

CRITICAL THINKING AND MEANINGFUL LEARNINGS IN ONLINE LEARNING: DO BOTH MAKE INCREASES?

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ABSTRACT

Crosspuzzle learning is necessary for encouraging students more critical and quickly to understand the material. This study aims to analyze the use of crossword puzzles in the inquiry model by determining the difference between the application of critical thinking and meaningful learning in online learning at SMPN 1 Parepare using crossword puzzle. The research approach was carried out with a sequential explanatory design. This research in the first stage uses quantitative methods, followed by qualitative methods in the second stage. The quantitative method used quasi-experimental data analysis techniques with independent sample-t test on 64 respondents in the control and experimental classes, while the qualitative method was used to extract information using an open questionnaire after the post-test results were got. The results showed that there was a significant difference in the ability of critical thinking and meaningful learning to use the inquiry model (crossword puzzle) got from the t-test results which showed the value of sig.2-tailed $0.00 < 0.05$ and $t_{count} 4.688$ $t_{table} 1.999$. This difference is also supported by descriptive data as an average post-test score of 93.28 for the experimental class which comprises 93.75% of respondents in the very good category and 6.25% in the good value category, higher than the average score for the control class of 85.19.

Keywords: *critical thinking, meaningful learning, crossword puzzle, pandemic*

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INTRODUCTION

Since the COVID-19 pandemic affected nearly 124 countries, each country has issued various policies to suppress transmission in the community. Indonesia as one of the affected countries, based on PP. No. 21 of 2020 regarding large-scale social restrictions that have limited the space for people to move in various sectors. The follow-up to the regulation, in education, enforces learning from home by first closing schools and universities (Murnie, 2020; Purwanto et al., 2020; Wegasari, 2021). This step was taken as an effort to minimize the risk of spreading COVID-19 among students (Cauchemez et al., 2020).

To support learning from home activities, guidelines for implementing Learning From Home were issued during the Covid-19 emergency through Circular Letter

Number 15 of 2020 to ensure the fulfillment of the rights of students in obtaining educational services during emergencies (Girsang, 2020). BDR must be ensured to provide security from the adverse effects of COVID-19 as the main consideration for fulfilling psychosocial support for teachers, students and parents.

Basically, online learning from home activities require students to can think critically about the concepts and theories they learn (Yuliati & Saputra, 2020). However, in reality, the transition from direct learning to online learning presents its own challenges. The controversy that spreads in the mass media about implementing online learning starts with limited knowledge about information technology to facilities and infrastructure that impact achievement (Gde et al., 2021; Safitri et al., 2021). The decline in learning achievement certainly implies that the process of online learning activities is less meaningful and is boring. Whereas the essence of learning from home is to provide meaningful learning experiences for students without having to be burdened with the demands of completeness of all curriculum achievements.

Learning during the COVID-19 pandemic emphasizes life skills education. The content of the learning material is inclusive according to the level of education, cultural context, and the characteristics of students. This illustrates that the benchmark for implementing learning is not on the quantity but on the quality of learning. Besides, it is necessary to teach inquiry as teaching based on the inductivity conception, where discoveries will be created from the observations that are estimated.

One of forms of inquiry model teaching is crossword puzzle learning. In this model, it is effective help students take part in all learning processes by playing and feel a more pleasant atmosphere so that learning outcomes can be maximized. In addition, it is also popular model used by most scholars to find the student's potential. Crossword Puzzle trains intelligence and skills through thinking and analyzing (Mshayisa, 2020; Orawiwatnakul, 2013; Zamani et al., 2021). Given the importance of critical thinking skills and meaningful learning, the authors are interested in conducting a research entitled "Improving Critical Thinking and Meaningful Learning Skills Through Crossword Puzzles (Inquiry Models) in Online Learning During the Covid-19 Pandemic". The novelty of this research is on the model design using the qualitative method after the experiment test is conducted. To support the quantitative data, this research uses qualitative data as response of students. The purpose of this study was to determine the difference between the application of critical thinking and meaningful learning in online learning at SMPN 1 Parepare using crossword puzzle. This research can provide benefits. The theoretical benefit is to instill concepts effectively, get models that support critical thinking skills and meaningful learning, and enrich insights and contribute to the development of knowledge. The practical benefit is to get an active, creative, fun learning activity design, and to get an interesting form of learning activity by focusing on students in improving their critical thinking skills and meaningful learning.

RESEARCH METHOD

The research is at SMP Negeri 1 Parepare which is at Jalan Karaeng Burane No. 18 Mallusetasi, Kec. Ujung, City of Parepare for the academic year 2021-2022. This study uses a mixed-method approach with a sequential explanatory design, namely a combination research method which in carrying out the research combines quantitative and qualitative methods sequentially. This research in the first stage uses quantitative methods, followed by qualitative methods in the second stage. Qualitative methods are used to find out how the application of cross-world puzzles can improve critical thinking skills and meaningful learning in online learning through extracting information using an open questionnaire. The symptom measured in this study is the critical thinking ability of students. To measure this symptom, a structured instrument sheet was used to see how the level of critical thinking ability of students in the classroom during the research took place. This instrument sheet is used only after the treatment is given to the experimental class.

Quantitative methods play a role in analyzing the application of crossword puzzles in improving critical thinking skills and meaningful learning in online learning to use quasi-experimental research with an experimental research design that is a true experimental design, characterized by more careful variable control. The true experimental design has two forms of design, namely posttest only control design and pretest-posttest control group design. In this study using a factorial experimental research form with 2 treatments (pretest-posttest control group design). The experimental group was given treatment (using an inquiry learning model), while the control group was taught using conventional methods. Here, the two groups continued to follow the lesson by discussing the same material, but the experimental group was given special treatment. At the end of the experiment, both groups were given a posttest (Kasiram, 2008).

An experimental design is called a factorial design if each level on one variable is combined with every level on the other variable (Judd et al., 2009). The treatment was the conventional learning model as the control class and the crossword puzzle (inquiry) learning model as the experimental class. The research design is shown in the table below:

Table 1.
Research Design

Class	Pretest	Experiment	Posttest
Experiment	T _i	I	T ₂
Control	T _i	DT	T ₂

Description: T₁= pre-test

I = treatment by learning with the inquiry model in the experimental class

DT= treatment with direct teaching learning in the control class

T₂ = administration of post-test

The sample is the smallest part of the number and characteristics possessed by the population. Withdrawal of sample data aims to reduce the burden of researchers in studying the entire population in the study if the number is large enough. Besides that, sampling can also reduce the limitations of funds, energy and time during the research. Even though it only takes a small part of the population, the results or conclusions are general (total) for the entire population so that the sampling is done representatively. Sample takes excellent class in SMP Negeri 1 Parepare because students are considered to have high average ability and equal thinking. To obtain data regarding their thinking skills, this research adopts the indicator from the previous study (Khasanah & Ayu, 2018). Some indicators are 1) formulating the problems, 2) disclosing the fact, 3) selecting the arguments, 4) detecting the bias, and 5) making a decision. The percentage of achievement on the critical thinking skills is measured using the comparison between the number of samples achieving the critical thinking and total sample then multiplied with 100 percent. The interval score is excellent between 86-100, good between 76-85, sufficient between 60-75, low between 55-59, and less than 54 meaning very low.

The sampling technique used in this study after conducting a survey, the researchers used a purposive sampling technique. The purposive sampling technique was chosen with several considerations or certain criteria. The total population used in the study were all students of class VII totaling 291 people. The sample in question is class VII.1 as the experimental class and VII.2 as the control class because the number of students in each class is the same. Complete data can be seen in the following table:

Table 2.
Number of Samples of Class VII Students

No	Group	Class	Total		Total
			L	P	
1	Control	VII.1	14	18	32
2	Experiment	VII.2	14	18	32
		Total	24	36	64

RESULTS AND DISCUSSION

The mean values of pre-test and post-test in the 2 classes are between 64.66-85.19 and 64.51-93.28. The results of the pre-test in the class with the inquiry learning model using crossword puzzle showed an average score below the KKM (minimum completeness criteria) that had been determined in social studies subjects, which was 80. However, the average post-test results with the inquiry model using crossword puzzle showed an increase in on the KKM value.

Although the results of the pre-test in the class using the inquiry learning model using crossword puzzle are below the KKM, this does not affect the research output because the post-test serves to overcome differences in critical thinking abilities and meaningful learning before treatment. This research basically wants to see changes in students' understanding by paying attention to the value of D.

Table 3 also shows the D value of each class. The mean value and standard deviation of D of each class show the magnitude of the change before and after treatment.

Table 3.
Pre-test and Posttest Description

No	Class	Test	Mean	Standard Deviation
1	Control	<i>Pre-Test</i>	64,66	11,552
		<i>Posttest</i>	85,19	8,209
	D	20,53	3,343	
2	Experiment	<i>Pre-Test</i>	64,51	11,401
		<i>Posttest</i>	93,28	5,293
	D	28,77	6,108	

Testing Data Analysis Requirements (Normality Test and Homogeneity Test)

a. Normality Test

Before performing the parametric analysis technique for testing research hypotheses, all data got from the pre-test and post-test scores of class VII.2 as the control class, as well as the pre-test and post-test of class VII.1 as the experimental class were tested using data normality. The normality test used in this study is the Kolmogorov-Smirnov and Shapiro-Wilk test with SPSS software version 25 analysis. The selection of the two normality tests is based on the consideration that the Kolmogorov-Sminov test and the Shapiro-Wilk test are very popular in testing the normality of the data, to test the hypothesis in lower:

H_0 = Data is normally distributed

H_1 = Data is not normally distributed

Based on the results of SPSS 25 in the control class and experimental class in table 3., it shows a sig. > 0.05 value in both the Kolmogorov-Smirnov test and the Shapiro-Wilk test. This indicates that the formulation of the initial hypothesis (H_0) is accepted so that (H_1) is rejected. Or in other words, the data in this study meet the assumptions of normal distribution so that it can continue data analysis to the next stage. This means that the control class and the experimental class have a composition of students with abilities that tend to be the same in one class.

b. Homogeneity test

The next assumption test requirement is homogeneity. This test aims to test whether the variance of the dependent variable is the same in the group. If this assumption is fulfilled, then the data in this study can be analyzed using parametric statistics. The results of the homogeneity test of the pre-test and post-test of the two groups of research samples can be seen in table 4.

Tabel 4.
Calculation Results of Pre-Test and Post-Test Homogeneity Tests for Control Class and Experiment Class

Data	<i>Pre-test</i>		<i>Post-test</i>	
	Control Class	Experiment Class	Control Class	Experiment Class
Sample (N)	32	32	32	32
Varians	133,459	129,984	67,383	28,015
Sig	0,576		0,07	
$\alpha = 0,05$	>0.05		$.>0.05$	
Result	Homogent		Homogent	

Table 4 shows that the control and experimental classes have homogeneous data both at the pre-test and post-test, because both meet the criteria, namely sig value > 0.05 , so the initial hypothesis is accepted. Or the data of this study meets the assumption of homogeneity.

Test of Homogeneity of Variance Post Test Experiment Posttestand Control Posttest

		Levene			
		Statistic	df1	df2	Sig.
Learning	Based on Mean	7.645	1	62	.007
Outcomes	Based on Median	6.660	1	62	.012
	Based on Median and with adjusted df	6.660	1	51.001	.013
	Based on trimmed mean	7.461	1	62	.008

Test of Homogeneity of Variance Experiment Pretestand Control Pretest

		Levene			
		Statistic	df1	df2	Sig.
Learning	Based on Mean	.316	1	62	.576
Outcomes	Based on Median	.165	1	62	.686
	Based on Median and with adjusted df	.165	1	61.737	.686
	Based on trimmed mean	.369	1	62	.546

Class VII Social Science Subject Online Learning

Implementing online education demands the readiness of teachers and students to be technology literate because classrooms are turned into virtual spaces with the help of the internet and various educational platforms that can support learning activities (Khusniyah & Hakim, 2019). Education services in the academic field before the pandemic period only used information technology as limited as administrative services, but during the pandemic, schools were required to use

information technology optimally by combining the abilities and knowledge of teachers to prepare strategies, methods, and learning media that use the internet and various educational platforms as a unit in a virtual space in learning. This shows that the smoothness of online learning is supported by the ability of teachers to adapt to ongoing changes. Salsabila et al. (2020) suggests that the use of multimedia technology can change the way knowledge is delivered in the classroom.

The condition of online learning, which is a new thing for teachers and students, of course, has several obstacles, but with the ease of accessing information and independent learning, it affects increasing the ability to find solutions to problems. As a result, teachers can be more innovative in providing learning media and impact the ability of students to always have new experiences in operating educational platforms. Innovative teachers can integrate various educational platforms so that the subject delivered can be widely accessed by students even though they are sometimes constrained by the network. Distance learning requires the use of appropriate virtual learning because it is believed to provide convenience and meaningful learning experiences, can communicate directly (synchronous and asynchronous) so that the material is easy to understand (Lestari & Selvi, 2020).

SMP Negeri 1 Parepare conducts distance learning activities during the covid-19 period as online learning. The same is true for social studies subjects in grades VII.1 and VII.2, using google meet and whatsapp group media. Interaction through Google Meet is carried out at the beginning of learning by the teacher to control students and explain the outline of the subject in a particular discussion. The learning was continued by using the whatsapp group media and closed by giving an evaluation through the google form.

Implementation of learning during the research using google meet, with an inquiry model which in the core activity is carried out by playing a learning video about Social Interaction material (<https://youtube/Fn7zw3d2lr0>) and closed by giving an evaluation using the crossword puzzle (crossword puzzle) application (<http://www.liveworksheets.com/ml2617931vj>). Using learning videos and crossword puzzle applications should provide an experience as meaningful learning, which will improve students' critical thinking skills about social interaction material.

The Relationship Between Increasing Critical Thinking and Meaningful Learning by Using a Crossword Puzzle (Inquiry Model)

The ability to analyze a problem by considering cause and effect in finding a solution can be categorized as part of critical thinking skills. Critical thinking involves inductive skills such as recognizing relationships, analyzing problems, determining causal relationships, making conclusions and calculating data relevance. The skills of deductive thinking involve the ability to solve problems spatially, logically and be able to distinguish between facts and opinions. Besides that, other critical thinking skills are the ability to detect bias, carry out evaluations, compare and contrast. The critical thinking roadmap must be carried out starting

from the stage of forming understanding, then proceeding with the formation of opinions and arriving at the stage of decision and drawing conclusions (Wati et al., 2018). Critical thinking skills will create meaningful learning that provides long-term experience, can link between several materials that is relevant and makes it easier to recall past subject. Daugherty (2017) suggests that meaningful learning emphasizes an inquiry-discovery approach by allowing students to take responsibility for fulfilling their learning goals.

To support the quantitative data that has been got through the post-test results, this study uses a questionnaire as several questions related to critical thinking and meaningful learning in order to determine the students' responses to the use of the inquiry model with crossword puzzles as a tool.

Some answers from respondents to related questions include:

1. Do you think online learning to use crossword puzzles is fun and interesting? What is the reason?

Answers from several respondents:

Andi Pangerang	<i>Yes, very interesting, because we can find out anything through online learning to use the crossword clue</i>
Athaya Maheswari	<i>Interesting and fun because it can train focus</i>
Rathifa Khairunnisa	<i>Yes, because it makes learning more fun and exciting</i>
Alfina Damayanti	<i>Pleasant. The reason is that crossword puzzle can make learning easier to arrange letter by letter.</i>

2. How did you experience/feel the improvement in learning after using crossword puzzle?

Andi Pangerang	<i>I can understand about the material</i>
Muhammad Dzaki	<i>Improve my quick thinking ability</i>
Rathifa Khairunnisa	<i>My knowledge increases and makes it easier for me to understand the material</i>
Alfina Damayanti	<i>Increase learning motivation to learn new things</i>

3. Did you experience an increase in critical thinking by using Crossword Puzzle?

Nurfadilah H	<i>Yes, crossword puzzle lessons are new. I've never learned in this way, so when I do it I have to think more critically.</i>
Nabilah Syafika	<i>Yes, because critical thinking is fun</i>
Alfina Damayanti	<i>Yes. Will improve memory</i>

4. How did you feel/experience meaningful learning experiences after using crossword puzzle?

Patrick P pasapan	<i>I find it easier to understand lessons using crosswords</i>
Athaya Maheswari	<i>Very meaningful because it trains understanding</i>
Alfina Damayanti	<i>Practice accuracy and curiosity to find the right answer until all the columns are filled correctly.</i>

Hypothesis testing

After testing the analysis requirements (normality test and homogeneity test), it is known that the two classes are normally distributed and homogeneous, because they both meet these requirements, so the hypothesis testing in this study uses the t-test. The t-test was conducted to determine the differences in students' critical thinking skills in the control class and the experimental class.

The t-test used in this study is the independent sample t-test. The independent sample t-test in this study aims to see the average difference between two unpaired samples after being given treatment in the post-test control class (conventional) and experimental class (crossword puzzle). Although the independent sample t test should see the difference in the mean in the post-test, the researcher also presents the results of the independent sample t test on the pre-test in the control and experimental classes. This was done to determine the difference in the results of the independent sample-t test on the post-test and pre-test in answering the research problem formulation. The results of the t-test on the pre-test and post-test in both classes (VII.1 and VII.2) can be seen in table 5 as follows.

Tabel 5.
The results of the t-test pre-test and post-test control class and experimental class

Data	Pre-test Kelas kontrol	Kelas eksperimen	Post-test Kelas kontrol	Kelas eksperimen
Sample (N)	32	32	32	32
sig. 2-tailed	0,172		0,00	
$\alpha = 0,05$	>0.05		<0.05	
t hitung	1,383		4,688	
t table	1,999		1,999	
Result	There is no significant difference		There is a significant difference	

In table 5, the independent sample test hypothesis test in the pre-test and post-test in the control and experimental class in this study uses a two-party test or a two-way test. Based on the results of SPSS version 25 statistical processing in the pre-test in the control class and experimental class, the output that states sig. 2-tailed > 0.05 . T table is got at a significance level of 5% or a 95% confidence level df (freedom) or with db = $(N1+N2-2)$ and a significance level of = 0.05. From the t table, the figure = 1.999. The t-count value in the pre-test of the control class and the experimental class was 1.383. It can be concluded that there is no significant difference in the t test in the control class pre-test, this is evidenced by the sig value. 2-tailed $0.172 > 0.05$ and the t_{count} value is $1.383 \leq t_{table}$ 1.999, so accept H_0 . In the pre-test control class and experimental class, there is no increase in critical thinking and meaningful learning on social interaction material. This is also supported by descriptive data, as the mean value of the pre-test in the control and experimental classes is the same.

Group Statistics

Descriptive data pre test control class and experimental class

	Kelas	N	Mean	Std. Deviation	Std. Error
					Mean
Learning Outcomes	Pretest of Experiment Class	32	68.63	11.401	2.015
	Pretest of Control Class	32	64.66	11.552	2.042

Independent Samples Test pre-test of control and pre-test of experiment

		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	
							ce	ce	Lower	Upper
Learning Outcomes	Equal variance assumed	.316	.576	1.383	62	.172	3.969	2.869	-1.767	9.704
	Equal variance not assumed			1.383	61.989	.172	3.969	2.869	-1.767	9.704

In the post-test in the control class and the experimental class, the sig value was got. 2-tailed < 0.05 and t arithmetic t table, so it meets the requirements to reject H_0 . Because t arithmetic lies in the rejection area of H_0 , so there is a difference in the average increase in critical thinking and meaningful learning to use the crossword puzzle application as an evaluation tool for students after receiving treatment (treatment) in the experimental class compared to the control class significantly. This is evidenced by the acquisition of a t-test value using SPSS.25 statistics showing a sig.2-tailed value of $0.00 < 0.05$ and a t_{count} of $4.688 > t_{table}$ 1.999 (t-count is greater than t-table). Besides that, it is also supported by descriptive data from the post-test results in the form of differences in the mean value in the control class 85.19 and the experimental class 93.28. The results of the independent t test in the post-test control class and experimental class are presented:

Descriptive statistical results of control post test and experimental post test
Group Statistics

	Kelas	N	Mean	Std. Deviation	Std. Error Mean
Learning Outcomes	Posttest of Eksperiment Class (Crossword Puzzle)	32	93.28	5.293	.936
	Posttest of Control Class (Conventional)	32	85.19	8.209	1.451

The results of the independent sample t-test control post-test and experimental post-test

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
Learning Outcomes	Equal variances assumed	7.645	.007	4.688	62	.000	8.094	1.727	4.642	11.545
	Equal variances not assumed			4.688	52.978	.000	8.094	1.727	4.631	11.557

Getting these data results, the authors can conclude that there is an increase in Critical Thinking and Meaningful Learning Skills through the Crossword Model (Inquiry) in Online Learning During the Covid-19 Pandemic Period for Class VII Students at SMP Negeri 1 Parepare. Related to the prior studies, the result aligns with them (Mshayisa, 2020; Orawiwatnakul, 2013; Zamani et al., 2021). Critical thinking and improved knowledge can be created in the tool of learning for student.

CONCLUSION

The research objective is to determine the difference between the application of critical thinking and meaningful learning in online learning at SMPN 1 Parepare using crossword puzzle. The results of the study from the application of the inquiry model (crossword puzzle) in the experimental class got the difference after the post test. It increases in critical thinking skills and meaningful learning both quantitatively and qualitatively. Quantitatively, the increase was shown from the difference in the results got in the pre-test and post-test of the experimental class and the control class through a different test (independent sample t test). In the

pretest, the results of the t test got the value of sig. 2-tailed $0.172 > 0.05$ and the t_{count} value is $1.383 \leq t_{\text{table}} 1.999$. This shows that there is no significant difference between the control class and the experimental class. In the posttest, the output results show a sig.2-tailed value of $0.00 < 0.05$ and $t_{\text{count}} 4.688 > t_{\text{table}} 1.999$. Getting these results explains that there are significant differences in the experimental class and control class after giving treatment using the inquiry model (crossword puzzle).

This increase was also strengthened by the acquisition of descriptive data, the mean value in the pretest was 68.63, an increase in the posttest with a mean value of 93.28. This illustrates that the average value of 32 students in the experimental class has increased by 93.28% comprising 93.75% of respondents in the very good category and 6.25% in the good category.

Qualitatively got positive responses given by students in the experimental class through the provision of open questionnaires. Various variations of answers from students who show changes in thinking (critical thinking) and meaningful learning in online learning after using the inquiry model (crossword puzzle). It can be concluded that in the experimental class, quantitatively and qualitatively, it has met the requirements for the KKM score (80) for class VII, in social interaction subjects for social interaction.

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