Prisma Sains: Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram
https://e-journal.undikma.ac.id/index.php/prismasains/index
e-mail: prismasains.pkpsm@gmail.com

July 2023. Vol. 11, No. 3
p-ISSN: 2338-4530
e-ISSN: 2540-7899
pp. 791-798

The Influence of Crossword Puzzle Science Learning Media toward Students' Critical Thinking Ability

***Syafna Mardhatillah, Nirwana Anas**
Madrasah Ibtidaiyah Teacher Education Program, Universitas Islam Negeri Sumatera Utara, Jl. William Iskandar Ps. V, Medan Estate, Deli Serdang 20371, Indonesia

*Corresponding Author e-mail: syafna.mardhatillah@uinsu.ac.id

Received: May 2023; Revised: June 2023; Published: July 2023

Abstract

This study aims to determine whether the Crossword Puzzle media has an effect on Critical Thinking of Class III students of MIS Farhan Syarif Hidayah on Jalan Orde Baru Gg, pipit Desa Muliorejo Kec. Sunggal district. Serdang deli. This research is a quantitative study using quasi-experimental methods. The research design used was a non-equivalent control group design. The population for this study was class III A consist of twenty students as experiment and class III B MIS consist of twenty students as control class. The results showed that there were differences in the ability to think critically on the subject of the characteristics of living things. The increase in critical thinking skills can be seen in the results of students' critical thinking tests in the experimental class after using crossword puzzle learning media and before using crossword puzzle learning media. The average post-test score for the experimental class was 84.50 and the post-test average score for the control class was 72.50. It can be concluded that there is an influence of the Crossword Puzzle learning method on students' critical thinking skills in class III MIS Farhan Syarif Hidayah and according to Researchers using crossword puzzle learning media can help students in repetition and habituation activities, so that students will easily learn material that is difficult in natural sciences. Learning media functions as a learning resource and a way for students to obtain information from the teacher. The benefits of learning media include guidelines for teachers to achieve quality learning objectives, increase students' interest and motivation in learning and make students think more critically.

Keywords: Crossword Puzzle, Critical Thinking

How to Cite: Mardhatillah, S., & Anas, N. (2023). The Influence of Crossword Puzzle Science Learning Media toward Students' Critical Thinking Ability. *Prisma Sains : Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram, 11*(3), 791-798. doi:https://doi.org/10.33394/j-ps.v11i3.8372

https://doi.org/10.33394/j-ps.v11i3.8372

INTRODUCTION

Thinking skills are needed in learning because critical thinking helps students gain knowledge through cognitive stimulation. Students can develop ideas about the problems being studied through this cognitive stimulation. In students the ability to think critically is needed, because critical thinking can encourage children's curiosity and train children's creativity. Critical thinking skills are techniques for thinking logically, reflectively, systematically and productively that are used when making judgments or making decisions correctly (Hidayah et al., 2017). Critical thinking is the ability to think at a high level in analyzing, evaluating, formulating strategies, preparing logical arguments, solving problems, and drawing conclusions (Chusni et al., 2020). Based on the opinion of several experts, it can be concluded that critical thinking ability is the ability to analyze ideas or evaluate information. To understand information in depth can form a belief in the truth of the information obtained or the opinions conveyed. Critical thinking can create students who have broad knowledge insights, and have the ability to prove the truth and knowledge obtained.

Critical thinking is needed for the process of learning, especially in science subjects where there is scientific knowledge and indicators that require critical thinking skills such as

understanding, analyzing, identifying, explaining and applying (Desania et al., 2020). In Permendikbud 81 A of 2013 it states that the abilities of students needed include the ability to communicate, think critically and creatively by taking into account the values and morals of Pancasila so that they become citizens who are democratic and responsible, tolerant of diversity, able to live in a global society, have an interest in breadth in life and readiness to work, intelligence in accordance with their talents/interests, and care for the environment, the curriculum must be able to answer these challenges so it is necessary to develop these abilities in the learning process.

So students' critical thinking skills can be influenced by several factors. The first factor is physical condition. Students who are unhealthy or lack enthusiasm in learning will interfere with concentration when learning takes place which can result in disrupted critical thinking. The second is motivation. Students who lack motivation from teachers and parents will also hinder the learning process. The third is the interaction between teachers and students. The existence of interaction in a lesson will make the learning atmosphere more fun and good because cooperation is very influential for the development of critical thinking. Students' critical thinking skills will develop more easily if the development of abilities is supported by efforts made especially by teachers and students (Yu et al., 2021).

Media is one of the components in the learning process, so the role of media in learning is very large, not only as a teaching tool but as an important part of the learning process. Components contained in learning. According to (Elsovia & Mukhaiyar, 2020) there are objective components, material or material components, strategy components, tools and media components, and evaluation components. To support the success of learning media, the position of media in learning is very important, because the media is not only a messenger that must be fully mastered by human resources, but can also be useful for teachers in presenting learning material. With the benefits of media, learning can be directly effective and achieve maximum results

Learning media is anything that is used as an intermediary in conveying information from the teacher to students which aims to stimulate students so that they are motivated to participate in the learning process as a whole and meaningfully (Hasan, 2021). Another opinion says that Learning Media is anything that is used to distribute teaching materials so that they can achieve learning objectives, because with these media all the attention, thoughts, and feelings of students are focused on learning (Kristanto et al., 2019). The researcher concluded that learning media is an important component in learning, because media is a tool that conveys messages and information in learning.

Crossword puzzle is a language game by filling in the boxes with letters to form words that can be read, both vertically and horizontally. With this crossword puzzle can provide an easy and deep understanding of the material. Compiling this crossword test will certainly invite participation and interest from students. Crossword puzzle game media can be used as an additional learning strategy that is interesting and fun without eliminating student learning concentration (Dewi et al., 2021). The next opinion is that crossword puzzle is a game that can be used as a strategy. Enjoy learning without losing the essence of learning. Since then, it might even include students think critically and actively (Salsabilah et al., 2022).

One of the components in Science Learning is about the characteristics of living things, namely Humans, animals and plants are living things. Each has its own characteristics and functions. Living things have the characteristics of breathing, moving and reproducing. That the characteristic of living things is that they can do breathing or respiration. This means that all living things, from humans, animals, to plants, carry out the breathing process at all times, from morning, noon, to night.

Based on preliminary observations at MIS Farhan Syarif Hidayah. In science learning, it was observed that students were not focused when the teacher explained the material. In addition, the students' activeness and interest in asking questions to increase curiosity are also lacking in value. After conducting interviews there were still students who were unable to think

critically. This can be proven by the fact that students do not understand the meaning of the problem clearly, cannot connect concepts in solving problems and cannot conclude using their own language.

Filsaime (2008) states that practicing critical thinking skills in the learning process will produce students who are used to developing original, aesthetic ideas, building directly related to conceptual perspectives and emphasizing aspects of intuitive and rational thinking. Providing training in critical thinking skills in the learning process, teachers should use methods or media that stimulate their students to be active and find facts to solve a problem.

Based on the results of previous research conducted by Syifa & Supriatna (2022) that the influence of crossword puzzle media on critical thinking skills can have a positive impact on students so that they are more enthusiastic about receiving material and expressing their opinions. Based on the results of research according to Samarinda et al. (2022). Those who use crossword puzzle media on student learning outcomes on the material for the national event of the proclamation of Indonesian independence fall into the appropriate category. There is also an increase in student learning outcomes after using crossword puzzle media.

METHOD

This research was conducted at MIS Farhan Syarif Hidayah which is located on Jl. Orde Baru Gg, pipit, Desa Muliorejo, Kec. Sunggal district. God Serdang. This study uses a quantitative approach, namely research by obtaining data in the form of numbers (Sugiyono, 2015). The population that will be the research sample are students in class III A consists of twenty pearsons and class III B consists of twenty pearsons. Class III A as the experimental class is treated with crossword puzzle learning media while class III B does not get treatment with crossword puzzle learning media.

The research method used is a quasi-experimental method. The research was used to see the effect of giving certain treatments to others under controlled conditions (Sugiyono, 2015). The use of experimental methods in research is intended to see the effect of classes that use Crossword Puzzle learning media and those that do not on students' critical thinking skills.

The design used in this study is the nonequivalent control group design. This study uses a control group, but it cannot fully function to control external variables that affect the implementation of the experiment (Sugiyono, 2015).

Table 1. Nonequivalent control group design

	Learning using Crossword Puzzle media (X_1)	Convensional learning without Crossword Puzzle media (X_2)
Students' Thingking Ability (Y)	(X_1Y)	(X_2Y)

The variables contained in this study consist of two kinds of variables, namely the independent variable and the dependent variable. The independent variable is the variable that influences or causes the change or the emergence of the dependent variable. The dependent variable is the variable that is affected or becomes the result because of the independent variables (Sugiyono, 2015).

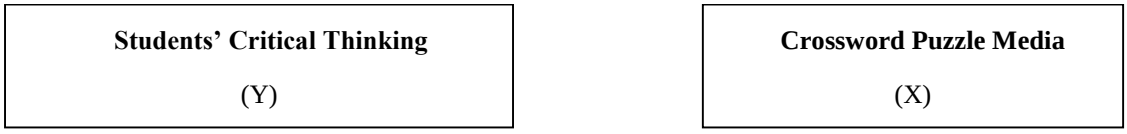

Figure 1. Research Framework

In the use of data collection instruments, it is based on observations with the teacher and giving written test questions that begin with students in the form of pre-test and post-test questions. to see the successful use of student worksheets in the process of implementing classroom learning. For more details, see the Table 2.

Analysis of the research data used is correlational analysis. To obtain data, an instrument is needed as a data collection device in the form of a set of questions given by the researcher to the respondent. The prerequisite test techniques are Normality, Homogeneity and Independent t-test. Data analysis was performed using SPSS (Statistical product and service solution) 24.

Table 2. Data Collection Techniques

Source of Data	Type of Data	Data Collection Techniques	Instrument
Science teacher	Question	Observation, Interview	Questions about learning methods, students' interests, the level of student activity
Student	Students' thinking ability before and after using crossword puzzle media	Pre test and post test	Questions about the characteristics of living things

RESULTS AND DISCUSSION

The data below is a pre-test and post-test of the critical thinking skills of the experimental class and the control class as follows:

Normality test

Analysis of the normality of the research data will test the independent variable data (X) and the dependent variable data (Y) in the resulting regression equation, normally distributed or not normally distributed. Data normality test needs to be done to find out whether the data to be analyzed is normally distributed or not. Because hypothesis testing can be used if the data is normally distributed. The normality test used the Shapiro Wilk analysis technique because the number of samples or the number of students was less than 100, here the researchers used an experimental class and a control class where the total sample used was 20 students. As for the basis for decision making in the Shapiro Wilk test, as seen in Table 3

Table 3. Tests of Normality

	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Students' thinking abilities	Experimental class pre test	.220	20	.012	.916	20	.084
	Experimental class post test	.257	20	.012	.790	20	.062
	Control class pre test	.182	20	.081	.913	20	.072
	Control class post test	.252	20	.017	.795	20	.074

a. Lilliefors Significance Correction

Based on the results of the Shapiro Wilk test, it is known that the significance value for the pre-experimental test is 0.084 > 0.05, so the data is said to be normal, for the post-test for the experimental class it is 0.62 > 0.05, it is said to be normal. Then for the significance of the pre-test for the control class 0.72 > 0.05, the data is normally distributed and for the significance of the post-test for the control class, namely 0.74 > 0.05, the data is also normally distributed. After the data is declared normal, the homogeneity test is then carried out.

Homogeneity Test

This test was carried out in order to find out the similarity of the variance of each group of data. Based on the results of the Pretest-Posttest in the experimental class and the control class, the results are shown in the Table 4.

Tabel 4. Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Students' thinking abilities	Based on Mean	2.583	1	38	.116
	Based on Median	1.086	1	38	.304
	Based on Median and with adjusted df	1.086	1	25.847	.307
	Based on trimmed mean	1.907	1	38	.175

The basis for decision making in the homogeneity test is:

1. If the Based on Mean > 0.05, the variance of the data is homogeneous.
2. If the Based on Mean significance value (sig) <0.05, the variance of the data is not homogeneous.

Based on the data output above, it is known that the Based on Mean significance value (sig) is 0.116 > 0.05, so it can be concluded that the variance of the experimental post-test group and the control class post-test are the same or homogeneous. After the data is known to be normal and homogeneous, a decision can be made to test the hypothesis. Hypothesis testing was carried out using the t-test with the help of the SPSS version 24 program. The following are the results of the hypothesis test (t-test) pretest-posttest data.

Independent Sample Test t Test

The independent t test was conducted to see whether there were differences in the post-test results of students from the experimental group and post-test students from the control group. The calculation results from the hypothesis test can be seen in Table 5.

Table 5. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Thinking abilities	Equal variances assumed	2.583	.116	3.499	38	.001	12.000	3.430	5.057	18.943
	Equal variances not assumed			3.499	28.835	.002	12.000	3.430	4.984	19.016

Based on the table above, the sig value is obtained. (2-tailed) of 0.001 < 0.05, it can be concluded that there is an average difference in students' thinking abilities between the Crossword puzzle learning method and the lecture method. For more details, knowing the average post-test of the experimental class and the control class can be seen in the following statistical Table 6.

Table 6. Group Statistics

	Class	N	Mean	Std. Deviation	Std. Error Mean
Thinking abilities	Experiment class post test	20	84.50	13.563	3.033
	Control class post test	20	72.50	7.164	1.602

It is clear that the experimental post test shows that the average is higher than the control class. The experimental class average is 84.50 while the control class is 72.50 meaning that the Crossword puzzle learning method has an influence on critical thinking skills.

Discussion

The effect of the Crossword puzzle method on students' critical thinking

Based on the results of the research that has been done, it is known that there is an influence by applying Crossword puzzle media to students' critical thinking. This can be known through data analysis of the results of the initial test (pre test) and the final test (post test). The questions given during the pre-test and post-test for the experimental class and the control class are the same questions. The pre-test and post-test questions about the characteristics of living things are made according to critical thinking indicators, namely understanding, analyzing, identifying, explaining and applying. In the experimental post test, the average is higher than the control class. The experimental class average is 84.50 while the control class is 72.50 meaning that the Crossword puzzle learning method has an influence on critical thinking skills.

Comparison of the average pre-test results for the experimental class and the average post-test results for the experimental class as a whole shows that students' critical thinking skills during the pre-test were said to be good before using the Crossword puzzle learning media, during the post-test for the experimental class using the Crossword learning media puzzles are better than experimental class students who use conventional methods (discussions, lectures, and questions and answers).

The application of crossword puzzle media to the learning process in the experimental class, with the arrangement of review tests in the form of crosswords that can invite student interest and participation (Mshayisa, 2020; Qutieshat et al., 2022). This crossword puzzle can be completed individually or in groups. Crossword puzzles or what can be called crossword puzzles is an active learning method for students which involves all students to think while learning takes place by filling in crossword puzzles (crossword puzzles) so that students become more enthusiastic in following the lesson (Siberman, 2018). Meanwhile, according to (Zaini et al., 2008), crossword puzzle is one of the active learning for students which can be used as a good learning tool without losing the essence of ongoing learning.

Implementation of learning using crossword puzzle media to students' critical thinking

Critical thinking arises after using crossword puzzle media during the implementation of answering the post test questions given by the teacher in the experimental class on the interpretation indicator there is an increase in student scores. The research results show that the use of the crossword puzzle model can improve students' critical thinking skills with the average post-test of the experimental class being higher than that of the control class. Based on the results of students' critical thinking skills in the pre-test and post-test experimental class and control class in table v the value of students' critical thinking abilities, the indicators show that the pre-test scores of control class students are 72.50 and the experimental class is 84.50, this value is of course included in good category.

Critical thinking is an intellectual process that actively and skillfully conceptualizes, applies, analyzes, synthesizes, and evaluates information collected or generated from observation, experience, reflection, reasoning, or communication, to guide beliefs and actions (Agusfitri, 2022). Critical thinking is one of the characteristics of an intelligent human being as well as one of the basic capital or intellectual capital which is very important for everyone and shows a person's level of maturity (Din, 2020; Mahanal et al., 2010). Critical thinking involves mental processes or strategies for analyzing or evaluating existing ideas, concepts or choices.

According to the views of philosophers, critical thinking is a combination of attitudes, knowledge, and skills. The merger includes the skills to identify problems, discover, and apply attitudes and knowledge. Critical thinkers have the characteristics of independent thinking, intellectual empathy, humility, courage, integrity, perseverance, curiosity, clever reasoning, polite and responsible. This study measures four aspects of critical thinking skills, namely: 1) focusing questions on sub-indicators identifying or formulating questions, 2) asking and/or answering questions on explanations and or challenges to sub-indicators providing simple

explanations, 3) considering the credibility of a sources in the sub-indicators provide reasons or opinions, and 4) define the terms in the sub-indicators to make content definitions (Filsaime, 2008).

CONCLUSION

Crossword puzzle is one of active learning for students which can be used as a good learning tool without losing the essence of ongoing learning. Based on the results of the study it can be concluded that the application of crossword puzzle learning media has a significant positive influence on students' critical thinking skills. This is based on the critical thinking test of students in the experimental class after using the Crossword puzzle learning media the average post-test score of the experimental class was 84.50 and the average post-test score of the control class was 72.50. Critical thinking is an intellectual process that actively and skillfully conceptualizes, applies, analyzes, synthesizes, and evaluates information collected or generated from observation, experience, reflection, reasoning, or communication, to guide beliefs and actions. And critical thinking arises after using Crossword media. puzzle during the implementation of answering the post test questions given by the teacher in the experimental class on the interpretation indicator there was an increase in student scores.

RECOMMENDATION

The school is expected to be able to provide input and support for science teachers to be able to apply various learning media, such as learning Crossword puzzle learning media as an effort to improve students' critical thinking skills. Teachers should prepare learning tools well before the implementation of learning. Students should continue to practice solving science questions, in order to better improve students' critical thinking skills. For further research, the researcher suggests using other instruments besides tests in measuring students' critical thinking.

REFERENCES

Agusfitri, D. (2022). Study on Student's Learning Motivation with The Application of Contextual Teaching and Learning Approach to Citizens Learning In Class IX SMPN 12 Palu. *Edu Civic*, *10*(1), 80–95.

Chusni, M. M., Saputro, S., Suranto, S., & Rahardjo, S. B. (2020). Review of critical thinking skill in indonesia: Preparation of the 21st century learner. *Journal of Critical Reviews*, *7*(9), 1230–1235.

Desania, F., Sinaga, B., Lubis, A., & Syahputra, E. (2020). Analysis of students' critical thinking skills through problem-based learning approach using HOTS questions in SMA N 13 medan. *International Journal of Scientific \& Technology Research*, *9*(3), 131–137.

Dewi, T. M., Dirneti, D., & Meilina, F. (2021). Pengembangan Media Permainan Teka-Teki Silang Ilmu Pengetahuan Alam Berbasis Web Untuk Siswa Sekolah Dasar. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, *10*(6), 1672–1682.

Din, M. (2020). Evaluating university students' critical thinking ability as reflected in their critical reading skill: A study at bachelor level in Pakistan. *Thinking Skills and Creativity*, *35*, 100627.

Elsovia, N., & Mukhaiyar, R. (2020). Evaluation of Learning Media Virtual Box Application In Basic Network Computer. *EDUTEC: Journal of Education and Technology*, *4*(2), 216–224.

Hasan. (2021). *Media pembelajaran*. Tahta Media Group.

Hidayah, R., Salimi, M., & Susiani, T. S. (2017). Critical thinking skill: konsep dan inidikator penilaian. *Taman Cendekia: Jurnal Pendidikan Ke-SD-An*, *1*(2), 127–133.

Kristanto, A., Mustaji, Mariono, A., Sulistiowati, & Afifah. (2019). Development of education game media for xii multimedia class students in vocational school. *Journal of Physics: Conference Series*, *1387*(1), 12117.

Mahanal, S., Darmawan, E., Corebima, A. D., & Zubaidah, S. (2010). Pengaruh Pembelajaran Project Based Learning (PjBL) pada Materi Ekosistem terhadap Sikap dan Hasil Belajar Siswa SMAN 2 Malang. *BIOEDUKASI (Jurnal Pendidikan Biologi)*, *1*(1).

Mshayisa, V. V. (2020). Students' perceptions of Plickers and crossword puzzles in undergraduate studies. *Journal of Food Science Education*, *19*(2), 49–58.

Qutieshat, A., Al-Harthy, N., Singh, G., Chopra, V., Aouididi, R., Arfaoui, R., Dileesh, S., Alsadoon, A., Al-Nadhiri, O., Al-Busaidi, S., & others. (2022). Interactive Crossword Puzzles as an Adjunct Tool in Teaching Undergraduate Dental Students. *International Journal of Dentistry*, *2022*.

Salsabilah, A. S., Afifah, N. P. N., Rustini, T., & Wahyuningsih, W. (2022). Implementasi Pendidikan Karakter dalam Pembelajaran IPS di Sekolah Dasar. *Jurnal Pendidikan Tambusai*, *6*(2), 9784–9790.

Samarinda, E. P., Handayani, T., & Sofyan, F. A. (2022). Pengaruh Penggunaan Media Pembelajaran Crossword Puzzle Terhadap Hasil Belajar Tematik Tema 5 Subtema 1 Kelas V MIN 08 Muara Enim. *ULIL ALBAB: Jurnal Ilmiah Multidisiplin*, *1*(4), 752–755.

Siberman, M. L. (2018). *Active learning 101 cara belajar siswa aktif*. Nuansa Cendekia.

Sugiyono. (2015). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Syifa, M. M., & Supriatna, E. (2022). *Pengaruh Penggunaan Media Crossword Puzzle (Teka Teki Silang) Terhadap Kemampuan Berpikir Kritis Siswa Pada Pembelajaran IPS Kelas VI di SDN Serang 7*.

Yu, Z., Gao, M., & Wang, L. (2021). The effect of educational games on learning outcomes, student motivation, engagement and satisfaction. *Journal of Educational Computing Research*, *59*(3), 522–546. https://doi.org/10.1177/0735633120969214?journalCode=jeca

Zaini, H., Munthe, B., Aryani, S. A., & others. (2008). Strategi pembelajaran aktif. *Yogyakarta: Pustaka Insan Madani*, *89*, 2008.