pretest to 83.06 in the posttest. The N-Gain score of 0.6055 falls into the moderate category, indicating that the Crossword Puzzle media is fairly effective. The result of the Paired Sample T-test showed a significance value of  $0.000 < 0.05$ , which led to the rejection of the null hypothesis ( $H_0$ ) and acceptance of the alternative hypothesis ( $H_a$ ), indicating that the use of Crossword Puzzle in classroom learning has a significant effect on students' learning outcomes. It can therefore be concluded that the use of this medium is effective in improving learning outcomes in IPAS and can be recommended as an interactive and enjoyable alternative learning media for elementary school students.

## 1. Introduction

Education is one of the main pillars in the development of a country. To achieve optimal educational goals, good curriculum development is very important. According to Law No. 20 of 2003, the curriculum is a set of learning plans related to the objectives, content, teaching materials, and methods used and used as guidelines in organizing learning activities to achieve national education goals.

The Merdeka Curriculum is a curriculum that adapts diverse internal learning activities, so that the content is optimized so that students have time to deepen concepts and strengthen skills (Kemendikbud, 2022). In the independent learning curriculum, the content of the Science (Science of Nature) subject has changed its name to IPAS (Science of Nature and Social). The main objective of IPAS learning is to develop students' ability to understand and apply concepts related to the environment and nature, as well as to have curiosity, problem solving, and skills in social life. Memorizing quite a lot of material makes students quickly feel bored to learn (Hastiwi et al., 2023). Monotonous and uninteresting learning media can make students bored, so that explanations from teachers cannot be understood properly which will have an impact on student learning outcomes (Handoyo et al., 2024).

Lack of student interest and attention in the learning process is still one of the problems that cannot be denied in the world of education. This is because the learning that takes place in the classroom is less interesting and less effective. In fact, there are still many students who have difficulty understanding the material and are less interested in several subjects, one of which is IPAS. This is because, when IPAS learning is taking place, there are still many students who do not pay attention to the teacher when explaining, and the classroom atmosphere is not conducive due to noisy students. In addition, learning media often use only printed books as reading material which of course can make students quickly feel bored and learning becomes ineffective.

Effective learning is indeed very important in improving student learning outcomes and creating a positive learning environment. Learning in the classroom should take place actively and meaningfully in order to create a pleasant learning atmosphere for students. Through crossword puzzle media, students can be given the opportunity to learn in a more active and creative way. In completing the crossword puzzle, students will be introduced to various terms and concepts contained in the IPAS subject. The process of finding words and understanding the clues can strengthen students' memory and understanding of the material that has been taught.

Therefore, researchers try to apply Crossword Puzzle learning media as an effective media to make students more enthusiastic, and excited in participating in learning so that they can achieve predetermined IPAS learning outcomes. In crossword puzzles, players must fill in empty spaces in the form of white boxes with letters that form a word based on the clues given. The clues can be divided into "horizontal" and "descending" categories depending on the word that must be filled in (Marsono, 2021). Kusuma (2021) states that there are several advantages of crossword puzzle media, including students actively thinking critically, being interested in participating in learning, students are excited by the stimulus provided in the form of images, shapes, and colors, enriching students' vocabulary, and optimizing students' skills in critical thinking.

According to Zulfikri (in Wati et al., 2024) Crossword puzzle is a learning media arrangement of review text in the form of crossword puzzles that can foster student interest and participation in the learning process. Followed by another opinion according to Hasan et al. (2021) This learning media is included in educational

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games, which train student concentration. How to do a crossword puzzle is very easy, only need to write the answers in the available boxes according to the number of boxes needed (Aziz, 2023).

Evidence that someone has learned, which can be seen from changes in behavior that occur in someone who receives learning, from not knowing and not understanding something, because he learns so that he produces knowledge and understands what he is learning. According to Sani (2019) Learning outcomes are abilities or changes in behavior obtained after participating in the learning process. Each subject has certain learning outcomes because each subject has different characteristics. This is in line with what Rahman (2021) stated that learning outcomes are the abilities achieved by students after carrying out learning activities. Indicators of learning outcomes can be measured to measure the affective, cognitive or psychomotor domains. Furthermore, using methods such as tests or non-tests that will be measured. This achievement includes various abilities that include aspects of knowledge (cognitive), attitudes (affective), and skills (psychomotor) that students have after undergoing the learning process.

This study aims to discuss the effect of student learning outcomes in the cognitive domain which covers six aspects including knowledge, understanding, application, analysis, synthesis, evaluation, and creativity. This study will also only discuss external factors that affect student learning outcomes, which focus on the use of learning media in the teaching and learning process. Through the application of Crossword Puzzle learning media in IPAS learning, it is expected to improve cognitive skills, strengthen memory, and improve student learning outcomes significantly.

## 2. Methodology

This type of research is quantitative research. According to Kuncoro (2021) quantitative data is data that can be measured and calculated directly, regarding information or explanations in the form of numbers or statistics. The method used by researchers in this study is Pre-experimental with One-Group Pretest-Posttest Design, according to (Sugiyono, 2019) the one-group pretest-posttest design consists of one predetermined group. In this design, tests are carried out twice, namely before treatment is called pretest and after treatment is called posttest. The research pattern of one group pretest posttest design is as follows Table 1.

Table 1. One Group Pretest Posttest Design

<i>Pretest</i>	<i>Treatment</i>	<i>Posttest</i>
O <sub>1</sub>	X	O <sub>2</sub>

Sourch : Sugiyono (2019: 131)

Information:

O<sub>1</sub> = Initial test (pretest) before treatment is given

X = Treatment of the experimental group in the form of using Crossword Puzzle learning media

O<sub>2</sub> = Final test (posttest) after the treatment is given

According to Nazir (In Rahmah, 2017) reveals that population is a collection of individuals with predetermined qualities and characteristics. According to Usman and Akbar (In Rahmah, 2017), samples are some members of the population taken using certain techniques called sampling techniques. Arikunto (2017) says that if the research subject is less than 100 then the entire population becomes the research sample, but if the research subject is more than 100 then 10-15% or 15-25% of the population can be taken.

The population in this study was not greater than 100 people, so prospective researchers took 100% of the existing population of 17 people. Thus in this study using Saturation Sampling (Saturated Sample). Saturated sample is a sampling technique that includes all members of the population to be used as research samples (Amin, 2023). This research uses a type of content validity. Content validity is a measuring tool that determines how accurately a test can reflect the abilities to be tested on students in accordance with the learning objectives to be achieved (Farida, 2021). In this study, the validity of the instrument was tested using the Product Moment Correlation formula with the help of SPSS version 27, with the formula:

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

Information:

- $r_{xy}$  = Test validity coefficient
- $N$  = Number of students who participated
- $\sum X$  = Test results for which validity is sought
- $\sum Y$  = Total score (Anwar, 2022)

The instrument testing criteria are as follows:

- If  $r_{count} > r_{table}$  (at a significant 0.05 or 5%) then the instrument is valid.
- If  $r_{count} < r_{table}$  (at a significant 0.05 or 5%) then the instrument is not valid.

To test the reliability of the instrument in the form of an objective test in this study, the Cronbach Alpha formula was used. The instrument reliability test in this study used computer assistance with the SPSS version 27 program. The results of this analysis will show various results consisting of the average value (mean), standard deviation, minimum value and maximum value of learning outcomes. The results of descriptive analysis will provide an overview of the distribution of student learning outcomes data. Descriptive statistics are statistics to analyze data through describing or describing the data collected as it is without having the intention of drawing conclusions that apply to the public (Yunita, 2021).

The N-gain test is carried out by calculating the difference between the pretest value and the posttest value. Normalized Gain or N-gain score is used to evaluate the effectiveness of using a particular method or treatment in research on improving

student learning outcomes (Katili, 2022). After checking the normality of the data, the next step is to conduct hypothesis testing. To measure the extent to which the hypothesis that has been formulated is supported by the data collected, we need to conduct testing. If the distribution of data is normally distributed, then we can use hypothesis testing using the Paired Sample T-test assisted by the SPSS version 27 program with a significant level of  $\alpha = 0.05$ .

### 3. Result and Discussion

Based on the results of the validity test with the help of IBM SPSS Statistic version 27, the value ( $r$  table) with 18 students as respondents is 0.468. Validity Test Requirements if  $r$  count  $>$  from  $r$  table or Sig value  $< 0.05$  then the question is declared Valid. There are 25 questions on the test that are declared valid because the sig value is  $< 0.05$  or  $r$  count  $>$  0.468. The following are the results of the research instrument validity test can be seen in Table 2.

Table 2. Test Instrument Validity Test Results

Soal	R <sub>hitung</sub>	R <sub>tabel</sub>	Nilai Sig. (2-tailed)	Keterangan
S.1	0.629	0.468	0.005	Valid
S.2	0.734	0.468	0.001	Valid
S.3	0.492	0.468	0.038	Valid
S.4	0.508	0.468	0.032	Valid
S.5	0.570	0.468	0.013	Valid
S.6	0.564	0.468	0.015	Valid
S.7	0.816	0.468	0.000	Valid
S.8	0.824	0.468	0.000	Valid
S.9	0.528	0.468	0.024	Valid
S.10	0.590	0.468	0.010	Valid
S.11	0.617	0.468	0.006	Valid
S.12	0.492	0.468	0.038	Valid
S.13	0.492	0.468	0.038	Valid
S.14	0.655	0.468	0.003	Valid
S.15	0.594	0.468	0.009	Valid
S.16	0.620	0.468	0.006	Valid
S.17	0.563	0.468	0.015	Valid
S.18	0.655	0.468	0.003	Valid
S.19	0.532	0.468	0.023	Valid
S.20	0.470	0.468	0.049	Valid
S.21	0.563	0.468	0.015	Valid
S.22	0.624	0.468	0.006	Valid
S.23	0.514	0.468	0.029	Valid
S.24	0.603	0.468	0.008	Valid
S.25	0.547	0.468	0.019	Valid

The reliability test is carried out after the test instrument has been validated. The research instrument is said to be reliable if it produces the same results even though it is measured many times. The following are the results of the calculation on the SPSS program using the Cronbach Alpha formula, can be seen in Table 3.

Table 3. Reliability Test Results

<i>Reliability Statistics</i>	
<i>Cronbach's Alpha</i>	<i>N of Items</i>
0,920	25

Based on the results of the reliability test using IBM SPSS Statistic version 27 in Table 3, Cronbach alpha > 0.60 was obtained, which means that the questions on the test can be said to be reliable so that they can be used for data collection in seeing the effect of Crossword Puzzle learning media on student learning outcomes in IPAS class IV SD Karuna Dipa Palu. In this study, the number of students who took the entire pretest and posttest tests totaled 17 students. The following is a descriptive analysis of the pretest and posttest, namely Table 4.

Table 4. Results of Pretest and Posttest Data Analysis

<b>Statistics</b>	<b>Pretest</b>	<b>Posttest</b>
Sample	17	17
Minimum Score	40	60
Maximum Score	92	100
Mean	62,59	83,06
Standard Deviation	13,186	11,093

Based on the data in the table 4 above, it can be seen that the average value (mean) of students on the pretest is 62.59 with a minimum value of 40 and a maximum value of 92. While the average value on the posttest is 83.06 with a minimum value of 60 and a maximum value of 100. The results of the pretest and posttest data analysis show that there is a difference between the average value of student learning outcomes before and after being given treatment using Crossword Puzzle learning media in IPAS subjects. The average value of student learning outcomes after being given treatment (posttest) is higher than before treatment (pretest). While the standard deviation on the pretest was 13.186 and the posttest was 11.093. This shows that the posttest score is better than the pretest score.

Based on the pretest and posttest scores from the research that has been done, it can be calculated the increase in test results that have been obtained from the results before and after being given Crossword Puzzle learning media based on the N-gain score and N-gain percent calculated using IBM SPSS Statistic 27 can be seen in the following table 5.

Table 5. N-gain Calculation Results

<b>N-gain</b>	<b>Number of Mean</b>	<b>Level of Gain</b>	<b>Criteria</b>
<i>N-gain Score</i>	0.6055	$0,3 \leq g \leq 0,7$	Medium
<i>N-gain Percent Score</i>	60.5503	56 - 75 %	Moderately effective

From the results of the N-gain score in Table 5, the N-gain percentage is calculated using IBM SPSS Statistic 27. The results of the N-gain percentage get a mean value of 60.5503, where this value is included in 56-75% with fairly effective criteria. Normality test is an analysis used to test whether the learning outcome data has a normal distribution or not (Katili, 2022). The provisions used in this test to

determine whether the data is normally distributed or not are if the significance value is  $>$  from 0.05 (sig.  $>$  0.05) then the data is said to be normally distributed, but on the contrary if the significance value is  $<$  from 0.05 (sig.  $<$  0.05) then the data is said to be abnormally distributed. The following are the results of the normality test, can be seen in Table 6.

Table 6. Pretest and Posttest Data Normality Test Results

Learning Outcomes	Shapiro-Wilk		
	statistic	df	sig.
<i>pretest</i>	0.978	17	0.942
<i>posttest</i>	0.965	17	0.734

Based on the data in the table 6 above, the results of the normality test using Shapiro-Wilk with the help of the IBM SPSS Statistic 27 program show that all research data have a Sig value  $>$  0.05. The pretest Sig value is (0.942  $>$  0.05) and the posttest Sig value is (0.734  $>$  0.05). Thus it can be concluded that all data are normally distributed, so data analysis can be continued. After the normality test is carried out, it is known that the IPAS learning outcomes data are normally distributed. The results of the Paired Sample T Test analysis with calculations assisted by the IBM SPSS Statistic 27 program can be seen in the table 7 below:

Table 7. Paired Sample T Test Results of class IV

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pretest - Posttest	-20,471	4,665	1,131	-22,869	-18,072	-18,092	16	0,000

Based on table 7, it is known that the Significant value of the Paired Sample T Test is 0.000. Because the significant value of T-test  $<$  0.05 (0.000  $<$  0.05) then  $H_a$  is accepted and  $H_0$  is rejected. So it is known that there is an effect of Crossword Puzzle learning media on student learning outcomes in IPAS class IV SD Karuna Dipa Palu.

### Discussion

Based on the research data obtained, pre-requisite testing was then carried out in the form of a normality test with the help of which it showed that the pretest and posttest data were normally distributed. Because the research data meets the requirements of normal distribution, a parametric test is carried out in the form of a t-test using the paired sample T-test test with the help of the IBM SPSS Statistic version 27 program. Sig. (2-tailed) learning outcomes on the pretest of 0.942  $>$  0.05 and posttest learning outcomes in the class of 0.734  $>$  0.05, it can be concluded that the results of the normality test analysis on the pretest and posttest are normally distributed. Furthermore, the hypothesis test obtained a significant value (sig. 2-tailed) of the pretest and posttest of 0.000  $<$  0.05, it can be concluded that  $H_0$  is

rejected and  $H_a$  is accepted. Paired Sample t test data shows that Crossword Puzzle learning media has an influence on student learning outcomes in IPAS class IV SD Karuna Dipa Palu. Media Crossword Puzzle can be seen in Figure 1.



Figure 1. Media Crossword Puzzle

Media Crossword Puzzle in Figure 1 the superiority of Crossword Puzzle learning media is one of the success factors. This media is classified as an educational game that stimulates students' cognitive abilities through filling in puzzles based on horizontal and descending word clues. These results are in line with the results of research conducted by Syahputri et al. (2024) proved that the use of Crossword Puzzle media can have a significant effect on student learning outcomes. Based on these results, the use of Crossword Puzzle media can be recommended as an alternative learning innovation that can increase the effectiveness of the teaching and learning process in elementary schools, especially in IPAS subjects. In addition to improving learning outcomes, this media also helps teachers create a more dynamic and participatory classroom atmosphere.

#### 4. Conclusion

Based on the results of research conducted on fourth-grade students at Karuna Dipa Palu Elementary School, it can be concluded that there is a significant effect of using Crossword Puzzle learning media on student learning outcomes in IPAS subjects in the fourth grade at Karuna Dipa Palu Elementary School. This is evidenced by the results of the Paired Sample t-test, which showed a significant value (sig. 2-tailed) between the pretest and posttest scores. Therefore, it can be concluded that the alternative hypothesis ( $H_a$ ) is accepted and the null hypothesis ( $H_0$ ) is rejected, indicating that the implementation of the Crossword Puzzle learning media on students' learning outcomes in the IPAS subject for fourth-grade students at Karuna Dipa Palu Elementary School is effective in improving students' learning outcomes. Based on these results, the use of the Crossword Puzzle medium

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can be recommended as one of the innovative learning alternatives that can enhance the effectiveness of the teaching and learning process in elementary schools, particularly in the IPAS subject. In addition to improving learning outcomes, this medium also helps teachers create a more dynamic and participatory classroom environment. The Crossword Puzzle medium can be recommended as an interactive and enjoyable learning medium for elementary school students.

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