

Student Engagement: The Effect of Flipped Classroom on Improving Critical Thinking Skills

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ABSTRACT

The study focused on the importance of History as a subject in social education, and highlights four essential skills that students should acquire in order to excel in social education: analytical, critical thinking, evaluative, and creative skills. The research aims to examine the impact of the flipped classroom approach and student engagement on the development of critical thinking skills in History classes. A quantitative research approach with a quasi-experimental design was used in this study. Various instruments including observation sheets, questionnaires, and critical thinking tests were utilized to collect the data, and Two Way ANOVA was employed for the data analysis. The findings suggest that the flipped classroom method and student engagement have a positive effect on the critical thinking skills of students. It is recommended that History teachers implement this method by creating a conducive learning environment that promotes student engagement and critical thinking skills.

Keywords: Student Engagement, Flipped Classroom, Critical Thinking Skills



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INTRODUCTION

The primary aim of tertiary education is to guide students towards achieving their maximum learning potential and acquiring necessary skills. This goal is not easily attainable and requires persistent efforts from educators to create a conducive learning environment (Leal Filho et al., 2019). A favorable learning environment should be encouraging and comfortable for students, while also equipped with adequate resources and infrastructure, such as wireless fidelity, to facilitate easy access to online materials (Abdel-Basset et al., 2019)

In junior high school, history is a compulsory subject under the social education curriculum. Proficiency in history is crucial for students studying social education, and there are four essential skills they must master: analyzing, critical thinking, evaluating, and creating skills. Through the study of history, students should gain an understanding of Indonesian national history and learn how to interpret historical texts as learning materials (Nganga, 2019; Mupin et al., 2019).

Teachers must guide students to analyze historical events and find solutions by utilizing their critical thinking skills to answer questions posed in class (Paul & Elder, 2019). Equally important is to encourage students to comprehend Indonesia's history as an independent country since 1945 and to explore various sources of learning material available.

Teaching critical thinking skills to students requires dedication and effort in practice. It is crucial for students to master this skill as they learn about Indonesian history and understand the significance of Indonesia's independence through both textual and contextual analysis (Abid, 2020). In addition to comprehending the literal meanings of historical texts, students should also be capable of interpreting implied meanings. To provide students with ample practice time, teachers often assign homework early, allowing them to complete question-based assignments at home before face-to-face class meetings. During these meetings, students engage in discussions and ask questions about the assigned material. The objective is to establish the truth behind the various interpretations that arise through student opinions, using a teaching method known as the flipped classroom.

According to Gilboy et al. (2015), this innovative student-centered approach enhances student engagement, learning outcomes, and critical thinking skills. Research by Guthrie and Klauda (2014) has also shown that contextual classroom instruction is more effective than traditional methods in teaching historical texts to adolescents, resulting in increased motivation and engagement. However, Connor et al. (2009) found no evidence that research-based learning instruction, assessment, training, or program evaluation had any influence on student engagement or critical thinking skills, with each class exhibiting substantially different levels of critical thinking ability.

Similarly, McElhone (2012) investigates the level of engagement between teachers and students in the classroom. The author examines the interaction patterns between teachers and students in facilitating their understanding of the material, and determines that teaching engagement did not have an impact on student engagement. The study focused on understanding Indonesian national history, and observed interactions such as the ability to explain and expand on the material. The researcher concluded that there was no correlation between the pattern of teacher-student interactions and student engagement.

Despite these findings, other studies on student engagement have reported varying results, with not all studies showing a significant and positive relationship. Therefore, it is recommended by Gilboy et al. (2015) that further research is necessary to understand how to improve students' critical thinking skills through interactions with student engagement and the use of the flipped classroom method.

According to several studies mentioned earlier, the flipped classroom approach was found to have a considerably lower impact on critical thinking skills. This was discovered through research conducted by Syafitri (2014) and Neisi et al. (2019), all of whom concluded that there was no significant difference between the effects of the flipped classroom and traditional methods on students' critical thinking skills. Therefore, further experimental research is required. This study aims to address the need for updated teaching methods in the new era of post-COVID-19 pandemic by utilizing a new version of the flipped classroom approach that differs from previous research. The study will also explore the potential benefits of hybrid learning in this context. The novelty of this research lies in its investigation of the interaction between the flipped classroom approach, student engagement, and critical thinking skills in the history subject. The research questions that will be addressed are: (1) Are there any differences in critical thinking skills between students who receive the flipped classroom treatment and those who receive traditional teaching? (2) Are there any differences in critical thinking skills among students with high, medium, and low levels of engagement? (3) Is there any interaction between the teaching method and engagement level in terms of improving students' critical thinking skills?

METHODS

Research Design

The study is an experiment that uses a quantitative methodology and employs a factorial 3 x 2 pre-test-post-test non-equivalent control group design, as described by Creswell and Poth (2007). Its objective is to investigate if the Flipped Classroom approach and student engagement have an impact on critical thinking abilities in the context of a history class

Research Population and Sample

The selection of the subject group for this study was based on random assignment to treatment. This involved choosing students from two classes, namely class VIIA and VIIB, from SMPN 16 Padang. Initially, there were 68 students in total, with 33 students in the experimental class and 35 students in the control class. However, three students from the experimental class and five students from the control class were excluded from the study because they failed to complete the learning requirements. As a result, the final sample size for the experimental and control classes was 30 students each. Both classes had the same initial abilities and were taught by teachers with the same educational background. The facilities used by the two classes were also the same. This study employed a subject group that was selected based on class assignment in a school, as described in Creswell (2014) and (Setyosari, 2017).

Instruments, Data Collection and Data Analysis

Observation sheets, student engagement questionnaires, documentation, and critical thinking tests were the tools utilized in this study. The observation sheets were employed to monitor both teachers' and students' actions during the learning process. The student engagement questionnaire was utilized to collect data on student involvement, and the critical thinking tests were administered to assess the students' learning outcomes. To analyze the data, the Two-Way ANOVA test was employed.

RESULTS AND DISCUSSION

Results

Student Engagement

A total of sixty individuals were given a survey to evaluate their views on their involvement in history lessons. The students who were part of these two classes were taught the same subject using distinct teaching techniques. While the experiment group employed the flipped classroom method, the control group employed the traditional method. Based on the participants' responses, the assessment outcomes are as stated below:

Table 1. Student Engagement in Experiment Class

Student Engagement	Category			Mean	Level
	Low (1.00-2.33)	Fair (2.34-3.66)	High (3.67-5.0)		
Behavioral	2 (6.7%)	8 (26.7%)	20 (66.7%)	4.01	High
Emotional	5 (16.7%)	7 (23.3%)	18 (60.0%)	3.82	High
Cognitive	2 (6.7%)	9 (30.0%)	19 (63.3%)	3.94	High
Average				3.92	High

The results of the data indicate that student engagement in the experimental class can be categorized into three levels. The first level is low behavioral engagement, which accounts for 6.7% of students, followed by medium behavioral engagement at 26.7%, and high behavioral

engagement at 66.7%. The second level is emotional engagement, with low emotional engagement at 16.7%, medium emotional engagement at 23.3%, and high emotional engagement at 60.0%. The final level is cognitive engagement, with low cognitive engagement at 6.7%, medium cognitive engagement at 30.0%, and high cognitive engagement at 63.3%. On average, the Likert-scale score was 3.92, indicating that the flipped classroom method was effective in promoting high levels of student engagement during history lessons.

Table 2. Student Engagement in Control Class

Student Engagement	Category			Mean	Level
	Low (1.00-2.33)	Fair (2.34-3.66)	High (3.67-5.0)		
Behavioral	8 (26.7%)	10 (33.3%)	12 (40.0%)	3.67	High
Emotional	9 (30.0%)	13 (43.3%)	8 (26.7%)	3.49	Fair
Cognitive	12 (40.0%)	8 (26.7%)	10 (33.3%)	3.53	Fair
Average				3.56	Fair

Based on the given table, there are three factors evaluated: behavior, emotions, and cognition. In the behavior. the average behavior score is 3.67, indicating a high level of behavior. In the emotions factor, the average emotions score is 3.49, indicating a fair level of emotions. In The cognitive factor, the average cognitive score is 3.53, indicating a fair level of cognitive ability. Overall, the average score of the three factors is 3.56 a fair level.

Critical Thinking Skills

To assess the critical thinking abilities of students, a critical thinking test was employed. The scores achieved in the test were then compared to investigate the impact of learning engagement on students' comprehension of critical thinking material using both the flipped classroom method and the traditional approach with the same medium. The level of student engagement was classified into three categories: high, medium, and low. The study yielded results from both the pre-test and post-test critical thinking assessments for the two classes.

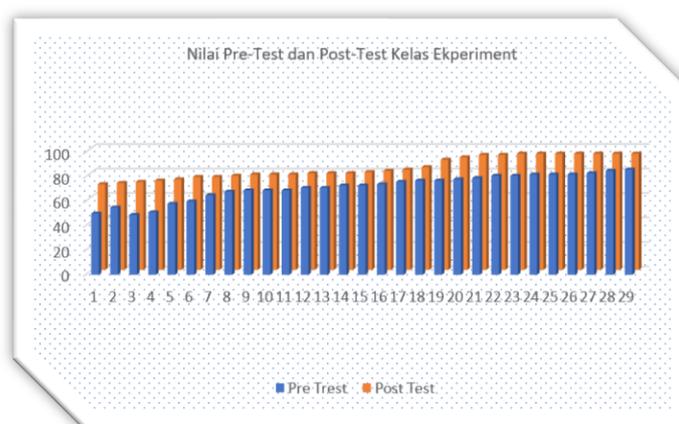


Fig. 1. Graphic of Pre-Test and Post-Test of Students' Critical Thinking Skills in The Experiment Class

The critical thinking skills of students in the experimental class were evaluated through pre-test and post-test assessments, and the average value and standard deviation were calculated.

The analysis of the data revealed a difference between the pre-test and post-test results, with the experimental class scoring an average of 89.8 and a standard deviation of 2,536. Meanwhile, the control class' pre-test and post-test values are depicted in the graph below.

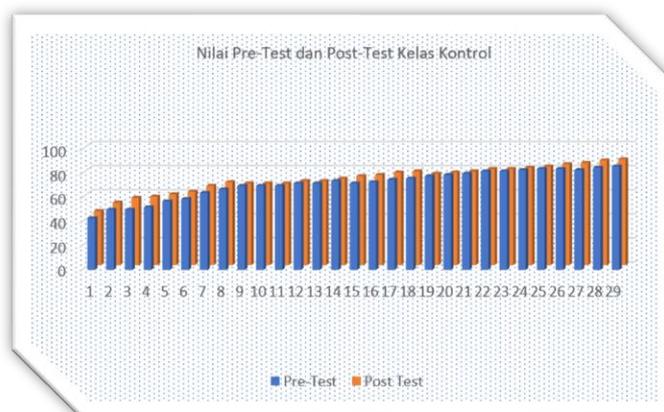


Fig. 2. Graphic of Pre-Test and Post-Test of Students' Critical Thinking Skills in The Control Class

The data from the pre-test and post-test assessments of critical thinking skills in the control class revealed that there was not a significant difference in the students' abilities. Specifically, the control class had an average score of 59.23 with a standard deviation of 2.131. In general, the results of a quantitative study analyzing post-test data on critical thinking skills in a history lesson and the level of student engagement indicated the following:

Table 3. Post-Test Values and Student Engagement for Both Learning Methods

Student Engagement	Statistics	Learning Methods	
		Experimental Class	Control Class
High	N	8	8
	Average	85.14	69.35
	Standard Deviation	2,761	2,474
Moderate/Fair	N	12	12
	Average	82,750	75.583
	Standard Deviation	3,682	3,476
Low	N	10	10
	Average	74.50	60.35
	Standard Deviation	2,915	2,894

The table presented above indicates that there is a difference in the quality of critical thinking skills between the experimental and control groups based on high, medium, and low levels of student engagement. The average score of critical thinking skills among students in the experimental group was 85.14, while the control group had an average score of 69.35. The student engagement category in the experimental group was 82.750, and in the control group, it was 75.83. In the low level of student engagement among the experimental group, the average score of critical thinking skills was 74.50, which was different from the control group's score of 60.35. These findings suggest that there is a difference in critical thinking skills between the experimental and control groups only among students with low engagement levels, while the

high engagement level did not show a significant difference in critical thinking skills between the two groups.

Hypothesis Testing

In order to address the research hypothesis, which includes examining whether there are differences in critical thinking skills among students who receive flipped classroom method versus online-based traditional learning using the same media, as well as exploring potential differences in critical thinking skills among students with high, medium, and low levels of engagement, and whether there is an interaction between learning method and engagement on critical thinking skills, a Two-Way ANOVA test is required. The outcome of this analysis is presented below.

Table 4. Two-Way ANOVA Test

Tests of Between-Subjects Effects

Dependent Variable: Critical thinking skills					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4590.530 ^a	5	918.106	27.186	.000
Intercept	585.761	1	585.761	17.345	.000
Method	20.647	1	20.647	13.611	.038
Student Engagement	2.039	1	1026.039	12.860	.007
Method * Engagement	1121.020	3	373.673	11.065	.000
Error	1823.654	54	33.771		
Total	315011.000	60			
Corrected Total	6414.183	59			

According to the results of the Two-Way ANOVA analysis, the F value for student engagement was found to be 12.860 with a significance level (Sig) of $\alpha = .007$. The interaction between method and student engagement was also tested, which yielded an F value of 11.065 with a significance level (Sig) of $\alpha = .000$. Additionally, student learning outcomes were measured based on the learning method factor, resulting in an F value of 13.611 with a significant (Sig) $\alpha = .038$. The significance level value reported in the table was lower than the significance value of .05, indicating that the flipped classroom method had a significant impact on student's critical thinking skills.

The data presented in the study led to several conclusions. Firstly, students who were taught using the flipped classroom method showed varying levels of critical thinking skills compared to those who received the traditional teaching method. Secondly, there were differences in critical thinking skills among students with high, medium, and low engagement levels. Finally, there was an interaction between the learning method and the level of engagement on critical thinking skills. To assess this interaction, post-hoc follow-up tests using ANOVA were conducted.

Table 5. Post-Anava Follow-Up Test Using Scheffe.

Multiple Comparison						
Critical thinking skills						
(I) Student Engagement	(J) Student Engagement	Mean Difference (IJ)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
High	Moderate	3.29	1,214	.761	-2.45	7.26
	Low	12.19 *	1,214	.000	4.43	16.44
Moderate	High	-3.29	1,214	.761	-7.12	4.38
	Low	7.69 *	1,214	.002	3.24	16.72
Low	High	-12.19 *	1,214	.000	-16.46	-4.29
	Moderate	-7.69 *	1,214	.002	-13.21	-3.84

The above table provides an explanation of the relationship between student engagement levels in high, medium, and low learning environments. The results of the study are presented as follows 1) when comparing high student engagement to moderate learning engagement, the sig value was found to be .761. Since the sig value is greater than α , the null hypothesis (H_0) was accepted. This indicates that there was no significant difference in critical thinking skills between students with high and moderate levels of engagement. 2) When comparing moderate student engagement to low student engagement, the sig value was found to be 0.002. Since the sig value is less than α , the null hypothesis (H_0) was rejected. This suggests that there is a significant difference in critical thinking skills between students with moderate and low levels of engagement. 3) When comparing high student engagement to low student engagement, the sig value was found to be 0.000. Since the sig value is less than α , the null hypothesis (H_0) was rejected. This suggests that there is a significant difference in critical thinking skills between students with high and low levels of engagement

Discussion

The objective of the research was to determine whether the flipped classroom teaching method and student engagement had an impact on the critical thinking abilities of college students during a history lesson. The study utilized a 2 x 3 pre-test-post-test non-equivalent control-group factorial research design to analyze the results and determine the degree to which the flipped classroom teaching method and student engagement contributed to students' critical thinking skills.

The Effect of Flipped Classroom on Students' Critical Thinking Skills

During the COVID-19 pandemic, a total of 60 history learning research projects were carried out in management classes using the experimental Flipped Classroom Method, while control classes used the traditional lecture method. The results of both methods differed, with the students' critical thinking abilities in the experimental class showing greater improvement compared to the control class. These findings are in line with Alsowat (2016) and Mupin et al. (2019) study, which found that the implementation of the Flipped Classroom Method enhanced students' critical thinking skills. Additionally, Huang and Hong (2016) conducted a study involving 40 randomly selected tenth graders, which showed a significant improvement in critical thinking after the teacher applied the Flipped Classroom Method.

On the other hand, Shcheglova et al. (2019) found no correlation between learning methods and student engagement or critical thinking skills. Similarly, McElhone (2012) study showed that the interaction patterns between teachers and students did not have an impact on student understanding and engagement. Mik (2019) research on flipped classroom note-taking revealed no significant differences in learning outcomes compared to individual writing assignments. Additionally, Silberman et al. (2021) noted that prior knowledge is a crucial factor in developing critical thinking skills and is a necessary predictor for understanding written text.

The utilization of the flipped classroom approach enables students to have an early introduction and take responsibility for adequately preparing themselves for their in-person classes. Furthermore, this technique establishes a framework for evaluating student participation in class which emphasizes comprehension and a higher level of understanding of the subject matter (Kvashnina & Martynko, 2016; Aidinopoulou and Sampson 2017). In order to encourage practice outside of the classroom, instructors can assign daily homework prior to the in-person class. Additionally, instructors can employ diverse questioning strategies to guide student perspectives in answering questions related to text comprehension. This approach may broaden their mindset and enable them to gain a better understanding of the meaning conveyed in the text. Teachers should exercise creativity in devising questions for students to motivate them to answer them. These guiding questions will help students focus on the specific sentences in the text being analyzed (Sopandi, 2017).

One of the benefits of the flipped classroom learning approach is the opportunity for students to practice answering comprehension questions at home, after being given history cases assignments at the beginning of class. Teachers must develop their proficiency in implementing this method. According to Risnanda (2018), teachers need to ask a minimum of 30 to 120 questions per hour to enhance their effectiveness in class instruction, as suggested by Guszak (1967). The questions should be designed to help students understand and analyze the text they read. Borich (2016) reports that 80% of class time should be devoted to asking and answering questions. This promotes social-emotional interaction between teachers and students, leading to increased engagement. Teachers and students can have discussions about the historical text to deepen their comprehension, as noted by Shanahan et al. (2016).

The use of the flipped classroom approach and active student participation during history lessons is intended to foster an environment of student engagement during critical thinking assessments. This method not only encourages students to effectively recall and respond to questions, but also helps them to develop their abilities in reasoning, analysis, evaluation, and criticism (Fahmi et al., 2019). Teachers guide their students in comprehending the meaning of the questions by following up with additional questions. To achieve this, teachers must present diverse and challenging questions that encourage students to understand the historical context of the text (Nokes, 2022).

Junior high school students in Padang had a similar experience with regards to learning. Teachers primarily utilized WhatsApp as their preferred social media platform for teaching activities. This choice was due to its ease of use and popularity among students, as well as its convenience as an instant chat platform for online communication that is accessible to everyone (Alamri, 2019). By using WhatsApp, students had access to learning materials through multipurpose chat rooms, where they could download, study, and review them at their own pace. The use of WhatsApp allowed students to learn in a way that suited their learning style, anytime and anywhere through their smartphones (Alkhatnai, 2019; Binti Mistar & Embi, 2016; Asmara, 2020). The widespread use of WhatsApp as a learning medium made it easily accessible, and the required internet access was not too significant. Additionally, WhatsApp facilitated distance learning, enabling teachers and students to interact in a virtual space. Teachers could share course materials through WhatsApp and conduct face-to-face meetings with students

Wandi, J., Afnita, N., Ananda, A., Erianjoni, E., Anwar, S., & Montesori, M. (2023). Student Engagement: The Effect of Flipped Classroom on Improving Critical Thinking Skills. *Indonesian Journal of Instructional Media and Model*, 5(1), 26-38. doi:<https://doi.org/10.32585/ijimm.v5i1.3514>

using the teleconferencing feature available in the application. As we know, WhatsApp provides both chat and teleconferencing spaces (Bahasoan et al., 2020; Asmara, 2020). This feature enabled teachers to communicate with students in chat and telecommunication rooms, accommodating up to eight people for direct communication.

The flipped classroom method used in the experimental group proved to be more effective than the lecture method used in the control group, despite the same media being used. In the experimental group, students were tasked with completing their history lesson assignments independently before participating in virtual face-to-face discussions. On the other hand, the traditional lecture method did not involve any independent study. Yen (2020) said that the flipped classroom approach encouraged students to take charge of their own learning by working on the history assignments prior to discussions. Conversely, the control group relied heavily on the teacher's explanations and guidance during class time. By providing students with the opportunity to study independently, the flipped classroom model facilitated the acquisition of the necessary foundational knowledge needed for productive face-to-face discussions.

Meanwhile, during the lecture method, teachers tend to provide more explanation. At the beginning of the learning process, teachers primarily focus on explaining the approach to understanding a text to their students. Following the explanation, teachers assign the students history lessons to be completed from their textbooks. During this stage, students spend their learning time in face-to-face meetings in the classroom and use social networking applications like WhatsApp outside of the classroom, leaving minimal time for discussions and Question and answer. Consequently, when teachers encourage students to work on history lessons questions in class, it becomes challenging for students to explain because they have had limited practice. This differs from earlier research conducted by Brady et al. (2010), Hamilton et al. (2019), Asmara (2020), and Almarzooq et al. (2020).

The Effect of Student Engagement on Critical thinking skills

The impact of student involvement on critical thinking abilities indicates that the average critical thinking scores of the initial students varied between the experimental and control groups. In the experimental group, those categorized with high critical thinking abilities achieved an average score of 82.87, compared to the control group's score of 68.12. Similarly, those with medium engagement in the experimental group received an average score of 81.667, while the control group achieved a score of 71.75. Finally, students with low engagement in the experimental group had an average score of 74.30, whereas the control group's score was 62.10. Overall, these findings suggest that at the beginning of the study, students' critical thinking outcomes were not significantly different across high, medium, and low engagement categories for both the experimental and control groups.

The results of Verawardina et al. (2020) study were reinforced by this research, which highlights the importance of teachers' ability to facilitate interactive learning experiences and foster students' eagerness to learn. Another study by Mohd et al. (2016) revealed that students' academic engagement is closely linked to their level of satisfaction with the learning process. Similarly, Karabiyik (2019) research demonstrated that student engagement has a significant impact on their learning outcomes.

According to Reflianto (2021), students demonstrate a higher level of engagement when using the flipped classroom online method compared to traditional classroom methods. The use of WhatsApp in the flipped classroom online method offers the benefit of increasing student awareness and encouraging active and independent learning in online settings. Furthermore, this method promotes critical thinking by stimulating self-regulated learning through high-intensity engagement.

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Ineffective control classes result in poor performance from both teachers and students. Teachers dominate the class, leaving less time for independent learning and practice by the students. Although WhatsApp may be used, the traditional teaching method remains dull and focused on the teacher, failing to challenge students. Teachers do not provide training or guidance to students on various strategies to understand historical reading texts, leading to difficulties for students who may lack initial knowledge of the material. This lack of knowledge creates obstacles during class discussions and question and answer sessions.

The results are in agreement with Zen et al. (2019) study. They show that the flipped classroom approach has several benefits, including its simplicity and flexibility, which allow teachers and students to study at their convenience, anywhere and anytime. Although social media is still the primary tool for teachers in Indonesia to conduct their lessons, this research suggests that using the flipped classroom method can enhance students' critical thinking abilities, even when employing the same media as traditional classroom instruction. Moreover, the study found that student engagement was also positively impacted by this teaching method.

Interaction of Flipped Classroom Method and Students Engagement on Students' Critical Thinking Skills

The correlation between the flipped classroom approach, student engagement, and critical thinking skills can be categorized as high, medium, or low. This finding aligns with the research of Aidinopoulou and Sampson (2017), who also found a positive connection between the flipped classroom method, student engagement, and critical thinking abilities.

The findings indicate that there was no correlation between high or medium student engagement and value with a significance level of 0.547. However, there was a significant difference in critical thinking skills between students who had moderate versus low engagement, with a significance level of 0.003. Additionally, the study predicted a positive relationship between students' learning engagement and critical thinking skills for those with high and low engagement, with a significance level of 0.000.

Student engagement is reflected in their behavior during learning. The impact of technology on student engagement in flipped learning is demonstrated through online learning, as stated by Santosa (2015). This interaction between technology and flipped learning highlights the influence of both on students' critical thinking skills and overall academic achievement. The intensity of students' learning engagement also plays a significant role in this interaction. Students with high and moderate levels of learning engagement show similar outcomes in history learning. However, significant differences were observed between students with low and moderate or high levels of learning engagement. These findings indicate that low learning engagement levels do not contribute to the development of critical thinking skills using the flipped classroom learning method.

CONCLUSION

The research confirms that the flipped classroom approach has an impact on critical thinking abilities, and there is a connection between student engagement and the learning method used for critical thinking skills. Students who are highly engaged in learning do not perform differently from those with moderate engagement in history lessons. However, those with medium and low learning engagement are affected in their history learning outcomes, as are those with high and low student engagement. The flipped classroom method and student learning engagement have been found to influence critical thinking learning outcomes. Additionally, the approach can effectively enhance student achievement in history learning material by encouraging active participation and interaction during in-person classroom discussions

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CONFLICT OF INTEREST

Hereby the authors declare that we have no conflicts of interest.

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