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The Implementation Of Self-Organized Learning Environment Model And Self-Directed Learning Model To Improve Students' Critical Thinking Skills: An Experimental Study

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Abstract: *This study aimed to investigate significant differences of student's Critical Thinking Skills who were taught using a Self Organized Learning Environments model and a self-directed learning model based on digital literacy in history subjects. This research was a quasi-experimental design with a sample of 62 senior high school students. Data collection used questionnaires and multiple choice tests. The data analysis technique was the t-test or independent sample T-test. The results of the t-test on the questionnaire shows the value of Sig. (2 tailed) 0.004 <0.05 smaller than the 5% significance level. Then, the t-test on the post-test shows a significance value (2-tailed) of 0.041 < 0.05 so that based on the t-test on the questionnaire and post-test, it shows a significant difference in the Critical Thinking Skills of students who were taught by using the Self Organized Learning Environments model and the self-directed learning model based on digital literacy. The average value difference between experimental class 1 and class 2 for the Critical Thinking Skills questionnaire shows a positive number of 4.194. Meanwhile, the average difference in the post-test values shows a positive number of 8.452. Based on these results, it can be concluded that the Critical Thinking Skills of students who were taught using the Self Organized Learning Environments model are better than students who were taught using the self-directed learning model based on digital literacy. The two models in this study are integrated with digital literacy, it is not examined how digital literacy affects CTS, so further research is needed.*

Keywords: Self Organized Learning Environments, Self Directed Learning Based on Digital Literacy, Critical Thinking Skills

1. INTRODUCTION

The learning model has always been an interesting discourse to study. The learning process urgency makes learning models must be always adaptive, innovative, and responsive to the new educational paradigm (Umamah et al., 2020). The learning model must be integrative, holistic, contextual, thematic, effective, collaborative, innovative, and student-centered (OECD, 2008: 4, Kalyani & Rajasekaran, 2018:23; Kemenristekdikti, 2018). When referring to the 21st century learning framework, the learning model is included in part of the curriculum and teaching that synergizes with standards and assessments, professional development, and a learning environment that will later produce outputs that support career and life skills, 4 C skills, and skill to utilize media, technology, and information. In this context, the relevant learning model to the 21st century learning framework is an innovative learning model. According to Anderson and Neri (2012) in Farah Naz and Hasan Sohaib Murad (2017:1), innovative learning involves virtual laboratories: learning activities based on real-life problems; learning environment with media in the form of audiovisual; as well as learning guidelines for educators and students (Umamah et al., 2020). All of this is combined with methodologies that promote the use of active teaching techniques that help learners develop their learners' learning abilities (Rufaidah et al., 2020). The innovative learning model is very important to be applied today because of the demands of an increasingly complex era and open competition.

Innovative skill needed and encouraged to be produced in 21st century learning is the Critical Thinking Skills, Communication Skills, Collaboration, and Creativity. Topskill 2025 according to UNICEF (2019) also mentions that there are three top skills that are urgently needed in the world of work and facing global competition in 2025, namely Critical Thinking Skills, Problem Solving, and Creativity. Critical Thinking Skills refers to students' skills in systematic thinking, effective reasoning, interpretation, evaluation of evidence, argumentation, and problem solving with in-depth assessment. Creativity is the ability to create new ideas or different ideas to produce innovative breakthroughs. Collaborative Skills are skills to work together effectively with various parties. Meanwhile, the Communication Skill is an oral, written, and nonverbal communication skill to express ideas effectively (Director General of Teachers and Education Personnel, 2018: 2-3; Shiresh, 2020: 1-14, Priyono & Sinurat, 2020: 84-85). These four skills are included in the realm of soft skills which are very useful for students to compete in the industrial revolution 5.0 era.

History as a subject that examines past events has challenges related to the aspect of time that separates the past events studied from present life (Moh. Ali, 1995:19). Historical studies require good Critical Thinking Skills in order to understand and interpret these past events. History cannot be separated from the process of critical thinking in

collecting historical sources that relevant to the events, being thorough in verifying the authenticity and validity of the sources obtained, interpreting and reconstructing them into an objective historical narrative. The Critical Thinking Skills in history learning cannot arise spontaneously but need to be trained and continuously developed (Ningsih et al., 2021; Dwijayanti et al., 2015). Therefore, the innovative learning model becomes an alternative in the process of honing the Critical Thinking Skills of students in the classroom (Mujianti et al., 2021; Fitrianingsih et al., 2015). So that later, the habit of critical thinking is carried over in a wider environment and can be applied to solve problems in the real world.

In fact, the problem of low Critical Thinking Skills is still a perennial issue that always exists in learning. Maghfiroh (2020:1-2) shows that 49.5% of students have very low critical thinking skill category, 29.9% of students belong to the low critical thinking skills category. The results of Rahmawati's research, (2020:2) based on the Critical Thinking Skills indicator from Ennis (1985) are (1) basic classification indicators show 39.21% of students with less critical (2) basic support indicators show 34.68% of students less critical education; (3) the indicator concludes that 36.56% of students are less critical; (4) the indicators provide further clarification by 30.93% of students are less critical; and (5) the indicators for managing strategies by 29.37% of students are less critical. The results of the research above indicate that the low level of Critical Thinking Skills is a problem to be solved in history learning. Based on BPS data, the internet use of high school students in 2020 increased by 91% and during the pandemic, students were estimated to have lost 0.33 year to study. A less optimal online learning during the pandemic has affected the quality of learning and the ability of students and also affected the Critical Thinking Skills due to the tsunami of information that is shallow and not necessarily valid.

There are many types of innovative models that can be applied to stimulate students' critical thinking skills. These are a Self Organized Learning Environments model and a Self Directed Learning model based on digital literacy. The Self Organized Learning Environments model allows students to manage themselves in groups and learn to use digital tools. The Self Organized Learning Environments model offers autonomy for students to learn and find learning resources using technology or smart devices they have with a stimulus in the form of an exploratory "Big Question" (Mitra, et.al. 2010:3; Ministry of Education and Culture, 2020 :64). Meanwhile, self-directed learning based on digital literacy is a learning model that gives students the opportunity to take the initiative, with or without the help of others in diagnosing their learning needs, identifying learning objectives, identifying learning resource materials, and evaluating learning outcomes that are integrated with digital literacy (Knowles, 2003). 1975:18-19; Towle & Cottrell 2017:35). The Self Organized Learning Environments and Self Directed Learning models based on digital literacy have the same focus on improving Critical Thinking Skills in the process of identifying information contextually, strategic insights in learning, and presenting unique learning experiences (Moyer, 2018:1; Song & Hill, 2007). This study will look at the difference between the application of the Self Organized Learning Environments model and the Self Directed Learning model based on digital literature on the Critical Thinking Skills of students in history subject.

2. RESEARCH METHOD

This research is a quasi-experimental design, using 3 variables, namely the X1 variable (Self Organized Learning Environments Model), X2 (Digital Literacy-based Self Directed Learning Model) and Y (Critical Thinking Skill) variable. The research population was all students of class XI IPA and IPS at SMAN 2 Tanggul academic year 2022/2023. The research samples were two class groups, namely the experimental class 1 and the experimental class 2. The determination of the sample was based on the homogeneity test and the average value of the last daily test of each class. After the entire population is declared homogeneous, two class groups will be selected with an average daily test value that is close to the same. The two selected class groups are class XI IPS 2 and class XI IPS 3. The two classes will be treated with the Self Organized Learning Environments learning model (class XI IPS 2) and the self-directed learning model based on digital literature (class XI IPS 3) to find out significant difference between the two models.

The research instrument used a questionnaire and a test in the form of 30 multiple choice questions in the C4 domain (analysis). The questions were developed according to the HOTS question guide and Facione's Critical Thinking Skills indicator (2015). Before the research instrument is given to students, a trial is first conducted to measure the level of validity and reliability. After the questionnaire, pre-test, and post-test are declared valid and reliable, then the instrument is suitable to be used as a data collection tool. Furthermore, the experimental class 1 will be treated in the form of a Self Organized Learning Environments model and the experimental class 2 will be treated with a self-directed learning model based on digital literature. The two classes that have been treated are given a post-test to see the significant difference between the two models. The hypothesis test in this study is a t-test (Independent Sample T-Test) assisted by SPSS for Windows version 23 with analysis prerequisite tests in the form of normality test and homogeneity test.

3. RESULTS OF RESEARCH

3.1 Instrument Trial Results

A. Validity Test

This study used a self-developed questionnaire instrument referring to the indicators put forward by experts as well as previous research with several changes. Likewise with the self-developed test instrument consisting of questions for pre-test and post-test questions. The pre-test and post-test questions are made differently with the same cognitive level, namely C4 (Analysis). Thus, the questionnaire and test

instruments need to be tested for validity to ensure the credibility in measuring the Y variable under study, namely Critical Thinking Skills. Invalid test instruments will be discarded or unused. The validity test is calculated by using the product moment correlation formula with rough numbers with the help of SPPS version 23 for windows with the following decision-making criteria.

The criteria for decision making on the content validity test of the instrument are as follows.

a. $\alpha = 0, 05$ (significance level 5 %)
b. If r_{count} is greater than r_{table} ($r_{count} > r_{table}$) then the item is considered valid. On the other hand, If r_{count} is smaller than r_{table} ($r_{count} < r_{table}$) then the item is considered invalid
c. If the significance value is less than < 0.05, the item is considered valid. Meanwhile, if the significance value is more than > 0.05 then the item is considered invalid.

The results of questionnaire validity shows that all item's values have a r_{count} greater than r_{table}value. In addition, the significance value of all items is smaller than < 0.05. Based on the two decision-making criteria, it can be concluded that all items of the questionnaire instrument were declared valid and feasible to be used as data collection tools. Furthermore, the results of the validity test for the pre-test and post-test are presented in the table below.

The pre-test and post-test validity are measured from two types of multiple choices questions are arranged differently but they are at the same cognitive level, namely C4 (analysis) totaling 30 items. The results of the validity test on all pre-test and post-test items shows that the r_{count} value was greater than the r_{table} value ($r_{count} > r_{table}$). In addition, the overall significance level of the items is less than 5% (< 0.05). If referring to the decision-making criteria in the item validity test, it can be concluded that all of the pre-test and post-test items are declared valid and suitable for use in research. r_{table} ($r_{count} > r_{table}$). In addition, the overall significance level of the items is less than 5% (< 0.05). If referring to the decision-making criteria in the item validity test, it can be concluded that all of the pre-test and post-test items are declared valid and suitable for use in research.

B. Reliability Test

The reliability test to measure the questionnaire instrument, pre-test and post-test in this study used Cronbha's Alpha calculation assisted by SPPS Windows version 23 with the reliability coefficient category to measure the degree of instrument accuracy referring to the opinion of Guilford (1956:145) as follows.

a. 0.80 < r 11≤ 1.00 very highly reliable
b. 0.60 < r 11≤ 0.80 high reliable
c. 0.40 < r 11≤ 0.60 reliable
d. 0.20 < r 11≤ 0.40 less reliable
e. -1.00 < r 11≤ 0.20 not reliable

The presentation of the data on the results of the reliability test on the questionnaire, pre-test, and post-test instruments is presented in the table below.

Table 1: The results of the research instrument reliability test

Research Variable	N	Cronbach's Alpha Coefficient	Notes
Critical Thinking Skills (questionnaire)	31	0,844	Very Highly Reliable
Critical Thinking Skills (pre-test)	31	0,917	Very Highly Reliable
Critical Thinking Skills (post-test)	31	0,915	Very Highly Reliable

(Source: Primary data processed)

Based on the data in table 1, the reliability test result for the Critical Thinking Skills questionnaire instrument has 0.844 in the category of 0.80 < 0.844 1.00 (very highly reliable). The multiple-choice instrument for the Critical Thinking Skills pre-test has a value of 0.917 in the category 0.80 < 0.917 1.00 (very highly reliable). Meanwhile, the multiple-choice instrument for the Critical Thinking Skills post-test has a value of 0.915 in the category 0.80 < 0.915 1.00 (very highly reliable). Based on this information, it can be concluded that the three instruments in the form of a questionnaire, pre-test, and post-test were declared reliable and had good consistency to be used in this study.

3.2 Analysis Prerequisite Test

The analysis prerequisite test was carried out before testing the hypothesis. The researcher used t-test analysis to see the difference between the treatments of the two models (independent sample T-test), so the normality test and homogeneity test had to be done first.

A. Normality test

Normality test is a requirement in testing parametric data hypotheses (Creswell, 2012). The normality test was measured on the results of the pre-test and post-test of the two samples, namely XI IPS 2 as the experimental class 1 which was treated with the Self Organized Learning Environments model and XI IPS 3 as the experimental class 2 which was treated with the Self Directed Learning model based on Digital literature. Normality test used the Kolmogorov-Smirnov formula assisted by SPPS for Windows version 23 with the following decision-making criteria.

a. The data is declared to be normally distributed (H_0 accepted) If Sig. value is greater than (> 0,05)
b. The data is declared to be not normally distributed (H_a accepted) If Sig. value is smaller than (< 0,05)

The results of the normality test of the questionnaire, pre-test, and post-test data for class XI IPS 2 and Class XI IPS 3 are presented in the table below.

Table 2: Normality test results

Sample	Data	N	Sig.	Notes
Eksperimen 1	Questionnaire before treatment	31	0,200*	Normal distribution

Sample	Data	N	Sig.	Notes
	Questionnaire after treatment	31	0,120*	Normal distribution
	Pre-test value	31	0,200*	Normal distribution
	Post-test value	31	0,200*	Normal distribution
Eksperimen 2	Questionnaire before treatment	31	0,141*	Normal distribution
	Questionnaire after treatment	31	0,200*	Normal distribution
	Pre-test value	31	0,200*	Normal distribution
	Post-test value	31	0,71*	Normal distribution

(Source: Primary data processed)

Table 2 shows the results of the overall normality test of the data, both questionnaire, pre-test, and post-test for the experimental class 1 and experimental class 2. The overall data above shows a number greater than 0.05 so that H_0 is accepted and H_a rejected so that the questionnaire, pre-test, and post-test in experimental class 1 and experimental class 2 were declared normally distributed.

B. Homogeneity Test

Homogeneity test was measured by the test of homogeneity of variance by referring to the Levene statistical test assisted by the SPPS for Windows version 23 program. The decision making criteria was based on a significance level of 5% with the following hypothesis.

a. If Sig value > 0,05 then H_0 is accepted and H_a rejected so that the sample variance is declared homogeneous
b. If Sig value ≤ 0,05 then H_0 is rejected and H_a accepted so that the sample variance is declared non-homogeneous

The results of the homogeneity test of the questionnaire for the experimental classes 1 and 2 are stated in the table below.

Table 3: Homogeneity test results for experimental class 1 and 2

Data	Levene test Statistic	Df2	Sig.	Notes
Questionnaire before treatment	1,249	60	0,268	Homogeneous
Questionnaire after treatment	0,625	60	0,432	Homogeneous
Pre-test value	0,342	60	0,561	Homogeneous
Post-test value	0,820	60	0,369	Homogeneous

(Source: Primary data processed)

The data presented in table 3 above shows that the homogeneity test of the Levene test statistic for the questionnaire value before treatment in experimental class 1 and 2 is 1.249 with a Sig value. 0.268 which is greater than > 0.05. Likewise, the value of the questionnaire after treatment in experimental class 1 and 2 is 0.625 with a Sig value. 0.432 which is greater than (>) 0.05. Thus, it can be concluded that H_0 is accepted and the two questionnaire values both before and after treatment in experimental classes 1 and 2 are declared homogeneous.

The pre-test and post-test values are declared homogeneous because they had a Levene test statistic value of 0.342 with Sig. 0.561 and 0.820 with Sig. 0.369. Both values of Sig. pre-test and post-test are greater than > 0.05 so H_0 is accepted and it can be concluded that the pre-test and post-test scores for the two samples are also declared homogeneous.

C. Hypothesis Testing

This study will test the hypothesis using the mean difference test or t-test (independent sample t-test) assisted by SPPS for Windows version 23. Before interpreting the results of the t-test, it is necessary to pay attention to the variance of the variables. The variance can be seen in the t-test output of Levene's Test for Equality of Variance column which shows its homogeneity. Variable data measured by questionnaires and tests are declared homogeneous if they have a Sig value is smaller than $p < 0.05$ and declared inhomogeneous if the Sig value is greater than $p > 0.05$. If the data is declared homogeneous or has the same variance, then the coefficient-t value is seen in the column-t row equal variances assumed. On the other hand, if the data is declared to be inhomogeneous or has different variances, then the coefficient-t value is read in column t row equal variances not assumed.

The decision-making criteria in testing the hypothesis of this study are as follows.

a. The mean difference between the two samples is expressed in the Mean Difference column
b. Criteria for decision making with t_{count} and t_{table} :
    1) If t_{count} value is positive and greater than > t_{table} value, then the two samples are declared to have significant differences and vice versa.
    2) If t_{count} value is negative and smaller than < t_{table} value, then the two samples are declared to have significant differences and vice versa.
c. The decision making criteria with the value of Sig. (2-tailed)
    1) If Sig. value (2-tailed) is smaller than (<) 0,05, then H0 is rejected and Ha is accepted
    2) If Sig. value (2-tailed) is greater than (>) 0,05, then H_0 is accepted and H_a is rejected

Critical Thinking Skills of students are measured through questionnaires and tests. Questionnaire and test value data before treatment will be used to determine the initial differences in Critical Thinking Skills of the two samples before being treated with the Self Organized Learning Environments model and the Self Directed Learning model

based on digital literacy. The results of the t-test on the questionnaire and the Critical Thinking Skills test for experimental class 1 and experimental class 2 are listed in the table.

Table 4: The t-test result of questionnaire and pre-test

Research Variable	Data Collection Technique	Class	N	Mean	Mean Difference
Critical Thinking Skills	Questionnaire	Experiment 1	31	67,13	4,548
		Experiment 2	31	62,58	
	Pre-test	Experiment 1	31	55,55	4,806
		Experiment 2	31	50,74	

(Source: Primary data processed)

The average value of the questionnaire in the experimental class 1 is 67.13 and the average value of the questionnaire in the experimental class 2 is 62.58 with the difference between the two samples (Mean difference) of 4.548. Next is the pre-test value in the experimental class 1 which is 55.55 while the pre-test value in the experimental class 2 is 50.74 with the difference between the two samples (Mean difference) of 4.806. This shows that before being treated according to their respective models, the average value of the questionnaire and pre-test in the experimental class 1 is better than the average value of the questionnaire and pre-test in the experimental class 2. The hypothesis testing in this study is as follows: There is a significant level of Critical Thinking Skills between students who are taught using the Self Organized Learning Environments (SOLE) model and self-directed learning model based on digital literature.

a. H0: There is no significant difference in the level of Critical Thinking Skills between students who are taught using the Self Organized Learning Environments (SOLE) model and students who are taught using the self-directed learning model based on digital literature.
b. Ha: There is a significant difference in the level of Critical Thinking Skills between students who are taught using the Self Organized Learning Environments (SOLE) model and students who are taught using the self-directed learning model based on digital literature.

The following are the results of the t-test on the questionnaire and post-test to measure the Critical Thinking Skills of students after treatment in experimental class 1 and experimental class 2.

Table 5: The t-test results of questionnaire and post-test

Data	Variant	F	Sig.	T	DF	Sig. (2-tailed)
Questionnaire	Equal variances assumed	,625	,432	3,015	60	0,004
	Equal variances not assumed			3,015	58,770	0,004
Post-test	Equal variances assumed	,820	,369	2,085	60	,041
	Equal variances not assumed			2,085	58,454	,041

(Source: Primary data processed)

According to the previous explanation, the determination of whether the t-value test is seen in the Equal variances assumed or Equal variances not assumed column is based on the homogeneity test contained in the Significance column (Sig.). The F value in the questionnaire is at 0.625 with Sig. of 0.432 is greater than (>) 0.05 so that H0 is accepted and the questionnaire data in the experimental class 1 and experimental class 2 are declared homogeneous. If it is so, then the value of t can be read in the Equal variances assumed line.

The value of the questionnaire t-test after treatment on the Equal variances assumed line. The first decision-making criteria is based on the t_{table} value and the t_{count} value. Based on the t_{table} data with Df 60 at a significance level of 5%, the figure is 2,0003. While the value of t_{count} is positive at 3.015. The t_{count} is 3,015 which is greater than > 2,0003. The second decision-making criteria is based on the value of Sig. (2 tailed) that is 0.004 < 0.05 smaller than the 5% significance level so that H0 is rejected and Ha is accepted.

Next, the interpretation of the results of the t-test on the post-test. The F value in the post-test is 0.820, the significance level is 0.369 > 0.05 so that H0 is accepted and the post-test data in the experimental class 1 and experimental class 2 are declared homogeneous. Next, the t-test value will be seen in the Equal variances assumed line. The post-test t-test interpretation refers to the t-table and t_{count} as well as the significance value (2-tailed). The t_{table} value with Df 60 at a significance level of 5% or 0.05 is 2,0003 while the t_{count} value is positive at 2,085. The t_{count} value > t_{table} (2,085 > 2,0003). The significance value (2-tailed) is 0.041 < 0.05 so that based on the two decision-making criteria, H0 is rejected, and Ha is accepted. Based on the results of the t-test questionnaire and post-test, it can be concluded that there is a significant difference in the level of Critical Thinking Skills between students who are taught using the Self Organized Learning Environments (SOLE) model and the self-directed learning model based on digital literature.

The magnitude of the average difference between the questionnaire values and the Post-test Critical Thinking Skills of students who were taught using the Self Organized Learning Environments (SOLE) model and students who were taught using the self-directed learning model based on digital literature is presented in the following table.

Table 6: The t-test result of questionnaire and post-test

Research Variable	Data Collection Technique	Class	N	Mean	Mean Difference
Critical Thinking Skills	Questionnaire	Experiment 1	31	73,61	4,194
		Experiment 2	31	69,42	
	Post-test	Experiment 1	31	78,03	8,452
		Experiment 2	31	69,58	

(Source: Primary data processed)

The average value of the questionnaire in the experimental class 1 is 73.61 and the average value of the questionnaire in the experimental class 2 is 69.42 with a mean difference showing a positive number of 4.194. It means that the value of the Critical Thinking Skills questionnaire for experimental class 1 students is better than experimental class 2. In addition, the average post-test value in experimental class 1 is 78.03 and the post-test average value in experimental class 2 is 69.58 with the mean difference shows a positive number of 8.452. This shows that the Critical Thinking Skills post-test value of the experimental class 1 student is better than the experimental class 2. Based on the average value difference of questionnaire and Post-test, it can be concluded that the Critical Thinking Skills of students taught by the Self Organized Learning Environments (SOLE) model are better from students taught using a self-directed learning model based on digital literature.

4. DISCUSSION

The study looked at the difference in the average value of the questionnaire items before and after the treatment of each model. The difference in the average value of the highest questionnaire items in the experimental class 1 taught using the Self Organized Learning Environments model is as follows: (1) questionnaire item number 1 is 0.39 (interpretation); (2) questionnaire item number 5 is 0.61 (analysis); (3) questionnaire item number 11 is 0.35 (inference); (4) questionnaire item number 15 is 0.61 (explanation); (5) questionnaire item number 17 is 0.39 (evaluation); and (6) and the questionnaire item number 20 is 0.81 (self regulation). Meanwhile, the difference in the average value of the highest questionnaire items in the experimental class 2 which is taught using the self-directed learning model based on digital literature is as follows: (1) questionnaire item number 4 is 0.48 (interpretation); (2) questionnaire item number 6 is 0.52 (analysis); (3) questionnaire item number 12 is 0.68 (inference); (4) questionnaire item number 13 is 0.52 (explanation); (5) questionnaire item number 19 is 0.13 (evaluation); (6) Questionnaire item number 20 is 0.81 (self regulation). When compared between the difference in the highest average value of each indicator in the two experimental classes, it is known that the experimental class 1 is better at analysis, explanation, and evaluation indicators. Meanwhile, the experimental class 2 is better on the indicators of interpretation and inference. Meanwhile, for the self-regulation indicator, the two classes have the same average difference of 0.81. A more concise explanation can be seen in the appendix.

Furthermore, the indicators of Critical Thinking Skills that stand out in each model based on test values, can be seen that the difference in the highest average score in the experimental class 1 is as follows: (1) item number 25 (interpretation indicator) is 0.74; (2) item number 20 (analysis indicator) is 0.71; (3) item number 9 (inference indicator) is 0.42; (4) item number 24 (explanatory indicator) is 0.71. While the difference in the highest average value in the experimental class 2 is as follows: (1) item number 4 (interpretation indicator) is 0.71; (2) item number 20 (analysis indicator) is 0.58; (3) item number 9 (inference indicator) is 0.48; (4) item number 24 (explanatory indicator) is 0.55. When compared to the difference in the highest average scores of Pre-test and Post-test for each indicator in the two experimental classes, it is known that the experimental class 1 is better at the indicators of interpretation, analysis, and explanation. While the experimental class 2 is better at inference indicators. Evaluation indicators and self-regulation are not measured on the test instrument because they are less relevant to be applied to the type of multiple choices questions.

The syntax and characteristics of the model put forward by the experts implicitly suggest that the Self Organized Learning Environments model involves almost all indicators of Critical Thinking Skills including interpretation, analysis, inference, explanation, and evaluation which is reflected in the second syntax, namely investigating and the third syntax, namely reviewing (Mitra, 2010:3; Moy-Low, 2016:4; Ministry of Education and Culture, 2020:64). Critical Thinking Skills indicators that stand out are not explicitly explained because all indicators have the same position and are expected to appear in learning activities. Meanwhile, the self-directed learning model based on digital literature also reflects the indicators of Critical Thinking Skills in its syntax and characteristics. However, what characterizes or stands out is the evaluation stage, which involves a strong evaluation and self-regulation process (Rufaidah, 2021). This happens because the self-directed learning model based on digital literature, besides being relevant for improving Critical Thinking Skills, also has a focus on increasing the independence of students.

Empirical facts based on research results confirm that based on the comparison of the average difference in the questionnaire value of the experimental class 1 taught by the Self Organized Learning Environments model, it stands out in the indicators of analysis, explanation, evaluation, and self regulation. Meanwhile, the experimental class 2, which was taught using the self-directed learning model based on digital literature, stands out for the indicators of interpretation, inference and self-regulation. Then, based on the comparison of the average difference in multiple-choice test values in the experimental class 1 taught with the Self Organized Learning Environments model, it stands out in the indicators of interpretation, analysis, and explanation. Meanwhile, the

experimental class 2, which was taught using a self-directed learning model based on digital literacy, stands out for inference indicators.

5. CONCLUSIONS

Based on the results of research regarding the differences in the Self Organized Learning Environments model and the Self Directed Learning model based on digital literature toward the Critical Thinking Skills of students in history subjects, it can be concluded that there are significant differences in the level of Critical Thinking Skills of students who are taught with Self Organized Learning Environments model and the Self-Directed Learning based on digital literature. The results of the t-test (Independent sample T-test) in the questionnaire shows a positive mean difference of 4.194. Meanwhile, the mean difference in the Post-test values shows a positive number of 8.452. Based on the mean difference, it can be concluded that the Critical Thinking Skills of students in the experimental class 1 who were taught by the Self Organized Learning Environments model are better than the Critical Thinking Skills of experimental class 2 students who are taught using a self-directed learning model based on digital literature. The two models in this study are integrated with digital literacy, it is not examined how digital literacy affects CTS, so further research is needed.

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