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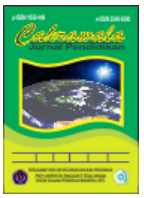

The Role of Think Talk Write Learning Model Assisted by Wordwall Media on Students' Critical Thinking Skills

[1] R. Nenden Lu'lu Patimah ✉, [2] Ati Sadiah, [3]Sri Hardianti Sartika,

[1,2,3] Universitas Siliwangi, Indonesia

Email: 192165113@student.unsil.ac.id

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Abstract

Critical thinking is a crucial ability for students to develop in the twenty-first century education. Unfortunately, in fact, common students' critical thinking abilities are still relatively poor. Many studies offered learning model and media in overcoming students' critical thinking. However, this study used the Think Talk Write (TTW) learning model assisted by Wordwall media as an X variable. This study aims to overcome the low level of critical thinking skills among students in the class 11th Social Science at SMAN 10 Tasikmalaya, specifically in Economics. The research design is quasi-experimental with a non-equivalent control group. The T-test analysis findings show the following: (1) There is an improvement in critical thinking abilities in the experimental group, with a sig value (2-tailed) of 0.000 0.05. (2) There is also an improvement in critical thinking skills in the control group, with a sig value (2-tailed) of 0.000 0.05. (3) With a sig value (2-tailed) of 0,199 > 0,05, there is no difference in critical thinking skills improvement between the experimental and control groups. As a result, it can be stated that employing the Think Talk Write (TTW) model assisted by Wordwall media has a considerable influence on strengthening students' critical thinking abilities.

***Keywords**: Think Talk Write (TTW), Wordwall, Critical Thinking*

Peran Model Pembelajaran Think Talk Write Berbantuan Media Wordwall Terhadap Keterampilan Berpikir Kritis Siswa

Abstrak

Berpikir kritis adalah kemampuan penting bagi siswa untuk berkembang dalam pendidikan abad kedua puluh satu. Sayangnya, kemampuan berpikir kritis siswa pada umumnya masih tergolong buruk. Banyak penelitian yang menawarkan model dan media pembelajaran dalam mengatasi berpikir kritis siswa. Namun penelitian ini menggunakan model pembelajaran Think Talk Write (TTW) berbantuan media Wordwall sebagai variabel X. Penelitian ini bertujuan untuk mengatasi rendahnya kemampuan berpikir kritis pada siswa kelas XI IPS SMAN 10 Tasikmalaya, khususnya pada mata pelajaran Ekonomi. Desain penelitian ini adalah kuasi eksperimen dengan kelompok kontrol non-ekuivalen. Hasil analisis uji-t menunjukkan sebagai berikut: (1) Terdapat peningkatan kemampuan berpikir kritis pada kelompok eksperimen, dengan nilai sig (2-tailed) sebesar 0,000-0,05. (2) Terdapat pula peningkatan kemampuan berpikir kritis pada kelompok kontrol, dengan nilai sig (2-tailed) sebesar 0,000 0,05. (3) Dengan nilai sig (2-tailed) sebesar 0,199 > 0,05, tidak terdapat perbedaan peningkatan keterampilan berpikir kritis antara kelompok eksperimen dan kontrol. Dengan demikian dapat dikatakan bahwa penerapan model Think Talk Write (TTW) berbantuan media Wordwall memberikan pengaruh yang cukup besar terhadap penguatan kemampuan berpikir kritis siswa.

Kata Kunci: Think Talk Write (TTW), Wordwall, Berpikir Kritis

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INTRODUCTION

The rapid development of technology poses increasingly severe challenges in global competition. To address these challenges, every country in the world must improve its resources, especially human ones. Dimyati (2015) and (Mardhiyah et al., 2021) assert that one of the supporting factors for a country's success lies in improving its human resources. One strategy governments can pursue is to improve the education sector, considering the role of education in shaping the nation's future generation. The government continually innovates in establishing educational ideas to adapt to changing times as part of its endeavors.

Education in the twenty-first century has embraced a curriculum that prioritizes student involvement, moving the focus from traditionally teacher-centered to student-centered learning approaches. According to Dewi (2019), one of the requirements for building a 21st-century school curriculum is to transform the learning method from teacher-centered to student-centered. The 4Cs (communication, collaboration, critical thinking, and creativity) are four crucial abilities for students to develop in the twenty-first century. Critical thinking is one of the most important abilities for students to master among these four (Tumanggor, 2021). Critical thinking skills hold great value as they significantly benefit students' future. Mastering critical thinking skills will prepare students to adapt to life and face various personal and social issues (Ririn et al., 2021). Critical thinking skills are precious for students in learning as they enable them to think rationally and selectively in receiving relevant information amidst the abundance of information around them and analyze and solve problems (Demiral, 2018).

However, empirically, there is a mismatch between the field reality and the ideal plans formulated by the government. This finding is based on interviews conducted with a teacher at SMAN 10 Tasikmalaya and the results of preliminary research data. The study results show that students' critical thinking abilities are still relatively poor. Through in-depth analysis, several factors can be identified as triggers for this phenomenon. These factors include the tendency of monotonous teaching models, insufficient availability of adequate learning media, and a lack of teaching readiness among educators.

Table 1. The Average Value of Critical Thinking Skills of Class XI IPS Students for the 2022/2023 Academic Year

No.	Indicator	Percentage of Number of Students Able to Answer Questions.	Value	Criteria
1	Elementary Clarification	77%	30,55	Low
2	The Basis for the Decision	94%	75	Good
3	Inference	27%	16,66	Very Low
4	Advances Clarification	38%	20,83	Low
5	Strategy and Tactics	66%	37,55	Low
	Average		**36,11**	**Low**

Source: Data Processed 2023

In overcoming these issues, a method based on the Constructivism theory proposed by Lev Vygotsky is needed. This method seeks to develop a learning paradigm that emphasizes students' active participation in learning, improving their critical thinking abilities (Himmi & Husna, 2018). The Think, Talk, Write (TTW) learning model may be used, which incorporates Wordwall media to integrate technology into the learning process. The TTW learning model is a method that begins with thinking, then moves on to talking or discussing, and finally to writing

(Juniasih et al., 2013; Wahyuni & Jazwinarti, 2019). Using this learning model will make students accustomed to critical thinking as all the syntaxes involved contain components that can sharpen critical thinking skills, namely thinking, talking, and writing. Wordwall media, conversely, is a digital learning medium in the form of a website that may be used for pre, main, or post-activities. According to Putri (2020), Wordwall is a media asset for learning because it can be used in all syntaxes, both at the beginning, core, and closing, packaged in an attractive and easy-to-create manner by teachers, even by beginners, as there are many templates and creative examples that can be used as references.

In light of the current problems, the researcher has shown an interest in testing the Think Talk Write (TTW) model assisted by Wordwall media to develop student's critical thinking abilities and achieve considerable progress. The following is a formulation of the research issue that will be investigated in this study: First, is there a difference in students' critical thinking skills in economics learning using Think Talk Write (TTW) model assisted by Wordwall media in the experimental class before and after the treatment? Second, is there a difference in students' critical thinking skills in economics learning using the direct learning model in the control class before and after the treatment? Third, is there a difference in improving students' critical thinking skills in economics learning between the experimental class Think Talk Write (TTW) model assisted by Wordwall media and the control class using the direct learning model after the treatment? As a result, the purpose of this research is to improve students' levels of critical thinking, particularly in the subject of economics, while they are studying social science in the eleventh grade at SMAN 10 Tasikmalaya.

METHODS

A Quasi-Experimental Design with a Non-Equivalent Control Group was utilized in the research. This approach is an advancement on the traditional true-experimental design, in which the control group does not function as a control for all of the extraneous factors that have the potential to affect the research. (Sugiyono, 2018).

Treatment group	O1	X	O2
Control group	O3	-	O4

Figure 1. Research Design

The population sample used in this study is all 11th-grade social science classes at SMAN 10 Tasikmalaya. Purposive sampling resulted in Class 11th Social Science 3 as the experimental group implementing the Think Talk Write (TTW) model assisted by Wordwall media and Class 11th Social Science 5 as the control group using a direct instructional approach.

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Table 2. Students' Population of Class 11th Social Science at SMAN 10 Tasikmalaya Academic Year 2022/2023

No	Class	Number of Students	Average Value
1	11th Social Science 1	33	56,81
2	11th Social Science 2	35	64,64
3	11th Social Science 3	31	46,04
4	11th Social Science 4	36	61,94
5	11th Social Science 5	36	48,19
6	11th Social Science 6	21	63,92

Source: Economics Teacher at SMAN 10 Tasikmalaya

A test technique was utilized during data collection for this particular research endeavor. The test used is description questions regarding international trade material, which will be given to students during the pre-test and the post-test. The purpose of this test is to measure the achievement of students' critical thinking skills in international trade material before and after treatment so that differences and improvements will be seen. After the data has been acquired, it will be processed with the assistance of the IBM SPSS statistical software version 25.

RESULTS AND DISCUSSION

Research Finding

This study examines the influence of the Think Talk Write (TTW) model assisted by Wordwall media on students' critical thinking abilities. The study sample is divided into two groups: Class 11th Social Science 3 as the experimental group, which used the TTW Learning Model with Wordwall Media support, and Class 11th Social Science 5 as the control group, which used a direct teaching method. Each class had 28 students, for a total sample size of 56 in this research. The study was conducted at SMAN 10 Tasikmalaya from May 15th to May 23rd, 2023. The field implementation period lasted two weeks and included teaching international trade materials.

An instrument test was performed before the study to assess the validity and reliability of the instruments utilized. The purpose of this instrumented test was to determine the validity and reliability of the instruments, as well as to compute their difficulty level and item discrimination. The instrument exam was performed one week before the study on 12th-grade students who had undergone international trade lessons. This instrument exam had a total of 12 items. The instrument exam, however, was administered online using Google Forms since the 12th-grade students were not present at the time. The findings of the instrument testing revealed that nine items were valid and three were invalid.

Following the successful completion of the instrument test, the study delivered a pre-test to the students in both the experimental and control classrooms to evaluate their initial aptitude in critical thinking. Two treatments or instructional sessions were done, followed by a post-test to assess the improvement and differences in students' critical thinking abilities before and after the treatments. The data processing findings acquired from the students' pre-test and post-test replies are shown below. Following the successful completion of the instrument test, the study delivered a pre-test to the students in both the experimental and control classrooms to evaluate their initial aptitude in critical thinking. Two treatments or instructional sessions were done, followed by a post-test to assess the improvement and differences in students' critical thinking

abilities before and after the treatments. The data processing findings acquired from the students' pre-test and post-test replies are shown below:

Table 3. Descriptive Analysis

	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Experiment	0,00	65,75	20,6714	18,54960
Post-Test Experiment	0,00	90,25	47,8393	23,99182
Pre-Test Control	0,00	48,75	20,5625	14,02455
Post-Test Control	7,50	92,50	56,6339	26,56704

Source: Data Processed 2023

According to the data shown in Table 3, a total of 28 different students were involved in the research project. These pupils were randomly assigned to two groups: the experimental or the control group. The individuals in the experimental group had pre-test scores ranging from 0 to 65.75, with a mean of 20.6714 and a standard deviation of 18.54960. In addition, the post-test results on the experimental group indicate that the lowest possible score was zero, the highest possible score was ninety-two points, the mean score was 47.8393, and the standard deviation was 23.99182 points. According to these findings, the experimental group's performance during the post-test was much better than during the initial pre-test.

Those assigned to the control group had pre-test scores ranging from 0 to 48.75, with a mean of 20.5625 and a standard deviation of 14.02455. The control group's post-test findings indicated that their lowest score was 7.50, their highest score was 92.50, their mean score was 56.6339, and their standard deviation was 26.56704. In addition, the group's mean score was 56.6339, and their standard deviation was 26.56704. The pre-test and post-test results reveal that the control group, just like the experimental group, has shown significant improvement throughout the study. As can be seen from the n-gain numbers that have been supplied below, the progress that has been exhibited in the control group is far more significant than the progress that has been discovered in the experimental group:

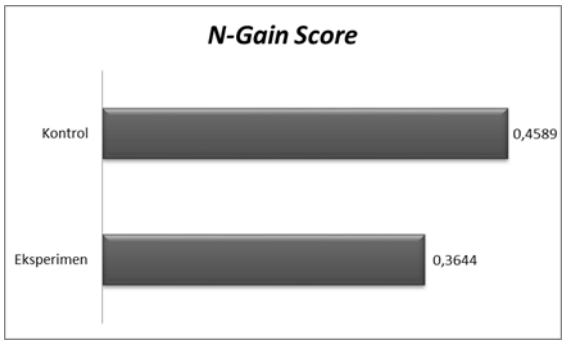

Figure 2. Average N-Gain Score

The data analysis was conducted using IBM SPSS version 25 software to obtain answers to the research questions. The testing procedure included numerous precondition tests, the outcomes of which are as follows:

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Table 4. Normality Test Results

Class		Kolmogorov-Smirnov[a]		
		Statistic	df	Sig.
Critical Thinking Skills	Pre-Test Experiment (TTW)	0,157	28	0,074
	Post-Test Experiment (TTW)	0,157	28	0,077
	Pre-Test Control (PBL)	0,083	28	0,200*
	Post-Test Control (PBL)	0,132	28	0,200*

Source: Data Processed 2023

The obtained significance value (sig) for the pre-test data of the experimental group is shown to be 0.074 in Table 4. Since this result is greater than the significance threshold of 0.05, it may be deduced that the pre-test data collected from the experimental group follows a normal distribution. The significant value (sig) of 0.077 for the post-test data of the experimental group is more than the significance threshold of 0.05, suggesting that the post-test data of the experimental group is equally regularly distributed. In addition, the significance value (sig) for the control group for the pre-test and post-test data is 0.200. Similarly, the significance threshold 0.05 is surpassed by the sig value of 0.200, suggesting that both data sets may be considered normal with standard deviations of 26.56704. In the same way as the experimental group, the control group demonstrates considerable growth between the pre-test and the post-test. As can be seen in the n-gain numbers below, the improvement that occurred in the control group had a more significant impact than the one that occurred in the experimental group.

Table 5. Homogeneity Test Results

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Critical Thinking Skills	Based on Mean	0,321	1	54	0,574
	Based on Median	0,326	1	54	0,570
	Based on the Median and with adjusted df	0,326	1	53,819	0,570
	Based on trimmed mean	0,308	1	54	0,581

Source: Data Processed 2023

A significant value (sig) of 0.574 was obtained from the post-test data gathered from the experimental and control groups, as shown by the findings presented in Table 5. In addition, the score of 0.574 was higher than the 0.05 significance threshold that was stated. As a result, it is possible to conclude that the post-test results from both populations are homogeneous.

The results of the preceding two precondition tests also show that the observed data has a homogeneous distribution. As a consequence of this, the Paired Sample T-Test is the one that is used in order to respond to research question 1 and research question 2, while the Independent Sample T-Test is the one that is utilized in order to respond to research question 3. The analysis produced the following results:

Table 6. Experiment Class Paired Sample T-Test Results

Paired Sample T-Test					
Test Type	N	Mean	T	Df	Sig. (2-tailed)
Pre-Test	28	20,6714	-9,540	27	0,000
Post-Test	28	47,8393			

Source: Data Processed 2023

Table 6 shows that the scores on the pre-test significantly improved from 20.6714 to 47.8393 in the post-test administered in Class 11th Social Science 3 as a result of implementing the Think Talk Write (TTW) teaching model with the help of Wordwall media. This rise suggests that using the TTW model with Wordwall assistance positively influences students' critical thinking abilities in the experimental class. Specifically, this class was subjected to an experiment. The p-value that was determined shows a significant difference of 0.000 between the two groups, which is lower than the significance threshold of 0.05. This data suggests a substantial change in students' critical thinking abilities before and after implementation. Thus, these test results effectively address the first research question.

Table 7. Control Class Paired Sample T-Test Results

Paired Sample T-Test					
Test Type	N	Mean	T	Df	Sig. (2-tailed)
Pre-Test	28	20,5625	-7,502	27	0,000
Post-Test	28	56,6339			

Source: Data Processed 2023

Table 7 illustrates an increase in the pre-test scores from the beginning value of 20.5625 to the final value of 56.6339 on the post-test administered in the control class, Social Science 5, in class 11th. Because of this rise, it is clear that using the direct teaching approach significantly improves the level of critical thinking abilities possessed by students in the control class. The p-value that was calculated demonstrates a significant result (2-tailed) of 0.000, which is lower than the threshold value of 0.05. This finding is further confirmed by the p-value, which was calculated. Therefore, it is possible to conclude that there is a substantial difference in the level of critical thinking abilities possessed by students in the control class both before and after implementing the direct instructional approach in economics education. Hence, these test results effectively address the second research question.

Table 8. Independent Sample T-Test Results

Independent Sample T-Test				
Test Type	N	Mean	T	Sig. (2-tailed)
Pre-Test	28	47,8393	-1.300	0,199
Post-Test	28	56,6339		

Source: Data Processed 2023

0.199 is the significance value for the independent samples t-test shown in the table. This value is more than the 0.05 threshold for statistical significance. It is possible to conclude, based on the findings presented here, that there is not a significant difference in the improvement of

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students' critical thinking skills between the experimental class, which used the Think Talk Write instructional model with Wordwall media after the intervention, and the control class, which used the direct instructional model in economics education. This outcome is the conclusion that can be drawn from the findings presented here. As a result, this test result adequately addresses the third research question.

Discussion

Level of Critical Thinking Skills of Experimental Class Students Using the Think Talk Write (TTW) Learning Model Assisted by Wordwall Media

The research results make it clear that there is a significant disparity between the critical thinking skills of students in the experimental class and those of students in the control class. This difference can be observed by improving students' scores after the intervention. The sample used in the experimental class was Class 11th Social Science 3, chosen for its suitability as the research subject. During the initial observation phase, it was apparent that the student's test scores in this class were the lowest among their peers, and this was also confirmed through the pre-research, indicating very low levels of critical thinking skills. The pre-test results indicated an average score of 20.6714, which, according to the criteria for critical thinking abilities, places the individual in the group of having poor critical thinking skills.

In the real world, the Think Talk Write (TTW) learning paradigm was implemented twice in international commerce classes with the support of Wordwall media. These lessons were descriptive, challenging, and relevant to students' lives. The implementation began with Wordwall games at the start of each session to stimulate students' knowledge of the previous lesson. This finding aligns with Tambunan's (2023) study, which explains that apperception plays a significant role in learning as it strengthens students' understanding, increases curiosity, and motivates their learning.

Next, the core activities involved engagingly presenting visuals related to the lesson through Wordwall media. Afterward, students independently learned about the material and the problems in their Student Worksheets. They then gathered in groups to discuss the solutions to the given problems. Following the discussion, each student was required to present their opinion in front of the class while others listened attentively. A group quiz using the available gameshow template on Wordwall was conducted as a surprise at the end of the discussion. Students were assigned to write a report after the session that included the topics covered during the day.

The same activities were carried out during the second session with exciting results. Students were more active and engaged more intensively in the learning process. This activity could be attributed to the student's familiarity with the previously applied learning model. They were accustomed to the steps that needed to be taken and were able to optimize the use of Wordwall media effectively. Their engagement in each step of the learning activities reflected the students' heightened active involvement in the learning process. In general, the experience of employing the Think Talk Write (TTW) learning model supplemented by Wordwall media during the second session revealed an improvement in student participation in the learning process. Students became more active, involved more intensively, and could utilize the media effectively. This learning model brought significant benefits in enhancing the quality of international trade education and developing students' problem-solving, discussion, and presentation skills.

After completing the intervention throughout two separate sessions, the students were given a post-test after the research project to evaluate how well their critical thinking abilities had improved. In the experimental group, students received an average score of 47.8393 on the post-test. This data indicates an improvement from the initial measurement, which only reached a score of 20.6714, with an N-Gain value of 0.36, classified as moderate. This improvement can be associated with the students adapting to the implemented learning model, influencing the final scores. Even if the change may not be regarded as large, it nevertheless displays an appropriate improvement, which indicates that using the Think Talk Write (TTW) learning approach supplemented by Wordwall media might strengthen students' capabilities in critical thinking.

The findings of this research provide evidence confirming the constructivism theory by Le Vygotsky, which states that "student engagement significantly influences learning outcomes". In this particular setting, using the TTW model with the support of Wordwall media is helpful in actively involving students in the learning process and boosting the student's ability to think critically. However, the implementation of this model still faces several challenges. One of them is the issue of internet connectivity, which often poses a barrier when using Wordwall. Additionally, in self-learning situations focusing on the "think" syntax, students often experience confusion as they are not accustomed to learning independently without direct explanations from the teacher.

In light of what has been said above, it is clear that the Think-Talk-Write (TTW) learning paradigm, supported by Wordwall media, substantially impacts students' analytical capabilities. This outcome is consistent with findings from prior studies. According to Putri et al. (2023), the TTW mode significantly impacts critical thinking skills, as evidenced by a calculated t-value of 2.33 which surpasses the critical t-value of 1.67. Similarly, Roisah et al. (2023) inquiry revealed that utilizing the Think Talk Write approach could lead to a two-tailed significance level of 0.000 ← 0.05. The investigation carried out by Anggreini (2017) also indicated that using the Think Talk Write approach might result in a 63.2 percentage point increase in the critical thinking abilities of pupils. In addition, findings from research conducted by Prawiyata (2019) showed that including visual media in the Think Talk Write model had a beneficial impact on the student's capacity for critical thinking. Through the Two Way Aniva approach, Saragih (2022) discovered that the TTW model led to better critical thinking abilities in participants.

Level of Critical Thinking Skills of Control Class Students Using Direct Learning Models

The outcomes of the research project conducted in the control group of the Social Science 5 class that was taken in the 11th grade revealed a statistically significant difference between the average scores on the pre-test and the scores on the post-test. In the pre-test, the results showed a score of 20.5625, but in the post-test, the score was 56.6339. These findings suggest that implementing the direct instruction pedagogical style in the classroom has a beneficial effect on the growth of students' capacities for critical thinking.

These phenomena are affected by several different circumstances. The first problem is that the student fundamentally misunderstands the topics covered in the questions. Furthermore, kids are not used to being asked questions that demand them to think on a more complicated level than they are used. In the context of education, the researcher decided to implement the

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Problem-Based Learning (PBL) model directly, despite the control class not getting the same treatment as the experimental class. This model was selected because it was considered comparable to the model used in the experimental class and enabled students in both classrooms to develop their capacity for critical thinking. The pupils were not too astonished and could adjust successfully since several previous professors employed this instructional technique. The students lead in this instructional paradigm, with the instructor as a guide and facilitator. The learning process began with the instructor assisting the students in analyzing the issue at hand, after which they were given direct assistance in finding potential solutions. Each group was forced to present the findings of their discussion after each session in front of the whole class to gather comments from the members of the other groups. This procedure was carried out once again at the second meeting. However, this time an additional level of difficulty was applied to the questions presented to the students in the hopes that they would progressively improve their capacity for critical thinking.

Following the outcomes of the learning process described above, the subsequent step was to carry out a post-test to evaluate the degree to which the learner had improved compared to the findings of the earlier pre-test. The findings of the post-test indicated that the average score was 56.6339. This number's jump from 20 to 56 shows a significant improvement. Therefore, it is possible to conclude that the development of student's critical thinking abilities was impacted by the use of the direct instruction teaching approach in the class that served as the control. This improvement was also seen when random quizzes were administered in the classroom when the students showed high interest in responding to the questions. This conclusion suggests that the students' knowledge was significantly affected by the learning process that they participated in. Despite this, there are still issues with how this instructional approach is being implemented.

There is evidence supporting the positive impact of the direct instruction teaching model on improving students' critical thinking skills, despite the research findings showing that some students did not actively contribute to group discussions despite receiving guidance from the teacher. Studies that were done in the past, such as the two that were carried out by Abrami et al. (2015) and Zahra et al. (2023), which analyzed several studies on the effectiveness of the direct instruction teaching model, have shown that there is a connection between the direct instruction teaching model and the improvement of students' critical thinking skills. It was shown consistently. Students who participate in models of direct education often have more excellent analytical abilities, logical reasoning skills, and evaluative skills than those who participate in less direct instruction models. Research by Dewi (2020) also revealed results that align with these findings. According to the research findings, utilizing the Problem-Based Learning model as one of the direct teaching models to promote critical thinking abilities resulted in a 37.5% improvement. This conclusion aligns with the results of a prior study, which demonstrated an improvement in problem-solving skills linked to critical thinking from 71.88% to 93.75% (Said & Azhar, 2020; Sari & Wardani, 2015). Research by Sulistyo (2018) also found similar results, with improved critical thinking skills from 41% in the pre-test of cycle 1 to 58% in the cycle 2 stage and from 68% in the post-test stage to 88%. Another study by Jono et al. (2018) demonstrated that implementing the Problem-Based Learning paradigm substantially impacted students' critical thinking abilities.

According to consistent research findings, employing the Problem-Based Learning (PBL) approach can potentially improve students' critical thinking skills. This teaching method can be a practical approach to increasing educational quality by significantly improving problem-

solving abilities and critical thinking. Implementing the Problem-Based Learning paradigm can thus be a good technique for improving students' critical thinking skills.

Difference between Experiment Class and Control (N-Gain and Effect Size)

Based on the observed N-Gain scores, the control class demonstrated superiority compared to the experimental class, with respective comparisons of 0.45 and 0.36. At first glance, this phenomenon may seem puzzling because typically it is the experimental class that receives treatment and therefore performs better than the control group that does not receive treatment.

Further analysis reveals several factors that likely influenced these results. Firstly, both samples used similar models which actively engaged students in learning; however, there was a bias towards monotony in model use within the control group which naturally led to superior performance by experiment classes. Problem-based learning (PBL) models have been shown to enhance critical thinking skills in many previous studies while remaining subject to this study. Secondly, while media intended for implementing the Think Talk Write (TTW) model in experiment classes increased student interest during learning processes, it also proved somewhat impaired compared to controls where learners adapted more smoothly using TTW with Wordwall media aid. Thirdly, extraneous factors such as sample backgrounds and outside influences were not studied as deeply as motivation levels across different groups although they could have affected research outcomes significantly.

Therefore, based on measures generating a value of 0.348 it has been determined that TTW models using Wordwall media can provide considerable effects on students' critical thinking skills. However, PBL proves more effective overall according to recent studies despite contradicting earlier findings. Miftahurrohmah and Wahjudi (2023) found that the PBL learning model is superior to the Think Talk Write (TTW). In this case, the possible difference in the results of this study may be attributed to the different samples used involving students with different psychological backgrounds, motivations and interests (Dongoran & Syaputri, 2022). Gintulangi et al. (2018) argued that low learning motivation would lead to low academic achievement. The findings of these studies align with these considerations, indicating that the learning process faced various obstacles, resulting in suboptimal outcomes. Moreover, it has also been proven that the model used in the control group influences students' critical thinking skills (Said & Azhar, 2020).

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CONCLUSION

In order to respond to the research questions presented at the beginning of the investigation, several different conclusions can be drawn based on the findings of this study. First, there is a significant difference in improving students' critical thinking skills before and after treatment in the experimental group using the Think Talk Write (TTW) model assisted by Wordwall media. This group was given the Think Talk Write (TTW) model. The average score grew from 20.6714 to 47.8393, with a significance level (2-tailed) of 0.000, indicating this improvement. Second, there is a difference in improving students' critical thinking skills before and after treatment in the control group using the direct instructional model. The average pre-test score of 20.5625 in this group improved to 56.6339 in the post-test, with a significance level

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(2-tailed) of 0.000. Third, no significant difference exists in enhancing students' critical thinking skills after treatment between the experimental group utilizing the Think Talk Write (TTW) model assisted by Wordwall media and the control group using the direct instructional methodology. This finding is indicated by a significance level (2-tailed) of 0.199 and an N-Gain Score comparison of 0.36 compared to 0.45, with an effect size of 0.348 falling into the moderate criteria. On the other hand, during the study, the researchers encountered several constraints and limitations, such as time constraints and a lack of control over external variables. Therefore, future researchers should extend the research period and add or modify variables to address these issues better.

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