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The Impact of the Integration of Metacognitive Strategy in the Flipped Classroom Model on Vocational High School Students' Writing Skill, Writing Anxiety, and Writing Self-Efficacy

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Abstract. The purpose of this study was to investigate the role of metacognitive strategy integration in the best class model on writing ability, anxiety, and self-efficacy in writing. The method used in this study was a quasi-experiment involving 250 vocational high school students using a random sampling method with 60% female and 40% male. The experimental group used five different types of metacognitive strategies with the flipped classroom model, while the control group received metacognitive strategy instruction intervention with traditional classes. The instruments used in this study were a writing self-efficacy scale, a writing ability measurement scale, two writing tasks, and a writing anxiety scale. Data analysis used the one-sample Kolmogorov–Smirnov (K-S) Test and the one-way ANCOVA test. The results showed that the integration of metacognitive strategies based on flipped classrooms was able to significantly improve writing ability compared to writing ability that received metacognitive strategy intervention in traditional classes. The improvement of students' writing skills is seen in several components, namely content, organization of ideas, vocabulary usage, and mechanics. Metacognitive strategies that included planning, monitoring, and evaluation are able to improve the quality of students' essay writing. The integration of metacognitive strategies in the flipped classroom model encouraged students to fully participate in various online learning activities before attending class and could reduce anxiety and writing self-efficacy substantially. This learning activity improves high-level cognitive skills, which can directly prepare students before entering the learning process activities. This study implies that the integration of technology with language learning models will not only be able to improve language skills but also be able to improve aspects that support the improvement of these language skills and reduce writing anxiety because students are equipped with various features in technology.

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1. Introduction

Writing skills in today's education world show substantial and transformative developments. Writing has become a method of academic communication in middle school and attracts the attention of researchers. Researchers have begun to investigate the role of cognitive processes and strategies that can support individual writing skills. The use of strategies, procedures, and cognitive frameworks in working memory plays an important role in supporting writing success (Haro et al., 2024; Levrai & Bolster, 2019). So, if students want to have good writing skills, they need to choose the right strategy and be able to carry it out effectively. These findings were found in previous studies that examined the positive relationship between the use of writing strategies and the development of writing skills (Kerman et al., 2024; Tsai et al., 2024). Based on conventional writing learning, writing instruction always focuses on assessing the final product of students' writing. It is still rare for the emphasis of writing learning to emphasize the process aspect. Currently, the approach to teaching writing skills has begun to shift toward an approach that focuses more on the process in its learning environment (Hadianto et al., 2021; Latifi et al., 2023). This shift in focus on teaching writing is evidence that the strategies used in the writing process will greatly affect the quality of students' writing results.

One of the effective teaching approaches in teaching writing is strategy-based instruction which has been proven by several experts to have a significant impact on student learning outcomes in terms of quality and quantity. Of the several strategies, metacognitive strategies are quite effective in improving high-level cognitive abilities. This strategy can be in the form of stages of learning activities such as designing, planning, monitoring progress, and evaluating (Çini et al., 2020; Shih & Huang, 2019). Metacognitive strategies can support an individual's ability to develop an independent attitude, manage themselves, strategize, monitor, and evaluate their own writing results. However, teaching metacognitive strategies requires quite a substantial amount of time (Alfaifi, 2022; Shih & Huang, 2020). Traditional classes that use this metacognitive strategy will take quite a long time. This has a negative impact on students to follow the writing process independently. To overcome this problem, teachers select innovative writing teaching methods that are able to improve the quality of the teaching process, and are able to motivate students to achieve learning achievement targets. Education policy trends also have an impact on overcoming this problem (Tsai et al., 2024; Wahyuda et al., 2023). One of them is the trend of student-focused teaching, namely the flipped classroom model which is currently attracting quite a lot of attention from teachers. This teaching approach is a learning approach that combines two online and offline methods that have been proven to be quite effective (Doğan et al., 2021).

Flipped learning was introduced by Bergmann and Sams (2012) and is known as a form of teaching approach that deviates from conventional teaching. The flipped classroom learning model reforms the implementation of homework into a class

activity, in traditional learning, materials are given in lectures and encourage students to do homework after the learning process (Al-Abdullatif, 2020; Houghton, 2023). In the flipped classroom, student participation in the learning process begins by encouraging them to be involved at home first through e-learning or online learning that contains various material content and applies or uses their understanding in the learning process in class. This approach is in line with the principle of student-centered learning and is able to create an interactive learning process environment and optimize time with active learning (Kerman et al., 2024; Wahyuda et al., 2023). The use of flipped classrooms in language teaching has not been widely studied even though flipped classrooms have found a place in several academic domains. The flipped classroom model is also used in language learning with extensive systematic reviews.

The results of the study indicate that the use of the flipped classroom model in language learning can encourage students' active participation, speaking skills, interaction, and academic achievement. In addition, the flipped classroom model can also increase learning motivation, high-level cognitive abilities, choosing learning strategies, and improving students' ICT skills (Noroozi et al., 2020; Ramirez et al., 2021; Thai et al., 2020). However, there are still few studies investigating the role of metacognitive strategies on writing skills. Based on this explanation, the current study will investigate the role of a classroom model integrated with metacognitive strategies on improving writing skills and its contribution to students' self-efficacy. Through this exploration, this study contributes to the pedagogy of teaching writing skills, residual self-efficacy, and current language teaching practices. Therefore, through this study, researchers try to integrate metacognitive strategies into the flipped classroom model to improve students' writing performance while increasing self-efficacy and reducing writing anxiety. Researchers formulate several problems in this study, including:

a) What is the impact of the integration of metacognitive strategies in the flipped classroom model on writing skills?
b) What is the impact of the integration of metacognitive strategies in the flipped classroom model on reducing writing anxiety?
c) What is the impact of the integration of metacognitive strategies in the flipped classroom model on developing writing self-efficacy?

2. Literature Review

2.1 Flipped Classroom Model

The principal idea of the flipped classroom model comes from the idea of learning environment flexibility, adaptation of learning culture, instructional design, and skilled teachers. This flipped classroom model approach is able to restructure conventional classes by encouraging active participation and minimizing teacher-centered teaching (Hwang et al., 2019; Li et al., 2023). The shift in the center of the role from the teacher to the student makes the flipped classroom model able to optimize students' active participation in the learning process. Learning with the flipped classroom model places the teacher as the director of the learning scenario through appropriate resources and provides opportunities for students to learn outside the conventional classroom (Xiao et al., 2018; Ye et al., 2019). The components of the flipped classroom include meaningful tasks, supportive

teacher role transformation, increased interaction based on instruction, focusing on holistic learning and adjusting to scholastic behavior, rapid feedback that improves the quality of learning, reinforcing technology integration, and timely delivery of instructions according to the needs of the learning process (Gok et al., 2023; Green et al., 2021). So, in essence the flipped classroom model is a learning model that offers teaching instructions presented on an online platform and provides students with the opportunity to access and learn materials at their own learning pace. Students can study the material before taking part in the learning process in class and this provides opportunities for students to create interactive and dynamic learning processes, including discussion activities, student-centered, and collaborative problem-solving tasks (Hwang et al., 2019; Thai et al., 2020). The concept of the flipped classroom model is seen as blended learning that combines two or more instructional approaches. Conventional teaching instructions are converted into personalized learning experiences mediated by technology. Teachers provide online resources for the learning process either in the form of videos or materials that can be freely accessed by students and create high-level cognitive activities.

In the literature review, the flipped classroom is reversing the conventional classroom conditions into activities outside the classroom or vice versa. The flipped classroom model has two important components, namely computer-assisted teaching for independent learning and interactive group learning (Chust-Pérez et al., 2024; Hadianto et al., 2022; Stone-Johnstone, 2023). Previous studies have shown that the use of the flipped classroom model has several benefits, including this model is able to encourage students to follow self-regulated learning and provide students with access to instructional content that goes beyond class material (Chan et al., 2021; Fan et al., 2020; Zheng & Zhang, 2020). This is certainly different from conventional classes. The flipped classroom also makes students more flexible and facilitates students to be able to adjust to the learning environment and regulate their own learning process. In addition, the flipped classroom model is also able to make the class dynamic and interactive both between teachers and students and between students. Previous studies have shown that the flipped classroom model is able to improve high-level cognitive abilities and encourage active student participation through various modes in the flipped classroom such as online quizzes, videos, and individual assignments in the flipped classroom (Jiang et al., 2020; Shih & Huang, 2019, 2020). So, the flipped idea of the FLIP framework is able to create a student-centered learning environment through the delivery of content to achieve learning goals.

2.2 Metacognitive Strategy

The concept of metacognition was first introduced by Flavell (1979) who proposed that metacognition has two components, namely metacognitive knowledge and metacognitive experience. Metacognitive strategies have the characteristics of cognitive techniques to provide guidance for cognitive processes to achieve certain cognitive goals. Metacognitive strategies in writing are classified into various categories, including taxonomies of planning, monitoring, and evaluation (Chan et al., 2021; Khodaei et al., 2022). So, teachers who use metacognitive writing strategies will encourage students to consider aspects of the writing

process, which include the stages of planning, monitoring, and self-evaluation. Furthermore, the application of these stages will help teachers in supervising, regulating, and forming quality student writing. Furthermore, metacognition is also defined as a method for students to think about how to think (Chust-Pérez et al., 2024; Ramirez et al., 2021). With this metacognitive strategy, it helps students to understand the process of good writing so that they are able to produce quality writing. In addition, metacognitive strategies also facilitate students to adapt the writing process and adjust to the demands of writing instructions. Writing learning is learning that is often oriented toward simple product-based tasks (Latifi et al., 2023; Ye et al., 2019). However, this writing skill is a skill that must be viewed as a process-based activity. The writing task instructions in the process are related to several aspects including cognitive, linguistic, affective, writing behavior, and other physical activities. Metacognition is defined as a general term that includes knowledge, experience. In addition, metacognitive strategies also facilitate individuals to understand knowledge and cognition about cognitive phenomena (Khodaei et al., 2022; Samadi et al., 2024).

Metacognition is also defined as students' deliberate actions to improve their learning process. Students can use metacognitive strategies to carry out several activities including managing, guiding, organizing, and guiding their own learning process (Alfaifi, 2022; Maor et al., 2023). The use of metacognitive strategies integrated into online flipped classes to develop writing skills has not been widely studied. Several previous studies were still dominated by the use of metacognitive strategies for conventional writing skills (Khodaei et al., 2022; Tsai et al., 2024). In this study, students were asked to carry out metacognitive reflections related to the essays they created. The findings of previous studies indicate that students still have minimal understanding of the structure of the writing process. This finding is in line with those of other studies that report that writing skills are the most difficult language skills and require rigorous practice to improve them (Fan et al., 2020; Gentner, 2024; Zheng & Zhang, 2020). Based on these findings, it is necessary to consider the characteristics of writing skills and adjust them to the flipped classroom model to accommodate aspects that can improve writing skills. Another study found that feedback plays an important role in learning to write (Haro et al., 2024; Levrai & Bolster, 2019).

2.3 Writing Anxiety and Self-Efficacy in Writing Learning

Writing skills are language skills that involve cognitive and emotional processes and, in the process thoughts and feelings interact with each other (Alfaifi, 2022; Latifi et al., 2021). Research on writing anxiety in first language focuses on the prevalence and potential negative impacts of writing anxiety on students. From the study, the term writing anxiety was found to describe the anxiety experienced by students when facing writing tasks. Students were introduced to the writing anxiety scale by Daly–Miller (2009). The findings attracted the attention of other researchers to investigate the nature and consequences of writing. However, another finding is that anxiety, a state of discomfort, can have a positive impact. This writing anxiety greatly helps students recognize potential threats and prepares students to be able to focus on their writing work effectively (Al-Abdullatif, 2020; Gok et al., 2023). Teachers can adopt effective methods to

facilitate students to be more prepared and comfortable when doing the writing process. Anxiety is a natural response to various uncomfortable situations, such as exams, speaking, interviews, and other important events, especially in language learning (Green et al., 2021). The theory explains that anxiety affects the learning process. However, another theory is that anxiety can also trigger productive attitudes.

Self-efficacy based on social learning and cognitive behavior is an individual's belief and ability to manage situations effectively through planned actions. Self-efficacy is an individual's ability and belief in organizing and completing tasks (Kiel et al., 2019; Power et al., 2024). High levels of self-efficacy in writing learning can increase effort and endurance when there is pressure and challenge in writing. Writing self-efficacy also refers to the evaluation of students' writing ability and belief in completing writing tasks successfully. Self-efficacy beliefs consist of high, medium, and low according to their level of belief. Students with high beliefs will have better writing efficacy (Gundel et al., 2019; Zheng & Zhang, 2020). Complex activities are considered as challenges that can stimulate and can be overcome by cognitive strategies. Several previous studies have investigated the impact of self-efficacy on writing ability. The findings indicate that students who have self-efficacy consistently show more motivation, less worry, more effort, and are able to show better performance. The impact of self-efficacy and anxiety levels contributes significantly to writing ability. This self-efficacy in writing is able to mediate the correlation between writing anxiety and writing performance. This can be found in cases such as students with poor writing experience will cause anxiety and can reduce self-efficacy and ultimately affect writing performance (Fan et al., 2020; Hong et al., 2023). Fluency, accuracy, and complexity of writing can be influenced by self-efficacy in writing. In addition, self-efficacy has an indirect effect on performance through interaction with writing anxiety. Another study also revealed that writing instruction that targets increasing self-efficacy has a significant impact on students' writing ability. Previous studies have revealed that self-regulation and motivation strategies can improve writing skills, transformation, and language regulation (Gentner, 2024; Tsai et al., 2024).

3. Methodology

3.1 Design and Participants

The study used a quasi-experimental design to investigate the effect of integrating metacognitive strategies into the flipped classroom model on writing ability, as well as reducing writing anxiety, and increasing self-efficacy. The participants involved were 250 vocational high school students in Indonesia aged 17-23 years. The participants involved were 60% female and 40% male with the same number of each experimental and control group, 125 students each. Participant grouping was done randomly so that internal validity was guaranteed. All participants who were flipped were confirmed to have participated in the blended learning process, but had never received instruction with the flipped classroom model. The experimental group received an intervention of integrating metacognitive strategies in the flipped classroom model, while the control group received a conventional teaching intervention. Both received the same teaching materials and assignments, only different teaching methods. The experimental group

received an explanation of the flipped classroom model and its instructional design before receiving the intervention.

3.2 Instrument

This study used several research instruments, including language ability tests, writing scales, self-efficacy scales, anxiety measurement scales, and several materials for the learning process. For more details, the following is a presentation of each instrument used.

3.2.1 *Language proficiency test*

The language proficiency test uses a language proficiency test instrument by adopting the assessment from Daly and Miller (1975). A language proficiency test consisting of 210 items was used to measure students' listening and reading comprehension skills as well as grammar and vocabulary mastery. This test is considered reliable for use on middle-class students.

3.2.2 *Writing ability measurement scale*

The writing measurement scale used is the writing scale adopted from Jacobs Jacobs, Zinkgraf, Wormuth, Hartfiel, Hughey, (1981), which is used to assess essay writing skills. This scale uses an analytical assessment approach with five criteria for evaluating written content. These criteria comprise content, organization of ideas, vocabulary, language use, and mechanics. The score is given through an inter-rater reliability test using Cohen's Kappa. The rubric used uses a value of 100 points consisting of vocabulary 20 points, language use 25 points, content quality 30, and organization of ideas 20 points, mechanics five points. Two assessors who have been trained independently are used in the assessment of writing skills. A total of 50% of the essays are used to test the inter-rater reliability of the essay assessment.

3.2.3 *Writing self-efficacy scale*

The self-efficacy scale used in this study adopted the self-efficacy scale from Yavuz-Erkan (2004). The self-efficacy scale is used to measure students' writing self-efficacy and to assess students' level of confidence in their respective writing abilities. The self-efficacy scale in this study consists of 22 items. Each item developed is assessed by a Likert scale with four levels, namely strongly agree, agree, disagree, and strongly disagree. The items developed are phrases that begin with "I can ...". The results of the reliability and validity test of the self-efficacy scale have met the criteria and can be used in research.

3.2.4 *Measurement of writing anxiety*

Measurement of writing anxiety levels was carried out using a scale instrument developed by Cheng (2004). Anxiety measurement is used to assess the level of anxiety from various aspects that students experience when working on writing assignments in the learning process. This scale consists of 22 items that assess the level of anxiety from three aspects, namely somatic anxiety, cognitive anxiety, and avoidance behavior. This questionnaire uses a response format with a 5-point Likert scale type, namely point 1 (strongly disagree), point 2 (disagree), point 3 (undecided), point 4 (agree), and point 5 (strongly agree). All items are distributed

into three categories, namely: somatic anxiety includes items 2, 6, 8, 11, 13, 15, and 19, cognitive anxiety includes items 1, 3, 7, 9, 14, 17, 20, and 21, and avoidance behavior includes items 4, 5, 10, 12, 16, 18, and 22. Reliability and validity tests are determined through correlation and factor analysis. Internal consistency measurement using the Cronbach's alpha formula.

3.2.5 Research materials

The experimental group received a video and PPT (Power Point) listening session explaining several metacognitive strategies according to the classification of metacognitive writing strategies from O'Malley and Chamot (1990). Follow-up activities of the explanation were carried out to strengthen students' understanding and application. Students practiced writing using metacognitive strategies. The control group received an explanation of metacognitive strategies through lectures by the teacher during the learning process. The control group used a lecture approach and was not given time to practice but was given the opportunity to do writing assignments at home. In the final session, both groups were given an essay writing assignment to assess the effectiveness of using metacognitive strategies conventionally and with the integration of metacognitive strategies in the flipped classroom model.

3.3 Procedure

The study procedure had several stages. Before the intervention, both groups took a language ability test to ensure comparable proficiency. This language ability test was recognized as a potential factor that influenced students' writing performance. After the language ability pretest was conducted, the scores of both groups were analyzed and compared to ensure that the language abilities of both groups were homogeneous before the intervention was conducted. Next, students received a 40-minute essay writing pretest. This essay was assessed using a writing ability measurement scale rubric. The writing anxiety scale and self-efficacy scale were used to assess the level of writing anxiety and self-efficacy in the early phase before receiving the intervention. The experimental group was given teaching using metacognitive writing strategies integrated with the flipped classroom model. The explanation includes three types of strategies through presentations and videos in several sessions (Tables 1 and 2). Students are also asked to carry out writing activities related to the strategy to enhance understanding. In order for students to be able to use metacognitive strategies well, many activities are carried out in the context of the strategy. The control group was given metacognitive strategies conventionally in the classroom. So, the class time is divided into two parts, the first is an explanation of the teaching strategy and the second is teaching writing activities. The focus of this study is the use of metacognitive strategies in teaching writing. The intervention was carried out for 10 sessions with three categories of metacognitive writing strategies, namely planning, monitoring, editing, and evaluating. After the intervention phase, a posttest was conducted by providing essay writing instructions and measuring writing anxiety and writing self-efficacy. Both groups participated in writing learning for 10 learning sessions with a duration of 75 minutes each. Both groups received the same three metacognitive writing strategies.

Table 1: Metacognitive strategy framework

Stage	Teacher activities	Student activities
Prepare and present	Activate background knowledge, explain models	Attend and participate
Practice	Train with extensive feedback	Practice strategies according to the guide
Evaluate and expand	Encourage transfer of assessment	Evaluate strategies and use them independently

Table 2: Metacognitive writing strategy interventions in the flipped classroom model

Session	Explanation
Session 1	Students are given an explanation of metacognitive strategies in general while metacognitive explanations of writing are given in detail. Students begin to get used to the stages of metacognitive strategies, such as planning, monitoring, and evaluating with the use of detailed strategies.
Session 2	Students receive a deeper explanation of global and local planning strategies in writing essays. Students are also given practice in analyzing tasks and setting goals.
Session 3	Students are given practice in analyzing students' prior knowledge and writing detailed draft outlines so that students can design their writing well. Students are also explained the stages of brainstorming and mapping of writing content.
Session 4	Students are guided to write essays according to the type and topic chosen. Students also practice carrying out the right writing mechanisms such as using vocabulary, phrases, and expressions that are appropriate to the context.
Session 5	Students practice making writing plans with the right strategies and paying attention to coherence, cohesiveness of the essay, and essay writing mechanisms.
Session 6	Students receive a detailed explanation of the monitoring strategy. Students are also trained to practice problem-solving strategies through the use of these strategies.
Session 7	Students receive training in using monitoring strategies and checking the suitability of organizational aspects, coherence, and diction.
Session 8	Students receive a detailed explanation of the essay writing evaluation strategy. Students receive training in self-evaluation, peer evaluation, and teacher evaluation.
Session 9	Students evaluate their own language skills, evaluate parts of the text, and evaluate the text as a whole.
Session 10	Students are facilitated to use all metacognitive writing strategies that have been learned in writing essays.

3.4 Data Analysis

The data analysis used in this study is descriptive analysis and inferential analysis. Descriptive statistics presented include mean, standard deviation, and pretest and posttest performance. Inferential statistical analysis used includes the one-sample Kolmogorov-Smirnov (K-S) test to see the normality of the data on the scores obtained in the pretest and posttest phases and one-way ANCOVA analysis to test the impact of metacognitive strategy integration in the flipped classroom model to improve essay writing skills, reduce writing anxiety, and improve self-efficacy in writing. ANCOVA test was also conducted to see the comparison of pretest and posttest scores of the two groups. The formulation of the problem in this study is how the impact of metacognitive strategy integration in the flipped classroom model on writing skills, writing anxiety, and writing self-efficacy.

3.5 Ethical Consideration

All participants involved in this study were presented with anonymous data which will only be used for research purposes. All participants filled out a form of willingness to be involved in the study so that participants participated in the study voluntarily. This research has received permission and approval from Prof. Dr. Hamka Muhammadiyah University, Indonesia.

4. Result

The results of the initial language ability test to ensure that the initial language skills of the two groups are the same. The results of the analysis are presented in Table 3. Based on the results of the analysis, no significant differences were found in the initial language ability scores with the results of the experimental group ($M = 62.30$, $SD = 13.41$) and the control group ($M = 62.24$, $SD = 13.61$); $t = -0.721$, $p > 0.05$). From these values, it can be concluded that both groups showed the same initial language ability before the intervention.

Table 3: Results of the analysis of initial language ability in each group

Groups	M (SD)	T	Sig.
Experimental	62.30 (13.41)	−.721	.583
Control	62.24 (13.61)		

Next, the results of the descriptive statistical analysis in the pretest and posttest phases are presented in Table 4. Inferential statistics are used to better understand the results of the analysis. The one-sample Kolmogorov–Smirnov (K-S) test was conducted to see the normality of the data on the scores obtained in the pretest and posttest phases. With the context test of the one-sample Kolmogorov–Smirnov (K-S) test, the results of the analysis showed a significance level exceeding 0.05, which means that the data are normally distributed. From these findings, it shows that the data used in the study are normally distributed and which can be tested further.

Table 4: Descriptive statistics for the pre- and posttest phases

	Group	N	Mean	Std. deviation	Std. error mean
Pre.writing	Experimental	125	51.3415	11.54243	3.32784
	Control	125	55.4631	13.61422	3.79645
Post.writing	Experimental	125	72.5721	9.86301	1.93531
	Control	125	61.3671	13.78312	3.84281
Pre.efficacy	Experimental	125	21.4562	5.74521	1.25934
	Control	125	21.1536	4.31581	.70451
Post.efficacy	Experimental	125	26.3424	6.14682	2.12513
	Control	125	22.1430	4.42745	.81334
Pre.anxiety	Experimental	125	20.7345	6.20145	2.12673
	Control	125	21.2500	5.35734	.87245
Post.anxiety	Experimental	125	16.4526	4.61326	.82541
	Control	125	22.7634	6.31424	2.35456

To answer the first problem formulation about the impact of metacognitive strategy integration in the flipped classroom model on writing ability, an ANCOVA test was conducted. The ANCOVA test was conducted by comparing the effects of the intervention before and after the intervention in each group. The pretest score was used as a covariate to calculate the initial differences between groups. The results of the ANCOVA analysis are presented in Table 5. Based on the results of the analysis, the average pretest score of the experimental group showed a value of 51.34 increasing to 72.57 writing ability in the posttest phase. The control group showed a writing ability score in the pretest phase of 55.46 and showed an increase in the posttest phase to 61.36. From both data, it can be concluded that metacognitive strategies can improve writing skills, only the increase in the metacognitive strategy group integrated in the flipped classroom model showed a more significant increase.

Table 5: ANCOVA results for writing performance scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Corrected model	3256.423	2	1546.273	22.254	.000	.513
Intercept	2572.672	1	2362.824	33.251	.000	.446
Prewriting	2412.324	1	2415.314	34.756	.000	.452
Group	1052.130	1	1051.030	16.340	.000	.287
Error	2924.745	247	68.981			
Total	214,862.000	250				
Corrected total	5835.315	249				

Furthermore, to identify groups that showed a more significant increase, an ANCOVA test was conducted. The independent variables in this analysis were metacognitive strategies with flipped and conventional classroom models, the dependent variable was the essay writing ability score. Students' pretest scores were used as covariates in the analysis to calculate differences in students' initial writing abilities. Before the ANCOVA test was conducted, several prerequisite tests were conducted to ensure that various assumptions had met the rules. The prerequisite tests include normality, linearity, homogeneity of variance, regression slope, and reliability tests. Based on the results of the ANCOVA test presented in Table 5, a statistically significant difference was found in the essay writing ability of the two groups in the posttest phase with a value of $F(1, 53) = 16.34$, $p = 0.00$, partial eta square = 0.28). The findings indicate that the experimental group showed a more significant improvement than the writing ability of students in the control group. So, from the data it can be concluded that instruction with integrated metacognitive writing strategies in the flipped classroom model is able to improve writing ability significantly.

Next, to answer the second problem formulation, how is the impact of the integration of metacognitive strategies in the flipped classroom model on reducing students' writing anxiety. The results of the descriptive statistical analysis are presented in Table 4. The results of the analysis show that the experimental group experienced a greater decrease in writing anxiety than the control group. From the results of the analysis of the experimental group, the value was 20.73 in the pretest phase to 16.45 in the posttest phase, while the control group experienced a decrease in writing anxiety from 21.25 in the pretest phase to 22.76 in the posttest phase. From these data, it can be concluded that metacognitive strategy instruction based on the flipped classroom model is able to reduce writing anxiety effectively. Furthermore, inferential statistics were used to investigate the effects of both types of interventions further on writing anxiety. From the results of observations of students in the experimental class, students were able to follow and complete all class activities during the implementation of the flipped classroom model effectively because before class students followed all flipped classroom learning activities. So, students are fully involved in the learning process activities during the intervention. However, students in the control group were partly not involved in class activities effectively because students did not follow class preparation well before class as in the experimental group. The findings indicate that the integration of metacognitive strategies in the flipped classroom model can improve students' writing self-efficacy. The results of the ANCOVA data analysis for the writing anxiety scores are presented in Table 6.

Table 6: ANCOVA results for writing anxiety scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Corrected model	452.053	2	234.634	20.325	.000	.483
Intercept	174.745	1	173.745	14.845	.002	.250
Pre.anxiety	350.724	1	350.536	30.784	.000	.427
Group	61.531	1	60.541	6.041	.042	.134
Error	489.734	247	12.712			
Total	20,572.681	250				
Corrected total	940.681	249				

This helps students to prepare themselves to take part in the learning process as well as possible. Thus, through this process in the flipped classroom model, students are assisted to carry out various independent and collaborative work activities before taking part in the learning process so that writing anxiety can be reduced. The findings are supported by the results of the ANCOVA data analysis presented in Table 6. Based on the results of the ANCOVA analysis with the general linear modeling technique, a significant difference was found between the posttest scores of writing anxiety of the two groups with a value ($F (1, 53) = 6.04$, $p = 0.042$, partial eta squared = 0.13). This finding indicates that metacognitive strategy instruction integrated into the flipped classroom model contributes to reducing students' writing anxiety. Furthermore, to answer the third problem formulation, the impact of the integration of metacognitive strategies with the flipped classroom model was able to significantly increase students' writing self-efficacy with a value of 21.45 in the experimental group in the pretest phase and showed an increase to 26.34 in the posttest phase. The average score of the control group's writing self-efficacy in the posttest phase was 21.15 and increased to 22.14 in the posttest phase. So, the metacognitive strategy approach is able to increase self-efficacy in both groups but the metacognitive strategy integrated into the flipped classroom model shows a more significant increase.

Metacognitive strategy instruction in flipped and conventional classrooms became independent variables and writing self-efficacy scores became dependent variables, and students' pretest scores were used as covariates. The results of the analysis on self-efficacy scores are presented in Table 7. Based on the results of the analysis, a significant difference was found in the scores of the two groups in the posttest phase with a value of $F (1, 53) = 8.63$, $p = 0.10$, partial eta squared = 0.17). This finding indicates that students in the experimental group experienced a more significant increase in self-efficacy scores than students in the control group. So, the integration of metacognitive strategies in the flipped classroom model is effective in improving students' writing self-efficacy.

Table 7: ANCOVA Results for Writing Self-Efficacy Scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Corrected model	485.823	2	189.467	17.563	.000	.457
Intercept	214.573	1	235.574	18.256	.000	.289
Pre.self-efficacy	289.876	1	288.672	26.762	.000	.384
Group	91.634	1	91.657	8.632	.010	.174
Error	491.784	247	12.824			
Total	26,462.400	250				
Corrected total	890.724	249				

5. Discussion

This study attempted to investigate the effectiveness of the integration of metacognitive strategies in the flipped classroom model in improving writing skills, reducing writing anxiety, and increasing self-efficacy. The findings of the study showed that the intervention was able to significantly improve writing skills. These findings are in line with several previous studies that revealed that instruction in flipped classrooms has a strong correlation with writing skills (Alfaifi, 2022; Latifi et al., 2021). The findings are relevant to the output-driven model of Tsai et al. (2024), which emphasizes that the flipped classroom model is more effective than conventional classes in improving writing skills because students are exposed to various academic content through various media, such as videos, materials, and lectures before facing the learning process, so that the process makes students more prepared and encourages them to actively participate in the learning process (Kerman et al., 2024; Tsai et al., 2024). This is in accordance with the theory that explains that the flipped classroom model provides students with the opportunity to access material content according to their learning speed before participating in the learning process in class (Al-Abdullatif, 2020; Houghton, 2023; Levrai & Bolster, 2019). The flipped classroom model also provides students with the opportunity to learn repeatedly and practice through various activities before and during class according to their respective learning speeds. However, conventional classes have less opportunity to interact and participate with study partners, material content, and with teachers.

Metacognitive strategies that include planning, monitoring, and evaluation can improve the quality of students' essay writing. These findings reinforce that metacognition can be used as a theoretical basis that explains that metacognitive strategy components are significantly correlated with essay writing competence (Çini et al., 2020; Shih & Huang, 2019). The current findings are also in accordance with previous studies that emphasize that metacognition is built by a regular structure and can be used to predict learning strategies. This study also confirms

that metacognition theory is always related to eight components of metacognitive strategies. This is consistent with the theory that metacognition is a cyclical process that includes self-assessment and cognitive management (Tsai et al., 2024; Wang & Jou, 2020). The components of metacognitive regulation include planning, monitoring, and evaluating, which define the role of regulation in self-regulated learning. This study confirms that there is a significant and positive correlation between metacognitive strategies and metacognitive regulation. The strong correlation between the two variables reinforces that students need to apply reports that are qualified with knowledge, metacognitive strategies, skills, and regulation when participating in learning (Hong et al., 2023; Khodaei et al., 2022). This is consistent with the theory that states that knowledge and regulatory strategies can optimize cognitive use, increase student effort, and facilitate students in completing their academic tasks (Fan et al., 2020; Zheng & Zhang, 2020). Therefore, this metacognition can be used as a guide in understanding data and conditions so that the right decisions can be made. Through this study, it can be concluded that this metacognitive strategy develops students' abilities to become independent learners in developing their academic writing skills as well as improving social competence, increasing motivation, and controlling student behavior during the writing process.

Students who learn with the flipped classroom model are able to complete all writing assignments because they spend most of their time practicing before starting the classroom learning process. Thus, students who are actively involved in various learning activities will be better able to complete learning assignments more effectively and efficiently. However, conventional classes do not afford the opportunity to actively participate before participating in the learning process. Conventional classes do not carry out learning process activities that train high-level cognitive abilities, and teaching is still centered on the teacher because it only relies on conventional classes directly, unlike flipped classroom models. The findings of this process are in accordance with the learning theory that students who receive intensive learning activities in the pre-learning phase will be able to increase the stability of their psychological learning conditions to be more prepared (Xiao et al., 2018; Zheng et al., 2020). Furthermore, the integration of metacognitive strategies in the flipped classroom model is also able to increase students' writing self-efficacy. These findings are in line with previous findings which revealed that technology-assisted language learning can produce better self-efficacy (Çini et al., 2020; Doğan et al., 2021). This is in line with the theory that thorough learning preparation before participating in the learning process will make you more confident and confident in facing various learning process activities (Chen & Yeh, 2019).

The next finding is that the integration of metacognitive strategies in the flipped classroom can reduce writing anxiety. Writing anxiety arises because students feel worried about their inability to complete various writing assignments or participate in learning process activities. Through metacognitive strategies in the flipped classroom model, students are facilitated to prepare competencies and activate knowledge in advance before participating in the writing learning process. Students' mastery of concepts regarding writing competencies is also

better in students with the flipped classroom model than in those in conventional classes (Gentner, 2024; Tsai et al., 2024). This good preparation helps reduce students' writing anxiety so that optimal writing competencies are explored during the learning process. This finding is in line with previous findings which revealed that technology-assisted language teaching can reduce students' writing anxiety (Kiel et al., 2019; Power et al., 2024). From these findings, it can be concluded that the flipped classroom model which encourages students to actively participate in various online learning activities and encourages intensive collaboration activities can reduce student anxiety.

6. Conclusion, Implication, and Recommendation

The integration of metacognitive strategies in the flipped classroom model can improve academic writing skills, reduce writing anxiety, and increase students' writing self-efficacy. The improvement in students' writing skills is seen in several components, namely content, organization of ideas, vocabulary of language use, and mechanics. Metacognitive strategies that include planning, monitoring, and evaluation are able to improve the quality of students' essay writing. This happens because the integration of metacognition with the flipped classroom model is able to provide students with the opportunity to learn independently before taking part in the learning process in class. Learning activities with the flipped classroom model can encourage students to practice high-level cognitive skills through various materials such as materials, videos, and lectures in online media. These learning activities are able to prepare students better before taking part in learning activities in class. This process is what makes writing anxiety decrease and increases writing self-efficacy because students are more ready to take part in the learning process in class. Self-efficacy increases because, in the flipped classroom model learning process, students can learn material through videos and read material according to their speed, can recognize their respective learning styles, and it helps students overcome obstacles. This process is ultimately able to increase self-efficacy because students are more prepared and able to reduce writing anxiety more effectively. The teaching process using the integration of metacognitive strategies with the flipped classroom model is ultimately able to improve writing competence. So, it can be concluded that the flipped classroom model is one of the quite effective learning models because it involves online technology that allows teachers to provide writing instructions and use various metacognitive strategies.

This study implies that a more varied learning environment, cultural context, and attention to student characteristics with the help of online technology can achieve more effective learning goals. This study has several limitations, including the targeted language skills focusing on writing skills, research participants who are dominated by homogeneous mother tongues, focusing on metacognitive writing strategies, only focusing on two affective variables of writing anxiety and self-efficacy, and not considering gender aspects in the analysis. Based on these limitations, the researcher recommends several aspects for further research, including the need to try other language skills, such as speaking, reading, and listening, the metacognitive strategies used must be more diverse, the need to

involve more affective variables that support language skills, and the need to consider analysis based on gender variables.

7. References

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