

The Effects of Integrative Model Assisted by Google Classroom on Students' Critical Thinking Skills

Diayu Putri Permatasari¹, Nurul Umamah^{2*}, Sumardi³

Department of History Education, Faculty of Teacher Training and Education, University of Jember, Indonesia

Jl. Kalimantan 37, Jember 68121

*nurul70@unej.ac.id ORCID ID 0000-0002-3589-5014

Abstract: *Critical thinking skills are urgent to be optimize in digital era. However, previous research shows the low critical thinking skills of students. Based on theory, the integrative models can improve students' critical thinking skills. Previous research shows that the integrative model facilitates students to be active, critical thinking, problem solving and increase their understanding. The purpose of this research was to examine the effect of applying an integrative model assisted by google classroom on students' critical thinking skills in history subjects. The research was a quasi-experimental with a pretest-posttest model, non-equivalent control-group design with 66 students as a sample. Data collection used multiple choice test and performance. Data analysis used the ANACOVA test and the LSD (Least Significant Different) test with a significance level of 5% or 0.05. The results of the ANACOVA test for the performance of the two classes showed a sig. $0.000 < 0.05$ and sig. $0.002 < 0.05$. The result of LSD test on the performance of the control class shows the sig. $0.002 < 0.05$ with a mean difference of -8.697. While the results of the LSD test data pretest and posttest control class showed a sig. $0.000 < 0.05$ with a mean difference of -8.303. While the pretest and posttest of the experimental class showed sig. $0.000 < 0.05$ with a mean difference of -12.303. So it can be concluded that there is a significant influence of the critical thinking skills of students who are taught with the integrative model assisted by google classroom compared to students who are taught by the discovery model assisted by google classroom.*

Keyword: Integrative Model, Critical Thinking Skills, Google Classroom

1. INTRODUCTION

Developments and advances in information and communication technology have an impact on all aspects of life, including education [5]. Education is expected to equip students with 4Cs, i.e. communication, collaboration, critical thinking, and creativity [25]. Critical thinking skills is one of the skills that must be possessed to encounter challenges in the 21st century's life. Students analyze ideas specifically, can distinguish, select, identify, assess, and develop to be more perfect [34]. Therefore, critical thinking becomes an important component in the world of work and education.

Critical thinking skills urgent grown in students according to the needs of the curriculum. The Merdeka Curriculum explains the objectives of learning history, such as: developing diachronic, synchronic, causal, imaginative, creative, critical thinking skills, reflective, contextual, and multiperspective thinking skills [21]. Critical thinking skills in learning history is needed to produce interpretations, analyses, evaluations and conclusions using evidence, concepts, methodologies and contextual considerations [14]. This ability evaluates evidence and expands thinking based on facts [28]. Students analyze, interpret, take positive values in an event and apply it [11,26]. If students have high historical thinking skills and critical thinking skills, they will be aware and ready for the academic and social challenges that await them in the coming years.

In fact, previous research still shows low critical thinking skills students in history subjects. Research by Permana, Umamah & Suranto (2014) shows that many students are still unable to think critically [26]. Research by Dwijayanti, Umamah & Na'im (2015) shows students tend to be passive and their critical thinking skills tend to be lacking [11]. Herlinatus's research (2021) shows 50.1% and include criteria that are not good. These data show that student's critical thinking skills who are still low, which is a problem to be solved in learning history.

Based on theory, some learning models can improve critical thinking skills. One of the relevant models is the integrative model. Previous research shows that the integrative model facilitates students to be active, think critically, solve problems and increase their understanding so that they can develop their cognitive domains. The advantage of the integrative model is that it supports students to develop independent learning abilities by using various thinking skills, and simultaneously trains critical thinking skills [22]. The integrative model shapes students' understanding and development critical thinking skills [9,12] by combining facts, concepts, generalizations, and their relationships for problem solving and critical thinking skills [30]. The results of Wulandari's research (2019) state that the integrative model can increase critical thinking skills and historical learning outcomes [35]. Other research also states that the integrative model improves critical thinking skills students [29]. The integrative model has a positive effect on learning

[27]. Brown & Charlier's research states that an integrative learning model that is integrated with technology is in the form of e-learning recommended because it can improve learning outcomes [6].

Instructional is directed at digital learning by adopting certain technologies [32]. The use of technology in education can facilitates technological learning for teacher and students [17]. Education strives for an active, innovative learning environment with the integration of technology [31]. Such education trains students' potential to be developed, so that it can be needed in the future. Several studies were conducted to investigate the effect of using technology as an innovative learning medium. One of relevant learning media is google classroom. Google classroom is platform web-based that allows students and teacher to carry out collaborative learning [1]. Bayarmaa & Lee's research (2018) states utilization google classroom in learning can develop the knowledge and quality of student performance, because it trains their critical thinking [4,2,24] which is very suitable for use in learning history [15]. Based on the theoretical studies and previous research above, research will be carried out with the aim of examining the effect of integrative learning models assisted by google classroom to students' critical thinking skills in history subjects.

2. RESEARCH METHODS

The research was a quasi-experimental with a pretest-posttest, non-equivalent control-group design [15]. The research population was all students of class XI IPS SMA Negeri Ambulu academic year 2022/2023 consists of 4 classes. Each class consisted of 33 student. The determination of the sample was based on the homogeneity test and the average value of the last daily test of each class XI IPS. Homogeneity test results can be seen in Table 1 below.

Table 1: Homogeneity Test Results

Data	<i>Levene Statistic</i>	df1	df2	Sig.
History's Daily Test Result	.400	3	128	.753

Source: Primary data processed

Table 1 shows the results of the homogeneity test with sig. 0.753 ($0.753 > 0.05$) which means the result is significant. This shows that the whole class (XI IPS 1-XI IPS 4) has a homogeneous variant and is suitable for use as a research object. The research sample used was 66 students of class XI IPS 1 as the experimental class and XI IPS 3 as the control class. Data collection used tests and performance. Experimental class and control class work on pretest (multiple choice 30 questions) and performance questions (paper) to know prior knowledge student's critical thinking skills. Then both classes are taught with different learning models. The experimental class is taught with an integrative learning model assisted by google classroom. Meanwhile the control class is taught with the discovery model assisted by google classroom. After the treatment, continued giving posttest (multiple choice 30 questions) and performance questions (paper) to determine the effect before and after treatment of critical thinking skills learners. Critical thinking skills students are measured through tests of multiple choice questions that refer to indicators critical thinking skills Facione (2010) includes: 1) Interpretation; 2) Analysis; 3) Evaluation; 4) Inference; 5) Explanation; and 6) Self Regulation [12]. The research instrument was then tested for the validity and credibility of the instrument first. Because not all indicators critical thinking skills Facione's property can be measured using a multiple choice test, so it is necessary to have a performance instrument to complement this research instrument. Data analysis used the ANACOVA test and the LSD (Least Significant Different) test with the help of software SPSS 25 for windows.

3. RESULTS AND DISCUSSION

3.1 Results

Before testing the hypothesis, a pre-requisite test is carried out which includes: the normality test, homogeneity test, regression homogeneity test and linearity test. Then, next step is to conduct a Hypothesis Test using the ANACOVA Test and the LSD Test. The criteria for decision making on the results of this study is to use a significance level of 5% or 0.05. If sig. value $> 0,05$ then H_0 is accepted and H_a rejected. If sig. value $\leq 0,05$ then H_0 is rejected and H_a accepted.

1. Pre-Requisite Test

A. Normality Test

The data to be analyzed are in the form of performance results and control class tests with model discovery learning and experimental class with integrative model. Normality test using Kolmogorov-Smirnov formula assisted by SPPS for windows version 25. The normality test results can be seen in Table 2 and Table 3 below.

Table 2: Normality Test Results (Performance)

Data	Sample	<i>Kolmogorov-Smirnov</i>		
		Statistic	N	Sig.
Pre-test	Control	0,132	33	0,154
	Experiment	0,115	33	0,200
Post-test	Control	0,108	33	0,200
	Experiment	0,106	33	0,200

Source: Primary data processed

Table 3: The Normality Test Results (Test)

Data	Sample	<i>Kolmogorov-Smirnov</i>		
		Statistic	N	Sig.
Pre-test	Control	0,138	33	0,110
	Experiment	0,139	33	0,103
Post-test	Control	0,121	33	0,200
	Experiment	0,107	33	0,200

Source: Primary data processed

Table 2 shows the results of the pretest and posttest data normality test performance of control class were normally distributed with a sig. ($0.154 > 0.05$) and ($0.200 > 0.05$). Meanwhile the results of the pretest and posttest data normality test performance of the experimental class were normally distributed with a sig. ($0.200 > 0.05$) and ($0.200 > 0.05$). Table 3 shows the results of the data normality test for pretest and posttest control class normally distributed with sig. ($0.110 > 0.05$) and ($0.200 > 0.05$). Meanwhile the result of the pretest and posttest data normality test performance of the experimental class were normally distributed with a sig ($0.103 > 0.05$) and ($0.200 > 0.05$). So, it was concluded that performance data, pretest and posttest the control class and the experimental class as a whole have normal distribution.

A. Homogeneity Test Results

Homogeneity test using Levene Statistics formula assisted by the SPSS for windows version 25. Homogeneity test results for pretest can be seen in Table 4 and Table 5 below.

Table 4: Homogeneity Test Result (Performance)

Data	<i>Levene test Statistic</i>	df1	df2	Sig.
Pre-test	.294	1	64	.590

Source: Primary data processed

Tabel 5: The Homogeneity Test Result (Test)

Data	<i>Levene test Statistic</i>	df1	df2	Sig.
Pre-test	1.093	1	64	.300

Source: Primary data processed

The homogeneity test results in Table 4 and Table 5 show the pretest performance and test critical thinking skills the control class and the experimental class have a homogeneous variance, with sig. value ($0.590 > 0.05$) and ($0.300 > 0.05$).

B. Regression Homogeneity Test Result

The regression homogeneity test is an assumption test to find out whether there is a relationship between covariate and independent variable. The slope of the regression line is said to be homogeneous if the covariates and independent variables have a sig value. more than 0.05 (sig. > 0.05). Regression homogeneity test assisted by the SPSS for windows version 25. The results of the regression homogeneity test can be seen in Table 6 and Table 7 below.

Table 6: Regression Homogeneity Test Result (Performance)

Data	Type III Sum of Squares	Df	Mean Square	F	Sig.
Class * Pre-test	6.574	1	6.574	.482	.490

Source: Primary data processed

Table 7: Regression Homogeneity Test Result (Test)

Data	Type III Sum of Squares	Df	Mean Square	F	Sig.
Class * Pre-test	1.410	1	1.410	.081	.776

Source: Primary data processed

The results of the regression homogeneity test for the control class and the experimental class in Table 6 and Table 7 show the sig. 0.490 (0.490 > 0.05) and 0.776 (0.776 > 0.05), which means that both the homogeneity values of the performance regression and student tests are > 0.05. So, it was concluded that the assumption of homogeneity of the regression is fulfilled.

C. Linearity Test Result

Test linier between covariate and dependent variable is the last assumption before conducting the ANACOVA Test to find out whether there is a linear relationship between the covariates and the dependent variable assisted by SPSS for windows version 25.

Table 8: Linearity Test Results (Performance)

Data	Type III Sum of Squares	Df	Mean Square	F	Sig.
Pretest	77.369	1	77.369	5.523	.022

Source: Primary data processed

Table 9: Linearity Test Results (Test)

Data	Type III Sum of Squares	Df	Mean Square	F	Sig.
Pretest	104.778	1	104.778	6.045	.017

Source: Primary data processed

The results of the linearity test in Table 8 and 9 show the sig. value 0.022 (0.022 < 0.05) and sig. value 0.017 (0.017 < 0.05) it is concluded that the assumption of linearity is met. Based on this, it shows that there is a strong enough reason to include the pretest variable as a covariate.

2. Hypothesis Test

Hypothesis testing is needed to answer the research problem formulation. The performance data, pretest and posttest the control class and the experimental class will be tested hypotheses using the ANACOVA Test and the LSD Test assisted by SPSS for windows version 25. ANACOVA test aims to see if there is an influence critical thinking skills students who are taught with an integrative model assisted by google classroom in the experimental class and the discovery model assisted by google classroom in control class, with the pretest value as the covariate. The criteria for decision making on the ANACOVA test with the sig. value > 0.05, then H₀ accepted and H_a rejected. If the sig. value < 0.05, then H₀ rejected and H_a accepted.

Table 10: ANACOVA Test Results (Performance)

Tests of Between-Subjects Effects	
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Dependent Variable: Posttest					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	399.193 ^a	2	199.597	13.468	.000
Intercept	1988.143	1	1988.143	134.151	.000
Pretest	114.815	1	114.815	7.747	.007
Sample	207.463	1	207.463	13.999	.000
Error	933.670	63	14.820		
Total	455509.000	66			
Corrected Total	1332.864	65			
a. R Squared = .300 (Adjusted R Squared = .277)					

Source: Primary data processed

Table 10 shows the ANACOVA test performance of the experimental class and the control class has a very significant effect on the sig value. 0.000 ($0.000 < 0,05$), then H_0 rejected and H_a accepted. So, it was concluded that there is an influence critical thinking skills students who are taught with integrative models in experimental classes and discovery models in the control class, after covariate pretest controlled.

Table 11: ANACOVA Test Results (Test)

Tests of Between-Subjects Effects					
Dependent Variable: Posttest					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	360.481 ^a	2	180.240	10.552	.000
Intercept	2038.860	1	2038.860	119.360	.000
Pretest	108.344	1	108.344	6.343	.014
Sample	180.701	1	180.701	10.579	.002
Error	1076.141	63	17.082		
Total	456941.000	66			
Corrected Total	1436.621	65			
a. R Squared = .300 (Adjusted R Squared = .277)					

Source: Primary data processed

Table 11 shows the ANACOVA test critical thinking skills the experimental class and the control class had a significant effect on the sig. value 0.002 ($0.002 < 0,05$), then H_0 rejected and H_a accepted. So, it was concluded that there is an influence critical thinking skills students who are taught with integrative models in experimental classes and discovery models in the control class, after covariate pretest controlled. The next step is further testing using LSD (Least Significant Different) to find out which treatment has a significant effect when H_0 rejected. The results of the LSD Test can be seen in Table 12 and Table 13 below.

Table 12: LSD Test Result (Performance)

Multiple Comparisons						
LSD						
(I) Sample	Data	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Pretest Control	Posttest Control	-3.606*	1.150	0.002	-5.88	-1.33
	Pretest Experiment	-0.061	1.150	0.958	-2.34	2.22
	Posttest Experiment	-8.758*	1.150	0.000	-11.03	-6.48
Pretest Experiment	Pretest Control	0.061	1.150	0.958	-2.22	2.34
	Posttest Control	-3.545*	1.150	0.003	-5.82	-1.27
	Posttest Experiment	-8.697*	1.150	0.000	-10.97	-6.42
*. The mean difference is significant at the 0.05 level.						

Source: Primary data processed

The LSD test results for the pretest and posttest (performance) of the control class in Table 12 shows the sig. value $0.002 < 0.05$, means that there is influence, with mean difference of -3.606. Meanwhile pretest and posttest (performance) of the experimental class shows the sig. value $0.000 < 0.05$, means that there is influence, with mean difference of -8.697. So, it was concluded that the experimental class was taught using an integrative model had higher critical thinking skills than the control class which was taught using the discovery model.

Table 13: LSD Test Result (Test)

Multiple Comparisons						
LSD						
(I) Sample	Data	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Pretest Control	Posttest Control	-8.303*	1.441	0.000	-11.15	-5.45
	Pretest Experiment	-0.667	1.441	0.644	-3.52	2.18
	Posttest Experiment	-12.970*	1.441	0.000	-15.82	-10.12
Pretest Experiment	Pretest Control	0.667	1.441	0.644	-2.18	3.52
	Posttest Control	-7.636*	1.441	0.000	-10.49	-4.79
	Posttest Experiment	-12.303*	1.441	0.000	-15.15	-9.45
*. The mean difference is significant at the 0.05 level.						

Source: Primary data processed

The LSD test results for the pretest and posttest of the control class in Table 13 shows the sig. value $0.000 < 0.05$, means that there is influence, with mean difference of -8.303. Meanwhile pretest and posttest the experimental class shows the sig. value $0.000 < 0.05$, means that there is influence, with mean difference of -12.303. So, it was concluded that the experimental class was taught using an integrative model had higher critical thinking skills than the control class which was taught using the discovery model.

3.2 Discussion

This research examines whether there is an effect of applying the integrative model to critical thinking skills students in history lessons. The results of the ANACOVA test for the performance of the two classes showed a sig. value $0.000 < 0.05$ and sig. value $0.002 < 0.05$. This means that there is influence critical thinking skills students who are taught by integrative models and models discovery learning, after covariate controlled pretest. After carrying out the ANACOVA test, further tests were carried out using

LSD (Least Significant Different) to determine whether there is a mean difference or significance on two-class data. LSD test results pretest and posttest the performance of the control class shows the sig. value $0.002 < 0.05$ means that there is influence, with mean difference of -3.606. Meanwhile pretest and posttest the performance of the experimental class shows the sig. $0.000 < 0.05$ means that there is influence, with mean difference of -8.697. LSD test results pretest and posttest the control class shows the sig. value $0.000 < 0.05$ means that there is influence, with mean difference of -8.303. Than pretest and posttest the experimental class shows the sig. value $0.000 < 0.05$ means that there is influence, with mean difference of -12.303.

So, from these data it can be concluded that the experimental class taught using an integrative model has critical thinking skills higher than the control class which was taught using the model discovery learning. Based on average results pretest and posttest the performance of the control class in this study showed values of 72.06 and 79.84 (critical). Average results pretest and posttest the performance of the experimental class shows a value of 76.30 and 77.94 (critical). Then the average results pretest and posttest the control class showed values of 72.06 and 79.91 (critical). Average results pretest and posttest the experimental class showed a value of 74.03 (critical) and 85 (very critical). Based on these data, it is known that the average value of the experimental class has a higher value than the average value of the control class.

The integrative model is an innovative learning model. The stages of the integrative model include: (1) describing and searching for patterns of knowledge or content; (2) explain the similarities and differences; (3) hypothesize knowledge results for different conditions; and (4) generalization. The stages of the integrative model indirectly show the superiority of this learning model. The integrative model helps students develop an in-depth understanding of reasoning and thinking skills, including critical thinking skills. Several stages of the integrative model involve almost all indicators critical thinking skills, including: (1) interpretation; (2) analysis; (3) explanation; (4) evaluation; and (5) generalization. Therefore, the integrative model applied in learning is superior for improving critical thinking skills learners. The integrative model emphasizes students being actively involved in learning and answering questions by utilizing technology as a learning medium, one of which is using google classroom. Media utilization google classroom in learning using relevant integrative models for improvement critical thinking skills learners.

Previous research shows the application of integrative learning models can improve critical thinking skills students in history lessons. Wulandari's research (2020) states that an integrative model can improve critical thinking skills and historical learning outcomes [35]. Research by Suswati (2015) says there is a difference critical thinking skills students who are taught with an integrative model. Learners who are taught using integrative models have critical thinking skills higher that is equal to 0.20 than the class studied with the learning guided inquiry models [29]. Previous research conducted [27,8,6,23] states that integrative models support better academic learning. Research (Rachel, 1999; Carey, 2005) said the integrative model encourages students to make connections with the knowledge, skills and experiences of students and can improve the quality of learning [27,8].

The results of this study reinforce previous theoretical and research studies which state that an integrative model can improve critical thinking skills. The integrative model is an innovative learning model that emphasizes students being actively involved in learning and answering teacher questions by utilizing technology as a learning media. Innovative learning transforms interesting new information so that skilled in communicating, collaborating, problem solving, creative and critical thinking skills [33]. Research by Brown & Charlier (2012) states that an integrative learning model that is integrated with technology is in the form of e-learning recommended because it can improve learning [6] one of which is google classroom. Google classroom really helps learning and is very suitable for use in learning [20,10] especially in learning history [3,15] and developing critical thinking [24]. Thus, based on theoretical studies and previous research, it can be seen that the application of an assisted integrative model google classroom effect on critical thinking skills students in history subjects.

4. CONCLUSION

Based on the results of research on the influence of the google classroom-assisted integrative model on students' critical thinking skills on history subjects, it is known that there is a significant influence of student's critical thinking skills who are taught with integrative model with assisted by google classroom. The result of ANACOVA test show that there was a significant effect critical thinking skills students who are taught with an integrative model with sig. value 0.000 ($0.000 < 0.05$). Meanwhile, to find out which treatment had a significant effect, a further LSD test was carried out. LSD test results (performance) show mean difference control and experimental class -3.606 and -8.697. Than mean difference control and experimental class (test) -8.303 and -12.303. Based on value mean difference it is known that the experimental class was taught using an integrative model had higher critical thinking skills than the control class which was taught using the discovery model.

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