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The Effect of Flipped Digital Classroom and Student Engagement on English Writing Skills

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Abstract

Incorporating digital-based learning is crucial for fostering self-directed learning among students. Various digital media platforms, such as Google Classroom, Zoom Meetings, and social media, motivate students to actively engage in their studies. This study aims to assess the effectiveness of the Flipped Digital Classroom (FDC) method on student engagement and English writing proficiency. It employs a quasi-experimental 2x3 factorial pretest-post-test non-equivalent group design and collected data through the Student Engagement in Schools Questionnaire and an English writing test. The FDC group receives pre-recorded lectures, additional reading materials, and online writing assignments before face-to-face discussions, while the control group follows a lecture-based approach with assignments. The analysis involves 48 FDC students and 51 controls, categorized by engagement levels (high, medium, low). Validity and reliability tests are conducted on the questionnaire data, rated on a 5-point

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Likert scale, while English proficiency is assessed using an English Writing Test. Hypothesis testing utilizes descriptive and inferential statistics, including Two-Way ANOVA. The results indicate a significant 18-point increase in English writing scores for FDC students compared to controls. Furthermore, an interaction analysis reveals a considerable positive impact of method and engagement level on writing skills ($p=0.00$). English language instructors are encouraged to adopt the FDC method to enhance student engagement and academic achievement in English writing literacy through technology-based learning.

Keywords: Digital-based learning, English writing proficiency, Flipped Digital Classroom (FDC) method, student engagement.

1. INTRODUCTION

English writing proficiency has gained significant recognition globally, especially in the era of globalization and increased connectivity (Rao, 2019a). English has emerged as the dominant international language for international business, academic, and cultural communication (Rao, 2019b). Students with excellent English writing skills are at an advantage in various career fields and international studies (Zainuddin et al., 2019).

In some countries, like Indonesia, improving English writing skills still presents challenges due to factors such as insufficient and ineffective teaching methods, limited access to resources to support learning, and a lack of opportunities to practice English outside of the classroom (Hibatullah, 2019; Kacetl & Klímová, 2019). Improving students' English writing skills requires the use of self-directed learning techniques that foster creativity, and one such method is the digital-based Flipped Classroom. This approach enables students to access learning materials on digital platforms independently before interacting with instructors in the classroom. Consequently, classroom time can be used more efficiently for discussions, exercises, and deeper comprehension. Christoffersen (2019) and Etemi et al. (2021) researched the implementation of the digital-based Flipped Classroom using online platforms such as Google Classroom, Zoom Meeting, and Microsoft Teams at Stanford University in America and Oslo University in Canada, revealing a positive impact of the digital-based Flipped Classroom on student engagement and learning outcomes.

Schlegelmilch (2020) revealed the influence of digital-based flipped classrooms on student engagement and learning outcomes. The impact of the digital-based flipped classroom method is highly positive on student engagement and learning outcomes at the University of Toronto, Canada, utilizing online platforms such as Canvas and Blackboard Collaborate (Mittal Bishnoi, 2020), as well as at Tsinghua University, Korea, utilizing social media platforms (Yu et al., 2022). Similarly, Mavrodieva et al. (2019), utilizing Google Classroom and social media platforms, demonstrated high levels of student engagement and academic achievement at Keio University, Japan. The utilization of Google Classroom and Zoom Meeting by Kim et al. (2022) in Korea also showed a significant impact. Finally, Low et al. (2021) conducted research exploring the impact of digital-based Flipped Classroom at Universiti Teknologi

MARA, Malaysia, revealing that this method can encourage student engagement, which positively contributes to learning outcomes.

The use of digital-based learning in Indonesia has been increasing, especially since the COVID-19 pandemic. Distance learning has become a popular option. However, almost all reports on the implementation of distance learning have raised new issues, such as the loss of learning, as highlighted by [Dorn et al. \(2020\)](#). With the gradual improvement of health conditions and the decline in COVID-19 cases worldwide, the Ministry of Education has reintroduced 100% face-to-face learning starting from the second semester of the 2021/2022 academic year until 2022/2023. This decision is a step towards normalcy but still encourages schools to incorporate technology to support classroom learning processes. Teachers are now directed to develop student-centered digital learning models, one of which is the Flipped Digital Classroom (FDC).

FDC's goal is to provide students with direct learning experiences that enhance their engagement and, as a result, improve their learning outcomes, particularly in the field of social sciences ([Loveys & Riggs, 2019](#)). Additionally, ubiquitous learning enables students to learn anytime and anywhere using a variety of digital media through their smartphones ([Rahmelina et al., 2019](#)). Students can download learning materials from Google Classroom and social media platforms, which are prepared by their teachers. Integrating technology into pedagogy is essential for the sustainability of digital learning in Indonesia.

As the demand for flexible learning options increases, the FDC model has emerged as a promising solution. According to [Webel and Otten \(2015\)](#), this model offers several benefits, including the ability to learn outside the classroom and the convenience of completing assignments on smartphones. [Sykes et al. \(2014\)](#) found that mobile-based learning can significantly enhance access to learning materials and accelerate mastery of classroom content. Furthermore, [Toto and Limone \(2019\)](#), [Mischenko et al. \(2020\)](#), and [Zen et al. \(2023\)](#) indicated that integrating FDC with social media can improve student engagement and learning outcomes. [Hinojo Lucena et al. \(2020\)](#) reported that the FDC model can boost motivation and learning outcomes when using platforms like WhatsApp. However, there is still a lack of research specifically exploring the use of FDC with the integration of Google Classroom, Zoom Meeting, and social media to enhance student engagement and English writing skills.

Educators must adapt to digital teaching methods to stay current, as highlighted by [Østerlie and Mehus \(2020\)](#). This study aims to test the effectiveness of the Flipped Digital Classroom (FDC) approach in improving student engagement and English writing skills. [Tucker \(2012\)](#) and [Singh and Arya \(2020\)](#) strongly supported the integration of the FDC model into digital teaching methods using various platforms such as WhatsApp, Facebook, Instagram, Google Classroom, Google Meet, Zoom Meeting, Edmodo, Moodle, and Microsoft Teams for effective distance learning.

In this study, FDC utilized three platforms for learning: Google Classroom, Zoom Meeting, and social media. These platforms are user-friendly and provide a structured online learning environment that is easily accessible to both students and instructors. They offer features such as assignment submissions, discussions, and real-time feedback, which enable interaction and communication between students and instructors ([de Oliveira Dias et al., 2020](#); [Oyarinde & Komolafe, 2020](#)). According to [Hengky \(2022\)](#), the advantages of these platforms compared to other online learning platforms are their ease of integration, user-friendly interface, and flexibility in

organizing learning sessions. Additionally, according to [Busebaia and John \(2020\)](#), the ability to provide direct feedback and present material by digital media interactively enhances student engagement and reinforces their understanding of the learning material.

The novelty of this research lies in testing the effectiveness of the FDC model integrated with Google Classroom, Zoom Meeting, and social media to enhance engagement and learning outcomes in English writing skills. Given the importance of FDC research in post-COVID-19 secondary education, this study focuses on these research questions:

1. Are there any differences in writing abilities between the FDC method and conventional methods?
2. Are there any differences in the writing abilities of students with high, medium, and low levels of engagement?
3. Is there any relationship between the model and student engagement in students' writing skills?

2. LITERATURE REVIEW

2.1 The Influence of Digital-Based Flipped Classroom on English Writing Skills

Based on several studies, it is evident that implementing the Digital-Based Flipped Classroom method positively impacts students' English writing skills. In-depth research by [Ebron and Mabuan \(2021\)](#) and [Adhami and Taghizadeh \(2022\)](#) indicated that online flipped classroom methods, such as chat rooms and teleconferencing, significantly enhance students' writing skills. Further investigations by [Güvenç \(2018\)](#) and [Lin \(2019\)](#) demonstrated that online flipped classroom methods, utilizing social media platforms, are highly beneficial in improving students' writing skills. [Qader and Yalcin Arslan \(2019\)](#) and [Indayani et al. \(2022\)](#) confirmed that the Flipped Classroom method utilizing digital platforms such as WhatsApp and Facebook is tremendously effective in enhancing students' writing skills. Similarly, research conducted by [Zou and Xie \(2019\)](#) and [Ghufron and Nurdianingsih \(2021\)](#) showed that online Flipped Classroom methods are proven to be highly effective in improving students' English writing skills.

The effectiveness of Flipped Classroom methods in improving students' English writing learning outcomes has been demonstrated by [Laura Angelini and García-Carbonell \(2019\)](#) through their research on digital-based platforms. Similarly, [Arifani et al. \(2020\)](#) have confidently reported that a social media-based flipped classroom approach significantly influences the English writing skills of students. Moreover, the study by [Engin \(2014\)](#) has provided solid evidence of the effectiveness of digital-based flipped classroom methods in enhancing the learning outcomes of students in English writing.

2.2 The Influence of Student Engagement on English Writing Skills

Recent research indicates a positive correlation between student engagement and English writing proficiency. [Zhang and Hyland \(2018\)](#) found that actively engaged students tend to have better writing skills. In China, [Yu et al. \(2023\)](#) discovered that

student engagement is positively associated with writing ability, and [Zheng and Yu \(2018\)](#) reported that student engagement influences students' English writing skills. In Chinese EFL contexts, [Cheng and Liu \(2022\)](#) also found a positive relationship between student engagement and English writing achievement.

Similarly, studies conducted in Taiwan and Malaysia by [Lin et al. \(2015\)](#) and [Zhang et al. \(2023\)](#), respectively, demonstrated that student engagement has a positive impact on English writing proficiency. [Zheng et al. \(2022\)](#) researched L2 students' participation in collaborative writing and found that student engagement correlates positively with the quality of English writing. In China, [Tian and Zhou \(2020\)](#) discovered that student engagement has a positive effect on students' confidence and English language skills. Finally, [Koltovskaia \(2020\)](#) reported a positive correlation between student engagement and English writing learning outcomes.

2.3 The Interaction between Flipped Classroom Method and Student Engagement in English Writing Skills

Previous studies have revealed a significant interaction between the Flipped Classroom method and students' engagement levels regarding English writing skills across various universities worldwide. For instance, [Afzali and Izadpanah \(2021\)](#) demonstrated that the effective use of the Flipped Classroom method enhances student engagement in learning and positively impacts students' English writing abilities. Similarly, [Meyliana et al. \(2021\)](#) confirmed that the interaction between the Flipped Classroom method and students' engagement levels is strongly associated with improved student learning outcomes.

[Florence and Kolski \(2021\)](#) revealed that the interaction between Flipped Classroom and student engagement significantly influences the enhancement of English writing skills. [Altas and Mede \(2021\)](#) in Turkey found that integrating the Flipped Classroom with student engagement has a positive impact on students' English writing abilities. These findings contribute significantly to understanding the quantitative interaction between the Flipped Classroom method and students' participation levels in improving English writing skills.

3. METHODS

3.1 Research Design

The study used a 2x3 factorial quasi-experimental design ([Creswell's, 2014](#)) to explore the relationship between FDC and students' writing proficiency, the impact of varying levels of student engagement on writing abilities, and the interaction between FDC and student engagement in explanatory text types. Conducted over three months, the research involved experimental and control groups with different academic tools.

3.3 Research Sample

The study involved second-semester students enrolled in the Economic Faculty at Universitas Sumatera Barat Pariaman, who were taking English business subjects. Purposive random sampling was used to select two classes with a total of 105 students.

Following the research, only 99 students who had completed writing skills learning along with the measurement of student engagement were included. The experimental class consisted of 48 students, while the control class had 51 students in the final sample.

3.4 Research Instruments

The Student Engagement in Schools Questionnaire (SESQ) is used as a research tool to measure students' self-regulation in the learning environment (Lam & Jimerson, 2008). Self-regulation is essential for students' engagement in the learning process, including their ability to manage their time, set goals, and monitor their learning progress. Students with good self-regulation tend to be more proactive in seeking resources, completing tasks independently, and participating in class discussions. Self-regulation is assessed based on students' ability to overcome barriers and challenges in learning, and how they can develop strategies to overcome difficulties, seek assistance, and remain motivated despite facing obstacles. These items, adapted from Hart et al.'s (2011) work underwent refinement based on expert recommendations, eliminating similar or irrelevant items. The selected 23 items demonstrate strong validity and reliability, with values exceeding 0.36, as indicated by a Cronbach's Alpha of 0.932 (Schunk & Zimmerman, 2012).

The study evaluated how engaged students were during the learning process using a 23-item SESQ scale that included a 5-point Likert scale ranging from one to five. Both the experimental and control groups completed an assessment that focused on the structure of the explanation text, specifically their writing skills. This assessment looked at elements such as the title, introduction, identification of the phenomenon, a series of sequenced paragraphs, and a concluding paragraph. The rubric used to assess the student's writing ability consisted of four criteria: low (0-45), fair (46-60), good (61-79), and excellent (80-100).

3.5 Procedure and Data Analysis

We employed a random assignment method to allocate participants into a 2x3 factorial design, creating two classes with two groups categorized by their level of student engagement. The experimental class (48 students, equally distributed among high, moderate, and low student engagement levels) utilized the FDC method, while the control class (51 students, categorized by high, moderate, and low student engagement) followed traditional teaching methods. Both groups underwent a pretest before engaging in English language learning activities.

In the experimental class, the FDC method was implemented through various digital platforms, promoting collaborative learning. Instructors set objectives and facilitated student interaction, utilizing communication tools such as discussion forums and video calls to support group tasks. The covered texts encompassed a wide range of subjects related to education.

On the other hand, the control class employed conventional methods to cover the same content. The post-test assessment evaluated the students' English writing skills through an essay in the explanatory text format. The collected data underwent descriptive and inferential statistical analyses using SPSS, which included descriptive statistics for student engagement and writing skills. Furthermore, a Two-way ANOVA

was carried out to investigate the influence of FDC and student engagement on English writing proficiency.

4. RESULTS

4.1 Students' Engagement

The Student Engagement in School Questionnaire (SESQ) was used to evaluate students' engagement specifically in English language studies. This survey contained various questions designed to assess student participation in learning goals, intrinsic motivation, and behavioral, emotional, and cognitive engagement in learning tasks. The survey consisted of 23 items, and the assessment of student engagement was based on a 5-point Likert scale. The percentage of respondents' achievement level per item was calculated to provide a comprehensive analysis. Detailed analysis results can be found in Table 1.

Table 1. Engagement of students in the experimental class.

No.	Indicator	Likert scale	%	Level
Behavioral Engagement				
1	I actively participate by answering questions, presenting new ideas, and engaging in discussions effectively during both synchronous and asynchronous classes.	3.01	61.7	Moderate
2	In online learning, both synchronous and asynchronous, I actively engage in group discussions.	4.21	87.8	High
3	I enthusiastically pose questions and present new ideas to the instructor regarding proper techniques for writing English explanation texts.	3.99	82.6	High
4	I evaluate each challenge I encounter while working on writing English explanation text assignments.	4.16	86.1	High
5	I am actively involved in practicing writing explanation texts related to assignments given by the instructor, utilizing the FDC method.	4.11	86.1	High
6	Diligently, I seek information on tips and strategies for writing English explanation texts while following FDC classes using Google Application for Education and social media.	4.26	82.6	High
7	I actively inquire with the instructor about the structure of writing English explanation texts.	2.83	60.9	Moderate
8	I put in more effort when practicing writing explanation texts when the instructor assigns English Writing tasks in FDC classes.	4.02	83.6	High
9	I enthusiastically partake in exercises and simulation sessions for writing explanation texts in both synchronous and asynchronous FDC classes.	2.90	61.7	Moderate
	Average	3.73	77.5	Moderate
Emotional Engagement				
10	I enjoy participating in this English Writing class using the FDC method.	4.39	98.3	High
11	I feel content and challenged while working on writing English explanation text assignments.	3.92	80.9	High
12	I take pleasure in collaborating within groups to complete English explanation text assignments.	4.28	88.7	High

Table 1 continued...

13	I'm pleased to follow the FDC teaching method to enhance my English explanation writing skills for the future.	3.04	63.5	Moderate
14	I feel joyful receiving guidance from the instructor and fellow peers in enriching my skills in writing explanation texts in FDC classes.	4.23	88.7	High
15	I'm extremely excited to be part of this FDC class to enhance my ability to write explanation texts.	4.16	85.2	High
16	I take pride in my achievements in writing explanation texts after undergoing the FDC teaching method implemented by the instructor.	2.96	61.7	Moderate
	Average	3.85	81.0	High
Cognitive Engagement				
17	I am highly focused during learning, especially in comprehending the techniques for writing English explanation texts in FDC classes.	4.10	86.1	High
18	My knowledge continues to expand by participating in all activities of the English Writing course using the FDC method.	2.86	60.9	Moderate
19	The FDC method has proven to be highly beneficial in enhancing my competence in writing accurate English explanation texts.	4.21	87.8	High
20	I am very eager to reinforce my English Writing skills, particularly in writing explanation texts.	3.07	62.6	Moderate
21	I am dedicated and continuously strive to become accustomed to writing explanation texts while participating in classes using the integrated FDC method with integrated Google Classroom, Zoom Meeting, and social media.	4.08	85.2	High
22	I am present and actively engage in discussions about proper techniques for writing English explanation texts in synchronous or asynchronous FDC sessions.	3.94	82.6	High
23	I am elated to be involved in the FDC method developed by the instructor to elevate my essay writing competence, especially in writing explanation texts.	2.86	61.7	Moderate
	Average	3.59	75.3	Moderate
	Total	3.72	77.9	Moderate

Table 1 shows the average Behavioral Engagement score is 3.73, suggesting that students were moderately involved. They actively participated in group discussions, evaluated challenges, practiced writing explanatory texts related to assignments, and sought information on writing techniques. However, there are certain indicators where their involvement was more moderate, such as actively inquiring about the structure of writing English explanatory texts and enthusiastically participating in exercise and simulation sessions.

The average score for Emotional Engagement is 3.85, indicating a high level of emotional involvement. Students were seen to enjoy the FDC method, finding satisfaction and challenges in assignments, collaborating within groups, and feeling content with guidance. While a few indicators showed more moderate emotional engagement, overall, students appeared to have positive emotional experiences with the FDC method.

Lastly, the average score for Cognitive Engagement is 3.59, reflecting a moderate level of cognitive involvement. Students appeared focused on understanding writing techniques, recognizing the benefits of the FDC method in enhancing

competence, and actively engaging in discussions. The findings on student engagement during the FDC Method are presented in Table 2.

Table 2. Student engagement in FDC Method.

Student regulated learning	Category			Means	Level
	Low (1.00-2.33)	Moderate (2.34-3.66)	High (3.67-5.0)		
Behavioral	9 (18.8%)	15 (31.3%)	24 (50.0%)	4.04	High
Emotional	12 (25.0%)	19 (39.6%)	17 (35.4%)	3.51	Moderate
Cognitive	10 (20.8%)	22 (45.8%)	16 (33.3%)	3.47	Moderate
Average				3.66	Moderate

It appears that the students in the FDC class exhibit varying degrees of engagement in their learning. Based on Table 3, the behavioral category indicates that half of the students showed high levels of engagement, achieving an average score of 4.04. Meanwhile, the emotional category reveals that 39.6% of students exhibited moderate engagement levels with an average score of 3.51. In contrast, the cognitive category showed that almost half of the students (45.8%) displayed moderate levels of engagement with an average score of 3.47. Overall, the collective average score across all categories is 3.66, indicating a moderate level of engagement in learning.

Table 3. Student engagement in the Control class.

Student regulated learning	Category			Means	Level
	Low (1.00-2.33)	Moderate (2.34-3.66)	High (3.67-5.0)		
Behavioral	12 (23.5%)	17 (33.3%)	22 (43.1%)	3.15	Moderate
Emotional	16 (31.4%)	20 (39.2%)	15 (29.4%)	3.01	Moderate
Cognitive	14 (27.5%)	21 (41.2%)	16 (31.4%)	3.07	Moderate
Average				3.21	Moderate

In Table 3, the student engagement in the conventional class also demonstrates varying levels of learning regulation. In the behavioral category, it is revealed that 43.1% of students exhibited high learning engagement, with an average scale of 3.15. Within the emotional category, 39.2% of students showcased a moderate level of learning engagement, yielding an average scale of 3.01. Meanwhile, within the cognitive category, 41.2% of students exhibited a moderate level of learning engagement, with an average scale of 3.07. The overall average across all categories is 3.21, indicating a moderate level of learning engagement.

4.2 Writing Skills

Figure 1 illustrates the findings of the study regarding the impact of FDC on writing skills. The information presented in Figure 1 illustrates that the scores of the experimental class are higher than the average scores of writing explanatory texts achievement. For further clarity, this can be observed in Table 4.

Table 4 illustrates that the mean score for the FDC-SE High group is 79.56, indicating a high level of comprehension. The FDC-SE Moderate group has an average score of 74.63, signifying a moderate understanding of the subject. Meanwhile, the FDC-SE Low group obtained an average score of 67.88, indicating a lower level of understanding. On the other hand, within the Convent-SE group, the average score is

67.00 for Convent-SE High, 58.47 for Convent-SE Moderate, and 42.59 for Convent-SE Low. These findings reveal variations in students' comprehension of the subject, with the Convent-SE High and Convent-SE Moderate groups displaying relatively higher levels of understanding compared to Convent-SE Low. The increase in the average score from the control to the experimental class is 18.0012.

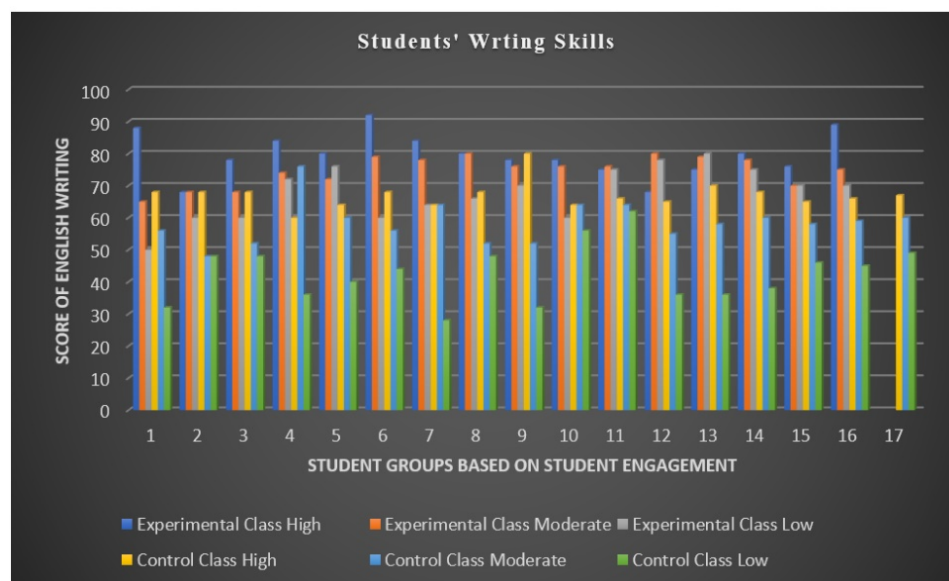


Figure 1. Students' writing skills in experimental dan conventional classes.

Table 4. Descriptive analysis of student writing skills.

	N	Minimum	Maximum	Mean	SD
FDC-SE High	16	68.00	92.00	79.5625	2.75247
FDC-SE Moderate	16	65.00	80.00	74.6250	1.71699
FDC-SE Low	16	50.00	80.00	67.8750	2.30161
Convent-SE High	17	60.00	80.00	67.0000	1.10792
Convent-SE Moderate	17	48.00	76.00	58.4706	2.45288
Convent-SE Low	17	28.00	62.00	42.5882	3.01429
Average increase in scores from the control to experimental classes				18.0012	

4.3 The Influence of FDC and Engagement on Students' Writing Proficiency

Before conducting the One-Way ANOVA test, we assessed the normality and homogeneity of the data. The subsequent section presents the results of the data normality assessment.

Table 5. Normality test.

	Method	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Writing Skills	Flipped Digital Classroom	.114	48	.152	.979	48	.538
	Conventional	.135	51	.120	.948	51	.127

The Kolmogorov-Smirnov test yielded a significant value of 0.152, which is greater than 0.05. Similarly, the Shapiro-Wilk test produced a significance value of 0.538, also greater than 0.05. These outcomes suggest that the learning outcomes data for both test groups exhibited a normal distribution, given that the Sig. value (significance level) was greater than $\alpha=0.05$. With the data meeting the normal

distribution criteria, the Independent Sample T-test was employed to assess the homogeneity of data, yielding the subsequent outcomes.

Table 6. Homogeneity test.

		Levene statistic	df1	df2	Sig.
Writing skills	Based on Mean	.172	1	97	.679
	Based on Median	.280	1	97	.598
	Based on the Median and with adjusted df	.280	1	95.510	.598
	Based on trimmed mean	.186	1	97	.667

Table 6 shows the homogeneity test results using Levene's Test, with a significant value of 0.679, indicating uniform variances among the three populations. Since normality and homogeneity conditions are met, a Two-Way ANOVA test was followed.

Table 7. Tests of between-subjects effects.

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	10767.042a	5	2153.408	31.915	.000
Intercept	362648.262	1	362648.262	5.375E3	.000
Method	2031.373	1	2031.373	30.107	.000
Engagement	8205.790	2	4102.895	60.808	.000
Method & engagement	478.316	2	239.158	3.545	.033
Error	6274.978	93	67.473		
Total	378379.000	99			
Corrected total	17042.020	98			

Table 7 illustrates a significant relationship between the FDC teaching method and student engagement, as well as an interaction between Method and Engagement in English writing proficiency. The test results reveal that the utilized method yielded a sum of squares of 10767.042 with 5 degrees of freedom, resulting in an average squared value of 2153.408. The computed F-value of 31.915 with a significance value of 0.000 indicates an overall significant impact of the model on students' English writing proficiency. The method variable (2031.373) exerts a substantial influence on writing ability. Similarly, the Engagement variable (8205.790) demonstrates a significance value of 0.000, highlighting the significant contribution of student engagement to writing proficiency. We found an interaction between the learning method and student engagement, with a significance value of 0.033.

An additional ANOVA test, followed by a Post Hoc analysis, was conducted to assess the interaction among high, moderate, and low levels of student engagement with the FDC method. The outcomes are presented in Table 8.

Table 8. Multiple comparisons.

(I) Student engagement	(J) Student engagement	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
High	Moderate	11.6667*	2.02219	.000	6.8502	16.4832
	Low	22.3636*	2.02219	.000	17.5471	27.1801

Table 8 continued...

Moderate	High	-11.6667*	2.02219	.000	-16.4832	-6.8502
	Low	10.6970*	2.02219	.000	5.8805	15.5135
Low	High	-22.3636*	2.02219	.000	-27.1801	-17.5471
	Moderate	-10.6970*	2.02219	.000	-15.5135	-5.8805

The study found a significant difference in English writing skills between students with high student engagement status (SE) and those with medium, as well as between medium and low SE, and high and low SE (Sig. 0.000). The graphs present the mean marginal values for students attending classes employing different strategies (FDC and conventional) and varying levels of student engagement (high, moderate, and low). The graphs illustrating the estimated mean marginal values are shown in Figure 2.

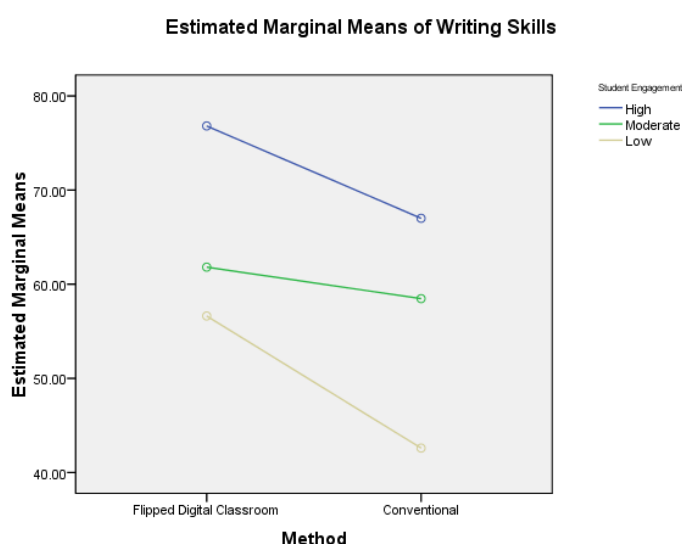


Figure 2. Estimated marginal means of students' writing skills related to different teaching methods and student engagement.

The estimated marginal means in Figure 2 indicate that the average writing ability estimates of students using the FDC with high, moderate, and low engagement were higher compared to the writing ability of students in the conventional class with the same levels of engagement. The interaction graph depicts two non-parallel lines (they intersect), indicating an interaction between the method and the level of student engagement regarding their writing skills.

5. DISCUSSION

5.1 The Impact of Flipped Digital Classroom Method on Writing Skills

The research findings indicated that the integrated FDC utilizing Google Classroom, Zoom meetings, and social media significantly impacted students' writing skills compared to traditional classroom methods. The experimental group demonstrated much better performance than the control group, with average scores of

73.49 and 67.72, respectively. These results are consistent with the findings of [Reflianto et al. \(2021\)](#) and [Zen et al. \(2023\)](#), which also asserted that the Flipped Classroom method effectively enhances English language proficiency. Other studies conducted by [Huang and Hong \(2016\)](#) and [Indayani et al. \(2022\)](#) supported these findings, showing that students taught using the flipped class method exhibit a significant improvement in their English language abilities.

This research also correlates with the findings of [Arifani et al. \(2020\)](#), indicating a significant impact of teaching methods and student engagement on writing skills. Other studies, such as [Roohani and Rad \(2022\)](#) and [Laura-De La Cruz et al. \(2023\)](#), also demonstrated that FDC utilizing integrated Google Classroom and Zoom can enhance English language proficiency. These research findings support the statements of [Connor et al. \(2009\)](#) and [Li and Li \(2022\)](#) that there is a significant interaction between the flipped class teaching method and student engagement in influencing English language skills.

In line with these research findings, efforts by teachers to improve students' writing skills suggested providing English text-writing exercises at home ([Kvashnina & Martynko, 2016](#)). Using various questioning strategies could guide students in structuring appropriate text frameworks. Implementing FDC could give students an initial exposure to prepare them for understanding lesson content before synchronous online classes begin. This method fostered a deeper understanding of English language learning strategies and encouraged active student participation. Lecturers should pose creative questions that guide students in formulating appropriate responses, with primary questions directing students to focus on understanding the ideas they would develop in their explanatory texts ([Al-Qahtani, 2020](#)).

Assigning writing tasks at the beginning of class enabled students to hone their skills in composing explanatory texts using digital media while at home, as was implemented in this FDC method. The method's advantage lay in encouraging students to repeatedly interact with the course material. This aligns with the assertions of [Guszak \(1967\)](#) and [Risnanda \(2018\)](#) that educators should sharpen their competencies in implementing digital-based flipped classes; both advocate for instructors to guide students through discussions and questioning, supporting them in generating ideas for their written texts. [Borich \(2016\)](#) revealed that 80% of class activities should involve question-and-answer interactions ([Hellman & Milling, 2020](#)).

The implementation of the FDC method combined with student involvement in teaching writing in this study revealed that this method fostered a connected learning atmosphere, motivating students to work on essay writing tests outside of class. Students could articulate their ideas both orally and in writing. In responding to the given questions, instructors guided students through sequential questions until they understood the concepts to be developed in their writing.

The selection of platforms in this research was based on ease of use and familiarity among students. According to [Indayani et al. \(2022\)](#), digital platforms enable comfortable communication and learning, providing students with easy access to materials shared by educators. Through FDC, students could collaborate on explanatory text tasks, aligning them with media that suit their needs.

The teleconferencing features of Google Classroom and Zoom significantly support synchronous and asynchronous classes ([Sela et al., 2022](#)). To test the hypothesis regarding the difference in writing skills between students undergoing FDC and conventional methods, a two-way ANOVA analysis was conducted. The results

showed that FDC significantly affects students' English writing abilities, with a significance value of 0.00.

These results indicate that digital media in English language courses for second-semester economics students at Universitas Sumatera Barat Pariaman were more effective than conventional classes. FDC allowed for comprehensive learning through synchronous and asynchronous classes, unlike the limited scope of traditional face-to-face classes. Additionally, the use of social media applications supported the success of this method. Teleconferencing media are more engaging for participants and interact directly with educators, making FDC advantageous compared to conventional classes (Hasanah & Arifani, 2020; Indayani et al., 2022; Martin & Tapp, 2019).

Based on the analysis of FDC and conventional teaching methods, two different outcomes emerged. Writing skills were more effectively developed in FDC classes. Siswanto (2021) and Roohani and Rad (2022) demonstrated that interactive discussions and question-and-answer sessions enhance students' writing skills, complementing their media preferences. Incorporating information technology into pedagogy created a continuous, scheduled, and comprehensive digital classroom environment for educators to engage in synchronous and asynchronous online interactions with their students.

5.2 Student Engagement in Online Learning Affects Writing Skills

The findings indicate significant differences in student engagement levels concerning learning achievement. This observation is reinforced by the mean scores of writing ability in both experimental and conventional classes, where students engaged in the Flipped Digital Classroom (FDC) method achieved higher mean scores compared to the conventional classes. Analyzing writing skills based on varying levels of student engagement—high, moderate, and low—reveals that behavioral, emotional, and cognitive engagement significantly impacted the writing abilities of students in the course of Business English II, with a significance value of 0.004. These findings align with Henderson et al.'s report on the significant influence of digital learning media on learning outcomes (Henderson et al., 2020). Similarly, Engin (2014), Siswanto (2021) and Roohani and Rad (2022) asserted the positive impact of digital-based learning methods on learning outcomes.

The efficacy of the FDC method in enhancing student engagement is evident through students' motivation to access learning materials before synchronous online classes, fostering increased cognitive engagement and high participatory learning motivation. This aligns with the assertion that behavioral, emotional, and cognitive engagement components contribute to academic potential. Research also showed that digital-based learning methods positively influence the academic environment (Subramaniam & Muniandy, 2019). Creating an interactive academic atmosphere during online learning is crucial, as student satisfaction with digital media significantly impacts its effectiveness (Talan & Gulsecen, 2019). Studies by Chen Hsieh et al. (2017) and Indayani et al. (2022) further highlighted that student engagement in digital-based flipped classrooms enhances confidence in exploring English language skills, leading to increased self-directed learning and academic performance.

The findings of this research also support Verawardina et al. (2020), stating that educators should create enjoyable and interactive digital learning processes to foster sustained student enthusiasm for learning. Furthermore, Zheng et al. (2022) argued

that students' engagement in writing is influenced by their satisfaction with the technology used. In conclusion, the success of implementing digital-based teaching methods heavily relies on the level of student engagement, and appropriately tailored learning methods contribute to improving academic performance according to students' needs. This is consistent with [Phothongsunan's \(2020\)](#) statement that the Flipped Digital Classroom (FDC) method supported by digital media demonstrates increased student engagement intensity, resulting in better learning outcomes.

Likert scale analysis indicated that student engagement in FDC classes yielded higher average scores compared to the control group. This study confirmed that the comprehensive features of the FDC method significantly enhanced student engagement and academic performance compared to conventional methods. The increased engagement in the FDC process was attributed to its superior features, which addressed the limitations of traditional classrooms. [Indayani et al. \(2022\)](#) supported this, stating that digitally-based learning significantly influences student engagement more than conventional classrooms, which often fail to maximize learning time and rely more on lectures than on discussions and writing exercises.

These findings are consistent with [Gilboy et al. \(2014\)](#), [Indayani et al. \(2022\)](#), and [Zheng et al. \(2022\)](#), revealing that digital-based Flipped Classroom methods can be the best means to enhance students' writing abilities in future learning. [Qader and Yalcin Arslan \(2019\)](#) and [Reflianto et al. \(2021\)](#) emphasized the excellence of this method, allowing students to access learning materials according to their preferences. In conclusion, this research indicates that implementing FDC through integrated platforms like Google Classroom, Zoom meetings, and social media positively impacts student engagement, resulting in improved English writing abilities.

5.3 Method Interaction and Student Engagement in Writing Ability

The correlation between the FDC method and student involvement in English text writing ability revealed a significant connection that affects students' writing skills. The research findings demonstrated that the implementation of the FDC method successfully fostered an interactive and positive learning environment, particularly in promoting student engagement. This discovery uncovered a notable interaction effect ($\text{sig}=0.000$) between the FDC method and student engagement concerning writing ability. The study indicated that this interaction stems from the uniqueness of individual characteristics, especially among highly engaged students. Those with high engagement tended to exhibit better self-management skills in enhancing their writing capabilities.

Students with high engagement were more prepared to develop ideas when composing English explanatory texts, ultimately contributing to the improvement of writing skills. The FDC method, when used with tailored media according to students' needs, has been proven to be more effective and efficient compared to conventional teaching methods in teaching English text writing. According to [Fan \(2022\)](#), the increased effectiveness of the FDC method could be attributed to various factors, including the ability to set learning goals, determine when to apply the method along with the use of appropriate media, and assess the method's effectiveness.

The interaction between these two variables demonstrated harmony and synergy in enhancing students' writing abilities through the selected teaching method. Students with high engagement tended to have higher writing skills compared to students with

moderate or low engagement. This difference is evident from the small variance in the average engagement scores between the experimental and control groups. Similarly, when comparing the engagement of moderate and low students in online learning, there is a significant difference in writing skills, as indicated by $\text{sig}=0.000$.

This study reinforced previous findings indicating a strong correlation between the flipped classroom method and traditional classroom settings regarding the development of speaking skills (Alsowat, 2016), reading skills (Reflianto et al., 2021; Septiani et al., 2024), and writing skills (Roohani & Rad, 2022). Additionally, this research highlighted the interaction between the use of digital media in flipped classroom methods and social engagement, both of which have reciprocal impacts on English language proficiency (Zen et al., 2023). Meanwhile, the findings of Arifani et al. (2020) and Indayani et al. (2022) revealed that alignment between the digital-based teaching methods used and the level of student engagement would result in greater academic achievement in mastering English writing skills.

6. CONCLUSION

The findings of this research indicate that the level of student engagement, whether high, moderate, or low, significantly impacts students' learning outcomes in English writing proficiency. This research provides evidence in favor of the idea that the adoption of the FDC method positively impacts student engagement. The interaction between teaching methods and student engagement also demonstrates varying effects on writing ability. By combining appropriate methods and a high level of engagement, digital-based flipped classroom learning can serve as an effective method to enhance students' writing skills. It is suggested that the Flipped Digital Classroom approach be implemented by English professors in universities to enhance student engagement and writing abilities. This method can serve as an alternative learning model to enhance the quality of students' English writing skills.

However, this research has some limitations. For instance, observing the behavior of digital-based students' writing skills using cooperative learning methods takes a significant amount of time, and close supervision of the experimental group is time-consuming. Therefore, this research is limited to a small group of students who are committed and willing to participate actively from start to finish.

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