



# Integrating hybrid learning and team-based project in EFL writing class

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This study aimed to describe the integration of hybrid learning and team-based projects in learning to write and to explain the effectiveness of implementing hybrid and team-based projects in improving students' writing performances. This research method was mixed with quantitative analysis using quasi-experiments and questionnaires, while qualitative analysis used observations in writing classes. The instruments applied were writing tests, questionnaires, and observations. The results of this study were feasible to be used and tested in a small-scale class in the third semester of English Education at one of the universities in Semarang, Central Java, Indonesia. The average result of the validation is more than four scores, so it is in the excellent category. Meanwhile, the results of the analysis of student perspectives on learning through Team-Based Projects were divided into four, namely; student perspectives and motivation regarding the implementation of hybrid learning, student perspectives on the effectiveness of Team-Based Projects, student perceptions of independent learning through team-based projects and hybrid learning, and student perceptions about working in groups. All of the indicators were categorized as excellent. In addition, the integration of hybrid learning and team-based project in the English Language Education Study Program with the participation of seventy-two students, with the final grades of all students being in the complete category above seventy so that the integration of hybrid learning and team-based projects was effectively implemented in genre text writing classes. Therefore, the results of this study could make a good contribution because they can motivate students to write texts and improve independent student learning.

**Keywords:** EFL Students, Hybrid Learning, Integrating, Team-Based Project, Writing

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## INTRODUCTION

English Education lecturers in Indonesia have responded to technological advances in the digital 5.0 era, so they have changed classroom learning from face-to-face to integrated face-to-face online, especially in writing (Wilson, 2020; Wijayatiningsih et al., 2021; & Maulida, 2020). Because they may not repeat material in face-to-face classes, a weakness of the face-to-face learning paradigm (Sun & Chen, 2016; Wright, 2017; Santikarn & Wichadee, 2018). In another context, many phenomena also occur in online learning: the lack of interaction that encourages character implementation in education, the lack of complete feedback for students, and the need for more logical and weighted learning involvement (Aslam et al., 2021; Lukas & Yunus, 2021). The phenomena in online learning also happens in English Education Study Programs at one of the private Universities in Indonesia, especially in genre-based writing courses where online learning has not provided complete facts that knowledge is evenly distributed and well implemented. This problem happened in 2020 and 2021 when

the writing class happened in online. These facts are supported with some previous studies about teaching writing through online ([Mahmud & German, 2021](#); [Simamora, 2020](#); [Wihastyenang et al., 2020](#))

Based on the previous studies in learning face to face and online, it needs to combine both of them in the teaching learning to create the harmonization process in learning writing ([Alsowat, 2022](#); [Tusino et al., 2021](#); [Wijayatiningsih et al., 2022](#)).

One of the facts that emerge is that students tend to close the camera during online classes where people are working, which will later affect student maturity ([Asgari et al., 2021](#); [Castelli & Sarvary, 2021](#); [Chen et al., 2020](#); [Gherhes et al., 2021](#); [Neuwirth et al., 2021](#)). The students also cannot focus on the content offered by lecturers, and e-learning often makes students unable to take full responsibility for their education. A hybrid learning model can be used to overcome the drawbacks of online and classroom learning, combining the best of both models. It allows students to learn both in school and outside the classroom learning model combines the benefits of face-to-face and online ([Wright, 2017](#); [Wang & Seepho, 2017](#); [Wang et al., 2017](#); [Williams & Lahman, 2011](#); [Lynch, 2014](#)).

On the other hand, until now, especially the English Language Education Study Program at one of private universities in Central Java, Indonesia, have utilized a teaching method known as "face-to-face learning," in which students do all their learning directly. The weakness of the face-to-face learning model is that it still relies on spatial and time ([Cheadae & Khongput, 2019](#); [Lynch, 2014](#); [Sun & Chen, 2016](#); [Wang et al., 2017](#); [Williams & Lahman, 2011](#)).

This generation was born due to the rapid development of information and communication technology (ICT) ([Ari et al., 2021](#); [Auster, 2016](#); [Sri et al., 2021](#); [Szeto, 2014](#); [Wright, 2017](#)). Teachers now learn online or via the internet, not in person. There are many benefits of online learning. First, everyone can know whatever they want without spatial and time constraints. Secondly, operational costs for each student to participate in learning activities become more affordable. Thirdly, it is more accessible to monitor student progress. Fourth, the web-based learning design enables personalized learning activities. Lastly, learning materials can be updated more quickly because of the web design. However, the weaknesses of this model include the following:

1. Student abilities and motivation.
2. Access to learning using the web is often a problem for students.
3. Students quickly feel bored and bored if they need access to information.
4. Guidance is required for students to find relevant information.
5. Learning is only possible if there are adequate communication facilities.
6. Lack of direct interaction between lecturers and students.

Face-to-face and online models have drawbacks. Therefore, a hybrid learning paradigm was born. The term "blended learning" refers to instruction that combines face-to-face and online (e-learning) components Click or tap here to enter text. Not all class activities are replaced by online learning in hybrid learning. Instead, online learning complements those not offered in class ([Suh & Huh, 2017](#); [Sumarno & Tatik, 2018](#); [Titova, 2017](#); [Tsiakyroudi, 2018](#)).

According to previous research, hybrid learning is 30 percent better, 40 percent faster, and 30 percent cheaper than traditional learning in learning writing ([Alsowat, 2022](#); [Maulida, 2020](#); [Purnomo et al., 2016](#); [Tusino et al., 2021](#)). In addition, hybrid learning classrooms provide a comfortable learning atmosphere pleasantly. It is also much more fun ([Abdullah et al., 2022](#); [Baresh et al., 2018](#), [Baresh, 2019](#); [Heim, 2022](#); [Yang & Spitzer, 2020](#)). Both in-person and online classes have lower participation rates than hybrid learning classes.

Moreover, the government has announced the implementation of Merdeka Belajar, which is identically related to learning collaboratively with technology. One approach that can be accommodated in the class is hybrid learning, which will help students develop their character while also being responsible for their mastery of English with collaborative and participatory learning, according to the Key Performance Index of the Ministry of Education and Culture, collaborative and participative class ([Anis & Anwar, 2020](#); [Krishnapatria, 2021](#); [Lhutfi & Mardiani, 2020](#); [Meke et al., 2021](#)). However, this collaborative and participatory learning model through hybrid learning still has drawbacks. It must be comprehensively integrated into the process design, practice, and assessment of learning English with technology.

Hybrid learning offers many advantages to students, including face-to-face meetings and collaboration, synchronous and asynchronous online chats and discussions, real-time interaction and feedback from the instructor, optimal course design for both channels of instruction, technology-driven assessment, and traditional examinations ([Stein & Graham, 2020](#); [Banditvilai, 2016](#)); [Gulnaz et al., 2020](#)). The hybrid learning approach incorporates a wide variety of different types of constructs, including those listed above. The hybrid learning environment is utilized if each component is in place.

This research integrates Team-Based Projects or what we often call Project Based Learning as the capital of students socializing in life in society in the 5.0 era. It is also one of the approaches to teaching and familiarizing students to become knowledge producers in a learning community called Team Project Based Learning or Teamwork and learning project based ([Alwasilah, 2019](#); [Guo et al., 2020](#); [Villalba, 2022](#)).

Teamwork and project learning competencies (Team Project Based Learning/ TPBL) are cited as essential learning objectives in most universities worldwide. Therefore, team project-based learning is interpreted as a learning approach that focuses on student involvement in teams and has been introduced to maintain social skills,

creative problem-finding, and problem-solving skills ([Alwasilah, 2019](#); [Guo et al., 2020](#); [Villalba, 2022](#)).

[Lee et al. \(2017\)](#) discussed that educators have come to embrace TPBL, or team-based, project-based learning, as a method for improving classroom engagement and student outcomes. "True peer-based learning" (TPBL) is more than just a catchy name for group research. Nevertheless, TPBL stands out from the crowd. The degree to which students must engage in design, problem-solving, decision-making, and investigative activities to find solutions to a project's stated problems or challenges is indicative of the project's complexity ([Lee et al., 2017](#)). Project-based learning, especially at the university level, requires teamwork rather than individual effort due to the complexity and variety of tasks involved. In addition, there is a broader choice of instructional methods that can be used in project-based learning than in problem-based learning. Even if a project addresses a problem, the focus may change to an unrelated area that is not causing issues ([Lee et al., 2017](#); [Villalba, 2022](#)). Because of its emphasis on teamwork, TPBL challenges students to think independently and provide original solutions to problems. In this way, TPBL does more than group students together for problem-solving.

Hybrid Learning can be combined with a Team-Based Project learning model to overcome these deficiencies, focusing on increasing students' comprehension ([Kassem, 2018](#)). This model is a combination of learning in the classroom and can be done collaboratively outside the school. This is in line with the previous research about hybrid problem-based learning in speaking skills ([Kassem, 2018](#)), which positively affected students' speaking performances, independent and self-directed. The main point that hybrid-based project learning has been researched is that it is practical to implement in the classroom or online ([Yang & Spitzer, 2020](#); [Lynch, 2014](#); [Tusino et al., 2021](#)). However, most previous studies on hybrid learning have only focused on speaking vocabulary acquisition, students' engagement, and virtual or hybrid comparisons in the writing class without integrating team-based projects in writing genre-based instructions ([Baresh et al., 2019](#); [Abdullah et al., 2022](#); [Alsowat, 2022](#); [Baresh et al., 2018](#); [Heim, 2022](#)).

Furthermore, the writing skills of English Education students at Muhammadiyah University Semarang in the third semester show progress during the online process of assembling sentence ideas into paragraphs. However, difficulties arise in providing peer feedback, class involvement could be more optimal, and there is still relatively high plagiarism, around 30% when given a review from the lecturer. Even though the online learning process during the pandemic and new normal has integrated technology applications, e-learning, games, and providing motivation for writing, the involvement and giving of fellow students' feedback could be better conditioned and positive.

Based on the findings above, developing the Hybrid Learning Based Team Project model is urgently needed to improve students' performances, especially in genre-based writing. However, the combination of the Hybrid Learning

and Team-Based Project models is a new model whose validity, practicality, and effectiveness of this combined model still need to be discovered.

Therefore, this study discusses two research problems, as follows.

1. How to integrate a valid Hybrid Learning and Team-based Project in writing class?
2. Is implementing the Hybrid Learning and Team based effectively improving students' writing performance?

## METHODS

### Research Design

This research employed a mixed-method approach by applying an explanatory research design to find out the quantitative data as the main findings while the qualitative data is additional data to find out the comprehensive findings ([Cresswell, 2014](#); [Cresswell & Plano, 2018](#)). The quantitative approach applied the quasi-experiment design, and the qualitative method used classroom observation based on the seven steps of the team-based model ([Jalinus et al., 2017](#); [Lee et al., 2017](#)). The seven steps of a team-based project are making basic questions, designing project plans, compiling project schedules, monitoring students and project progress, testing test results, and evaluating experiences.

### Research Participant

This research was conducted in the Department of English Education at one of a private universities in Semarang, Central Java, Indonesia. This department offered courses in writing from the first to the sixth semester. This study was limited to genre-based writing because this course strongly connected to producing a genre or text. Seventy-two students in the third semester participated in the eight-week experiment, divided into thirty-four students in the control class and forty-two in the experiment class. They had age-ranged from 18-21 years old. This study employed purposive sampling since there are only two classes.

### Research Instruments

This study applied three instruments, namely writing essay tests, questionnaires, and observation sheets. The type of questionnaire used is a questionnaire for analyzing student needs in the implementation of hybrid learning and team-based projects, a questionnaire on student comfortable in using technology, a questionnaire on student motivation on knowledge with student writing results, student perspectives on the effectiveness of team-based projects, student perceptions of independent learning through team-based projects and hybrid learning, and student perceptions in group learning. The indicator of questionnaires modified from ([Ari et al., 2021](#); [Kassem, 2018](#); [Mulyadi et al., 2019](#)). The questionnaire had been validated in one of private universities in East Java, Indonesia and had valid result 0.295 and reliable results 0.75. The observation sheet is the observation of the learning process in the form of making basic questions, designing project plans, compiling project

schedules, monitoring students and project progress, testing test results, and evaluating experiences.

**Data Analysis**

The results of this study were analyzed using descriptive statistics, normality tests, validity tests, one-sample tests, alpha regression analysis, and effectiveness tests using the following effectiveness indicators quantitatively.

Analysis of the effectiveness of the HLBTP model is based on three indicators, namely;

- a. Completeness of writing ability
- b. The effect of motivation and independent learning on writing
- c. A comparative test of the experimental class with the control class

While the qualitative data was analyzed by using thematic analysis based on Team-Based Project steps [Baresh et al., 2019](#); [Abdullah et al., 2022](#); [Alsowat, 2022](#); [Baresh et al., 2018](#); [Heim, 2022](#)).

**RESULTS AND DISCUSSION**

*The Integration of Hybrid Learning and Team-Based Project in Writing Class*

This current research had four concept analyses: need analysis, design, development, implementation, and evaluation.

At the need analysis stage, researchers analyzed students' skills, knowledge, and learning motivation in the learning process in Genre Based Writing courses. This analysis was carried out using a questionnaire and observation method. The questionnaire was distributed from student perspectives in Hybrid Learning and Team-Based Project learning which was divided into satisfaction questionnaires in the implementation of hybrid learning and questionnaires for students' convenience in using technology. In contrast, the student perspective questionnaire on learning through the Team-Based Project is divided into four types, namely, student perspectives on knowledge with their writing results, student perspectives on the effectiveness of Team-Based Projects, student perceptions of independent learning through Team-Based Projects and Hybrid learning, and student perceptions about working in groups. The results of the satisfaction analysis in implementing hybrid learning are summarized in [Table 1](#).

[Table 1](#) reveals that the perspective of EFL students on implementing hybrid learning related to their satisfaction in writing class has the highest result on EFL learner satisfaction with class interaction in class 4.02. While the lowest effect on EFL learner satisfaction with writing material provided online is 3.56. The average score of statements about the EFL perspective, especially their satisfaction with hybrid learning in writing, is 3.78. Almost all of the questionnaire statements are above the standard criterion 3.5. Therefore, hybrid learning has progressed in scaffolding the writing learning process, especially using a genre-based approach. It has the same results as previous research from [Wijayatiningsih et al. \(2022\)](#) that EFL

learners tend to have a positive perspective in classroom interactions in writing with hybrid or mixed learning, especially the scaffolding of their processes in writing.

**TABLE 1 |** The Satisfaction Questionnaires in the Implementation of Hybrid Learning

Indicator	Mean	SD	Level
The satisfaction is that hybrid teaching is appropriate for situations where writing classroom space is limited.	3.78	1.02	Very Good
Satisfaction with hybrid formats in writing classes.	3.74	1.05	Very Good
Satisfaction with the lecturer's teaching methods in writing classes	3.78	1.07	Very Good
Satisfaction with class interaction in writing class	4.02	0.87	Very Good
Zoom meeting & google meet satisfaction in learning to write	3.86	1.03	Very Good
Satisfaction with writing learning management systems	3.8	1.05	Very Good
Satisfaction with written communication tools such as email, forums, g drive, Instagram, YouTube	3.68	1.15	Very Good
Satisfaction with writing materials provided online.	3.56	1.01	Very Good
Total	3.78	1.03	Very Good

The two results of the analysis of student satisfaction with the use of technology are summarized in [Table 2](#).

**TABLE 2 |** The Comfortable of Using Technology

Indicator	Mean	SD	Level
The use of email in writing class	3.68	0.82	Very Good
Typing and editing in paper writing assignments	3.76	1.08	Very Good
Delivering electronic documentation	3.72	1.03	Very Good
Receiving electronic documentation	3.46	1.05	Good
Downloading writing materials	3.74	1.03	Very Good
Listening writing materials on laptop or PC	3.66	1.10	Very Good
Writing product lay out	3.74	1.12	Very Good
Seaking verbally and sharing activities each other	4.16	0.96	Very Good
Total	3.74	1.02	Very Good

[Table 2](#) explains that students' comfort in using technology has the highest outcome indicator in speaking verbally and sharing at 4.16. However, there is the lowest result on the material gauge uploaded online. At first glance, this habit is carried out by students in everyday life and is



considered something that is usually done, obtaining the smallest average size of 3.46, which is included in the excellent category. In contrast, the intermediate results of the questionnaire indicators range from 3.6 to 4.1, which fall into the outstanding category. These results align with previous research (Santikarn & Wichadee, 2018) where the highest marks were in the use of chatting or talking online and sharing.

Furthermore, the results of the analysis of student perspectives on learning through Team-Based Projects are divided into four, namely; student motivation on knowledge with their writing results, student perspectives on the effectiveness of Team-Based Projects, student perceptions of independent learning through Team-Based Projects and Hybrid learning, and student perceptions about working in groups.

**TABLE 3** | Student Motivation on Knowledge with the Writing Results

Indicator	Mean	SD	Level
Motivation in developing the writing product	3.05	0.85	Good
Motivation in developing the skills in writing text	3.14	0.96	Good
Motivation in mastery the knowledge of discussion in the classroom	3.64	1.05	Very Good
Motivation in acquisition of various types of writing knowledge such as word choice, sentence structure and mechanics	4.10	0.95	Very Good
Motivation in developing the critical thinking patterns such as thinking based on things that are logical and systematic	3.63	1.01	Very Good
Motivation in developing independent learning in writing text	3.56	0.88	Very Good
Motivation in developing collaborative learning in writing class	3.75	1.09	Very Good
Mean	3.78	0.97	Very Good

Table 3 analyses students' motivation toward knowledge with their writing results. The highest marks are indicators of acquiring various types of writing ability, such as word choice, sentence structure, and mechanics of 4.10. In contrast, the lowest result is 3.05 on the genre writing product development indicator. Furthermore, the average result for all indicators is 3.78, which is very good.

So, this analysis's results align with previous research from Kassem (2018), where implementing hybrid and project-based learning can increase student motivation in

learning to speak. The difference in the results of this study is that student motivation increases in implementing hybrid learning and team-based projects in writing classes.

In addition, a need analysis was also carried out to analyze how far the student's perception of the effectiveness of the team-based project is presented in Table 4.

**TABLE 4** | Students' Perspectives on the Effectiveness of Team-Based Project

Indicator	Mean	SD	Level
Materials (handout, writing assignments) are fulfilled	3.82	0.82	Very Good
The problems encountered at the time of writing have been sufficiently resolved	3.71	0.93	Very Good
The number of handout materials has logical reasons according to the desired CPL	3.68	1.02	Very Good
The process of learning to write is arranged systematically	4.10	0.98	Very Good
The time for implementing the Team Based Project is sufficient according to the rules in the syllabus	3.74	1.07	Very Good
Mean	3.81	0.96	Very good

Table 4 describes that the results of the analysis of student perspectives on the effectiveness of Team-Based Project implementation are in the excellent category. The indicator with the highest achievement results in learning to write is systematically arranged where these results align with previous research (Wijayatiningsih et al., 2022). The results of this study have similar results in the process of writing texts by prioritizing harmonization between synchronous and asynchronous learning processes by using coherent and coherent outlines and plots.

In addition, the results of this study are also supported by an analysis of students' perceptions of independent learning using Team-Based Projects and Hybrid Learning, which are explained in detail in Table 5.

Table 5 describes the average student's perception of their learning independence through team-based projects and hybrid learning, which achieve good categories. The highest indicator is in the ability to solve difficulties encountered when writing texts, which these results following research from (Yang & Spitzer, 2020). However, the difference is that this study focuses on solving difficulties and challenges in writing texts. At the same time, (Yang & Spitzer, 2020) discusses how problems determine the main ideas in reading classes through hybrid learning.

**TABLE 5** | Student Perspectives on Independent Learning through Team-Based Project and Hybrid Learning

Indicator	Mean	SD	Level
The ability to choose reading sources that suit each other's preferences and writing ideas	3.72	0.91	Very Good
The ability to solve all difficulties in writing texts	3.92	1.01	Very Good
The need for assistance and assistance from lecturers in the learning process of writing texts	3.69	0.88	Very Good
Mean	3.77	0.93	Very Good

Furthermore, [Table 6](#) is the last in analyzing student perceptions of working in groups which can be seen as follows.

**TABLE 6** | The Student's Perspectives on Group Work

Indicator	Mean	SD	Level
The ability to work with friends in the teaching and learning process of writing texts	3.64	0.77	Very Good
I receive all opinions and input from all my classmates about the results of my writing products	3.89	1.13	Very Good
Differences in English proficiency do not affect the student learning process	3.53	0.91	Very Good
The ability to work together in groups to write texts rather than writing texts individually	3,3	0.82	Very Good
Mean	3.59	0.90	Very good

[Table 6](#) illustrates the perspectives of students in the group, which found that the highest results were on the student indicator receiving all opinions and input from classmates about their respective writing products, which were categorized in the excellent category. The results of this study follow the results of research by ([Alsowat, 2022](#); [Wijayatiningsih et al., 2022](#)), which state that peer feedback gives a positive perception in developing student writing essays.

Furthermore, the Hybrid Learning model is integrated into the Team-Based Project method at this stage in the design step. The Team-Based Project method is taken from the development of Project Based Learning ([Lee et al., 2017](#)), such as design, problem-solving, decision-making, and investigative activities. Meanwhile, Hybrid Learning is integrated with teaching and learning process activities in

genre courses based on writing using the theory from [Tusino et al. \(2021\)](#). Hybrid Learning is divided into online classes and offline classes. Brainstorming activities are done online to adapt students to new knowledge or skills. Exploration activities and assimilation of new knowledge or abilities are carried out in offline activities in class. The last stage is strengthening and understanding through application and evaluation. Which, in the end, is combined into one unit of the Hybrid Learning Based Team Project.

Next, the Hybrid Learning and team-based project model were assessed by the learning model validator in the development stage. The validator wrote English text to meet the validity rules before being tested in class on students. The results of the expert validation can be seen in [Table 7](#).

**TABLE 7** | Validation Result

No.	Indicator	Mean		
		Lesson Plan	Steps	Material
1	Learning model	4.03	4.30	4.17
2	Writing text	4.13	4.43	4.2
Criteria		Valid	Valid	Valid

[Table 7](#) illustrates the HLBTP model, which is feasible to use and test in small-scale classes in the third semester of English Education at the Muhammadiyah University of Semarang. The average result of the validation results is more than 4.00, so it is in the excellent category.

The validation results of the integration of this model were implemented in the S1 English Education Study Program with the participation of 72 students. It applied with the final scores of all students being in the complete category above KKM 70. There is an increase in effectiveness from the pre-test 57 to the post-test 81. Therefore, this research is categorized as successful in developing and implementing the model.

*The Effectiveness of Hybrid Learning and Team-Based Projects in Improving Students' Writing Performance*

Based on the normality test results, the sample comes from a normally distributed population. The Kolmogorov-Smirnov test was used to test for normality. Testing the hypothesis, which is divided into two, namely;

H<sub>0</sub> = data normally distributed

H<sub>1</sub> = data is not normally distributed

**TABLE 8 |** Normality Tests

	Tests of Normality					
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Writing	.102	45	.200*	.957	45	.094
Motivation	.112	45	.194	.978	45	.542
Independent learning	.100	45	.200*	.969	45	.258

a. Lilliefors Significance Correction  
 \*. This is a lower bound of the true significance.

From the normality test in [Table 8](#), it was found that the results of H<sub>0</sub> were accepted. If the sig value was > 5% with a significant level set by the researcher of 5%, the data is typically distributed. Based on the table using the Shapiro-Wilk test, it can be seen that sig for writing sig = 0.20 = 20% > 5%, sig motivation = 0.194 = 19.4% > 5%, sig independent learning = 0.20 = 20% > 5%. The results of this analysis indicate that all samples come from normally distributed populations.

Furthermore, the results of the analysis of the hypothesis test of the ability to write text with the completeness test through the calculation of the completeness test individually using the t-test. The hypothesis used to calculate the t-test is

- Hypothesis:  
 H<sub>0</sub> = μ ≥ μ<sub>0</sub> (Writing reaches completeness)  
 H<sub>1</sub> = μ < μ<sub>0</sub> (Writing does not reach completeness)

**TABLE 9 |** One Sample Test

	t	df	Sig. (2-tailed)	Test Value = 80		
				Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Writing	11.569	44	.000	5.356	4.42	6.29

[Table 9](#) explores that the analysis of the one sample writing test, it was found that H<sub>0</sub> was accepted. If the value of t<sub>count</sub> > t<sub>table</sub> with a significant level set by the researcher was 5%, the ability to write texts reached completeness. Based on the calculation results above, t<sub>(count)</sub> = 11.569 and t<sub>(table)</sub> = 1.696. Because t<sub>count</sub> > t<sub>(table)</sub> (11.569 > 1.696), then H<sub>0</sub> is accepted and H<sub>1</sub> is rejected. Thus, the value of writing achieves completeness.

In addition, the test of the influence of students' motivation and independent learning is analyzed to know how much influence students' motivation and independent learning have on writing. An alpha regression test will be carried out as follows.

Equation analysis:  $Y = a + b_1 x_1 + b_2 x_2$  was performed to test for significance

- To test significance  
 Hypothesis:  
 H<sub>0</sub>: b = 0 (meaningless regression)  
 H<sub>1</sub>: b ≠ 0 (mean regression)

The results of rejecting H<sub>0</sub>, if it is significant < 5%. See the Coefficients table below to find out whether to accept or reject. It can be seen in [Table 10](#).

**TABLE 10 |** The Influence of Students' Motivation and Their Independent Learning

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
1 (Constant)	7.781	8.992		.865	.392
Motivation	.912	.162	.855	5.636	.000
Independent Learning	-.018	.186	-.015	-.098	.922

a. Dependent Variable: Writing

Based on Table 10, the regression equation  $Y = 7.781 + 0.912x_1 - 0.018x_2$  means that an increase in motivation and critical literacy by 1 unit will increase writing by 0.912 and -0.18. For motivation, it can be seen

that the sig value = 0% < 5% so that H<sub>0</sub> is accepted, meaning that the regression coefficient is significant or that motivation has a substantial effect on cognitive structure. Independent learning can be seen as the value of sig = 92.2%

> 5% so that  $H_0$  is accepted, meaning that the regression coefficient is not significant or critical literacy does not substantially affect the cognitive structure.

In addition, testing the effect of motivation and independent learning on student text writing was analyzed using regression analysis.

**TABLE 11** | The Effect of motivation and Independent Learning on Students' writing Performance

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.842 <sup>a</sup>	.709	.695	1.714
a. Predictors: (Constant), Independent Learning, Motivation				

Based on [Table 11](#), the value of  $R^2=0.709=70.9\%$  means that the student's writing ability is influenced by independent learning, motivation is 70.9%, and other factors influence 29.1%.

Furthermore, the comparative analysis of the average text writing scores between the control class and the experimental course. Based on the calculation results in [Table 12](#),  $t_{count} = 3.648$  and  $t_{(table)} = 1.670$ . Because  $t_{count} > t_{(table)}$  ( $3.648 > 1.670$ ), then  $H_1$  is accepted and  $H_0$  is rejected. Therefore, the experimental class is better than the control class. The explanation can be seen in [Table 12](#).

Based on the findings presented above, the development of the Hybrid Learning Team-Based Project learning model is declared suitable for use in the learning process of writing in Genre Based Writing courses. In the following, the research team describes the process of implementing the model in the learning process based on the results of observations using the seven stages of Project Based Learning.

The learning process in class is carried out for one semester with details of eight meetings for 100 minutes each session. Panels are designed using a Project Based Learning or Team-Based Project teaching flow with flow designs, namely the stages of making basic questions, developing project plans, compiling project schedules, monitoring students and project progress, testing test results, and evaluating experiences.

In the first meeting, students collaborated in groups by asking fundamental questions about the types of narrative texts discussed in the session using trigger questions. The questions are how is the story's background taken, who are the characters in the story, when the story takes place, what tenses are needed, and what kind of language structure will be used? After that, students were asked to design a text that

would be written collaboratively in a discussion team of four people. Each student was divided to determine the orientation, describe the evaluation of the problem, write down complications, explain resolutions, and write reorientations that complement the topics discussed. Then at the stage of monitoring students and project progress, the lecturer asks students to present the results of the joint discussion in the form of a framework and whole draft paragraphs to provide input so that the writing to be developed is meaningful and coherent. Then arrange the scheduling process of writing paragraph by section. The next stage is to test the writing results per student to find out how far students carry out the team-based project-based writing process. In the final step, students and lecturers evaluate the experience of learning to write and reflect on the strategies that have been carried out.

At the second meeting, lecturers and students learned to write a descriptive text. It was divided into the first stage of the process, namely, making basic questions. The questions sample consists of how the topic is chosen in writing descriptive text, what tenses are used, the structure of the language and linguistic features used, and the process of writing a coherent description. Then design the project plan by planning the writing process in the form of groups according to the generic structure of the descriptive text. Then arrange the design of doing descriptive writing. Then the lecturer monitors while the students collaborate to write collaboratively. After that, do an indirect feedback assessment with peer feedback so that the writing test carried out is tested for its process and implementation. Finally, lecturers and students evaluate experiences that process one another so that students can receive feedback and critical thinking that supports their literacy skills.

The third meeting was carried out with the stages of making basic questions about recount text by knowing what experiences students wanted to tell in the past, what point of view was taken, what events were to be said, what grammar was used, and what language features were needed. Then students design paragraph outlines in groups. Then students compose their writing by scheduling who will write the orientation section, event one, even two, and other events and who will write the reorientation of the text being told. The next stage is carrying out monitoring of students and the progress of the writing process. Then test the results of the recount text by providing direct feedback providing the best and appropriate input. Finally, students and lecturers evaluate the experience gained when writing recount texts.

The fourth meeting was carried out according to the stages: making basic questions about report texts. They are what topics are chosen, what the structure of the language is used, whether the descriptions presented do not overlap with the descriptive text, and whether the vocabulary and word



classes are used following the linguistic features of the report text. Then students design an outline and arrange a schedule and write paragraph by paragraph in small groups online and half in class. In addition, lecturers also monitor student writing by involving students in the writing process, namely by providing direct peer feedback between students. Then the writing results are tested to determine whether they follow the busy text rubric and the paragraph writing rubric. Then, finally, students reflect and evaluate the experience gained in the writing process.

The fifth meeting was carried out with the stages of making questions in groups. They are what topics are used in writing explanatory texts, the structure of the language and its generics, how the grammar is used, and how are the language features used. Then students design explanatory paragraph frameworks according to the group's linguistic structure. Students share which part is written by each member in the online group and half of the students in the class. Then the lecturer monitors the process of writing explanatory text so that it does not overlap with the report text. After that, the writing results are given feedback and tested to determine whether they are under the structure requested by the explanatory text. Finally, in the final stage, students and lecturers evaluate the experience processed in an explanation text.

In the sixth meeting, students make basic questions about exposition analytic texts by determining how the topic is chosen, how the generic structure is used, and how the tenses and the coherence between paragraphs are. Then students design an expository analytic text framework according to its generic form. Then students arrange the distribution of writing in groups according to the linguistic features used by group analytical exposition and hybrid learning. Furthermore, the text is written individually and assessed and given feedback. Finally, students evaluate the experience gained by discussing it with the lecturer.

The seventh meeting continued with writing hortatory exposition texts using the project-based learning or team-based project stage. The students made basic questions about hortatory texts, such as; what kind of topic is chosen, it overlaps with exposition analytics, how is the generic structure used, and how are the linguistic features used in a hybrid manner. Then students design writing in groups. Then students individually write texts and give feedback to each other as peer tutors. Furthermore, students determine how the student process evaluates the experience gained.

In the eighth meeting, students write review texts concerning the first stage, namely asking fundamental questions about the process of writing review texts according to their generic structure and language features. Furthermore, students design review texts written in groups in a hybrid manner. Then they schedule a week-long writing

process individually. Then the lecturer tests the results of the review text and provides direct feedback. Then, with students and lecturers, evaluate the experience gained in writing review texts.

From the observations from meetings one to eight, implementing the hybrid learning team-based project model is feasible and supports learning to write and motivates students to improve their critical literacy in language. Therefore, this study is in line with previous studies ([Wijayatiningsih et al., 2022](#); [Wright, 2017](#); [Wang & Seepho, 2017](#); [Wang et al., 2017](#); [Williams & Lahman, 2011](#); [Lynch, 2014](#)).

In addition, the results of the effectiveness of model implementation significantly impact the learning process, both on motivation and independent learning ([Kassem, 2018](#); [Yang & Spitzer, 2020](#)). In learning to write because not only are they motivated, but they can also reflect on the learning process with the integration of hybrid learning and team-based project so that students can contribute experience obtained as a form of developing their soft skills to become independent individuals. In addition, this model helps the learning process to be more harmonious between synchronous and asynchronous.

## CONCLUSION

Based on the research results, the researchers can draw the following conclusions:

1) The results integrating hybrid learning and team-based project are suitable for use and testing in small class scales in the third semester of English Education at the Muhammadiyah University of Semarang. The average result of the validation results is more than 4.00, so it is in the excellent category. Meanwhile, the results of the analysis of student perspectives on learning through Team-Based Projects are divided into four, namely; student perspectives on motivation and their writing results, student perspectives on the effectiveness of Team-Based Projects, student perceptions of independent learning through Team-Based Projects and Hybrid learning, and student perceptions about working in groups.

2) The results of developing this hybrid learning and team-based project model were effectively implemented in the S1 English Education Study Program with the participation of 72 students, with the final grades of all students being in the complete category above 70 in genre text writing classes.

Therefore, the lecturers should apply hybrid learning and team-based project to motivate and train students to learn independence and provide experiences of a harmonious learning process which can give the insightful learning process in writing genre and supported Merdeka Belajar for students. Next, for future researchers, it is advisable to expand the research subject so that the results obtained are more in-depth and can be implemented in other English skills, namely speaking, listening, and reading.

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## REFERENCES

- Abdullah, Talib, A., & Abduh, A. (2022). Developing a hybrid learning model based on moodle e-learning on morphology course. *Tamaddun*, 21(2), 152–159. <https://doi.org/10.33096/tamaddun.v21i2.164>
- Alsowat, H. H. (2022). Hybrid learning or virtual learning? effects on students' essay writing and digital literacy. *Journal of Language Teaching and Research*, 13(4), 872–883. <https://doi.org/10.17507/jltr.1304.20>
- Alwasilah, S. S. (2019). Creating your animated stories with plotagon: Implementation of project-based learning in narrative writing. *International Journal of Learning, Teaching and Educational Research*, 18(12), 333–349. <https://doi.org/10.26803/ijlter.18.12.19>
- Anis, M., & Anwar, C. (2020). Self-organized learning environment teaching strategy for ELT in Merdeka Belajar concept for high school students in Indonesia. *JEES (Journal of English Educators Society)*, 5(2), 199–204. <https://doi.org/10.21070/jees.v5i2.869>
- Ari, N. W., Wijayatiningsih, T. D., & Mulyadi, D. (2021). Students' motivation in learning online of reading comprehension narrative text through google classroom. *JALL (Journal of Applied Linguistics and Literacy)*, 5(1), 1–9. <https://jurnal.unigal.ac.id/index.php/jall/index>
- Asgari, S., Trajkovic, J., Rahmani, M., Zhang, W., Lo, R. C., & Sciortino, A. (2021). An observational study of engineering online education during the COVID-19 pandemic. *PLoS ONE*, 16(4 April). <https://doi.org/10.1371/journal.pone.0250041>
- Aslam, M. Z., Hakeem Barzani, S. H., Aslam, T., & Rasool, U. (2021). Teachers and students perceptions towards online ESL classrooms during covid-19: An empirical study in North Cyprus. *Journal of Asia TEFL*, 18(4), 1423–1431. <https://doi.org/10.18823/asiatefl.2021.18.4.22.1423>
- Auster, C. J. (2016). Blended Learning as a Potentially Winning Combination of Face-to-face and Online Learning: An Exploratory Study. *Teaching Sociology*, 44(1), 39–48. <https://doi.org/10.1177/0092055X15619217>
- Banditvilai, C. (2016). Enhancing students' language skills through blended learning. *The Electronic Journal of E-Learning*, 14(3), 220–229. [www.ejel.org](http://www.ejel.org)
- Baresh, E. F., Ali, S. M., & Darmi, R. (2019). Using hybrid problem-based learning (HPBL) approach to enhance Libyan EFL students' engagement with English language. *International Journal of Education and Literacy Studies*, 7(2), 9–20. <https://doi.org/10.7575/aiac.ijels.v.7n.2p.9>
- Baresh, E. F., Ali, S. M., Ii, A., & Darmi, R. (2018). Motivating the Libyan English as foreign language speaker students through the hybrid problem based learning approach. *International Journal of Islamic Studies*, 10(2), 2289–9944. <http://al-qanatr.com>
- Castelli, F. R., & Sarvary, M. A. (2021). Why students do not turn on their video cameras during online classes and an equitable and inclusive plan to encourage them to do so. *Ecology and Evolution*, 11(8), 3565–3576. <https://doi.org/10.1002/ece3.7123>
- Cheadae, A., & Khongput, S. (2019). Thai EFL students' perceptions toward learning English descriptive paragraph writing through problem-based learning. *Veridian E-Journal, Silpakorn University*, 12(6), 1688–1704.
- Chen, J. C., Dobinson, T., & Kent, S. (2020). Lecturers' perceptions and experiences of Blackboard Collaborate as a distance learning and teaching tool via Open Universities Australia (OUA). *Open Learning*, 35(3), 222–235. <https://doi.org/10.1080/02680513.2019.1688654>
- Cresswell, J. W. (2014). *Research design, qualitative, quantitative, mixed methods approaches*. Sage Publications.
- Cresswell, J. W., & Plano, C. V. (2018). *Designing and conducting mixed methods research (3rd ed.)*. Sage Publications.
- Gherheş, V., Şimon, S., & Para, I. (2021). Analysing students' reasons for keeping their webcams on or off during online classes. *Sustainability (Switzerland)*, 13(6). <https://doi.org/10.3390/su13063203>
- Gulnaz, F., Althomali, A. D. A., & Alzeer, D. H. (2020). A Gender-Based Study to Investigate Saudi Male and Female EFL Learners' Satisfaction Towards the Effectiveness of Hybrid Learning. *International Journal of English Linguistics*, 10(5), 321. <https://doi.org/10.5539/ijel.v10n5p321>
- Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International Journal of Educational Research*, 102. <https://doi.org/10.1016/j.ijer.2020.101586>
- Heim, K. (2022). Designing hybrid learning spaces together: The potential of cooperative projects for language teacher education. *Anglistik*, 33(1), 185–201. [www.tcpdf.org](http://www.tcpdf.org)
- Jalinus, N., Nabawi, A., & Mardin, A. (2017). The seven steps of project based learning model to enhance productive competences of vocational students. *Advances in Social Science, Education, and Humanities Research*, 102, 251–256.
- Kassem, M. A. M. (2018). Improving EFL students' speaking proficiency and motivation: A hybrid problem-based learning approach. *Theory and Practice in Language Studies*, 8(7), 848. <https://doi.org/10.17507/tppls.0807.17>
- Kornilov, I. v., Danilov, D. A., Kornilova, A. G., Golikov, A. I., & Gosudarev, I. B. (2020). Different approaches to the development of online learning in higher education. *Propósitos y Representaciones*,

- 8(SPE3), e706.  
<https://doi.org/10.20511/pyr2020.v8nspe3.706>
- Krishnapatria, K. (2021). Merdeka belajar-kampus merdeka (MBKM) curriculum in English studies program: Challenges and opportunities. *ELT in Focus*, 4(1), 12–19. <https://doi.org/10.35706/eltinf.v4i1.5276>
- Lee, H. J., Kim, H., & Byun, H. (2017). Are high achievers successful in collaborative learning? An explorative study of college students' learning approaches in team project-based learning. *Innovations in Education and Teaching International*, 54(5), 418–427. <https://doi.org/10.1080/14703297.2015.1105754>
- Lhutfi, I., & Mardiani, R. (2020). Merdeka belajar - kampus merdeka policy: How does it affect the sustainability on accounting education in Indonesia? *Dinamika Pendidikan*, 15(2), 243–253.  
<https://doi.org/10.15294/dp.v15i2.26071>
- Lukas, B. A., & Yunus, M. M. (2021). ESL teachers' challenges in implementing e-learning during COVID-19. *International Journal of Learning, Teaching and Educational Research*, 20(2), 330–348.  
<https://doi.org/10.26803/IJLTER.20.2.18>
- Lynch, L. C. Y. (2014). Blending Online Asynchronous and Synchronous Learning. *The International Review of Research in Open and Distance Learning*, 15(2), 189–212.
- Mahmud, Y. S., & German, E. (2021). Online self-regulated learning strategies amid a global pandemic: Insights from Indonesian university students. *Malaysian Journal of Learning and Instruction*, 18(2), 45–68.  
<https://doi.org/10.32890/mjli2021.18.2.2>
- Maulida, U. (2020). Konsep blended learning berbasis Edmodo di era new normal. *Dirasah*, 2(2), 121–136.
- Meke, K. D. P., Astro, R. B., & Daud, M. H. (2021). Dampak kebijakan merdeka belajar kampus merdeka (MBKM) pada perguruan tinggi swasta di Indonesia. *EDUKATIF: Jurnal Ilmu Pendidikan*, 4(1), 675–685.  
<https://doi.org/10.31004/edukatif.v4i1.1940>
- Mulyadi, D., Hersulastuti, & Purnama, Y. (2019). Students' Perceptions of Blended Learning in Mastering English for Specific Purposes. *Journal of Physics: Conference Series*, 1339(1).  
<https://doi.org/10.1088/1742-6596/1339/1/012116>
- Neuwirth, L. S., Jović, S., & Mukherji, B. R. (2021). Reimagining higher education during and post-COVID-19: Challenges and opportunities. *Journal of Adult and Continuing Education*, 27(2), 141–156.  
<https://doi.org/10.1177/1477971420947738>
- Purnomo, A., Ratnawati, N., & Aristin, N. F. (2016). Pengembangan pembelajaran blended learning pada generasi z. *Jurnal Teori Dan Praksis Pembelajaran IPS*, 1(1), 70–77.
- Reese, S. A. (2015). Online learning environments in higher education: Connectivism vs. dissociation. *Education and Information Technologies*, 20(3), 579–588.  
<https://doi.org/10.1007/s10639-013-9303-7>
- Santikarn, B., & Wichadee, S. (2018). Flipping the classroom for English language learners: A study of learning performance and perceptions. *International Journal of Emerging Technologies in Learning*, 13(9), 123–135.  
<https://doi.org/10.3991/ijet.v13i09.7792>
- Simamora, R. M. (2020). The challenges of online learning during the COVID-19 pandemic: An essay analysis of performing arts education students. *Studies in Learning and Teaching*, 1(2), 86–103.  
<https://doi.org/10.46627/silet>
- Soliman, N. A. (2014). Using e-learning to develop EFL students' language skills and activate their independent learning. *Creative Education*, 05(10), 752–757.  
<https://doi.org/10.4236/ce.2014.510088>
- Sri, D., Hutabarat, A., & Gunawan, W. (2021). GBA in Teaching Writing to Scaffold Students in Online Learning.
- Stein, J., & Graham, C. R. (2020). *Essentials for blended learning a standards-based guide (Second Edition)*. Routledge.
- Suh, Y. M., & Huh, S. (2017). Korean university readers' growth through an integrated approach of conventional and critical literacy. *English Teaching*, 72(4), 23–51.  
<https://doi.org/10.15858/engtea.72.4.201712.23>
- Sumarno, W. K., & Tatik, T. (2018). Integrating edmodo-based digital portfolio with EFL writing instruction: Exploring the students' performance. *Journal of English Education*, 3(2), 100–106.  
<https://doi.org/10.31327/jee.v3i2.864>
- Sun, A., & Chen, X. (2016). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research*, 15(1), 157–190.  
<http://www.informingscience.org/Publications/3502>
- Szeto, E. (2014). A Comparison of online/face-to-face students' and instructor's experiences: Examining blended synchronous learning effects. *Procedia - Social and Behavioral Sciences*, 116, 4250–4254.  
<https://doi.org/10.1016/j.sbspro.2014.01.926>
- Titova, S. (2017). The use of MOOC as a means of creating a collaborative learning environment in a blended CLIL course. In CALL in a climate of change: adapting to turbulent global conditions – short papers from EUROCALL 2017 (pp. 306–311). Research-publishing.net.  
<https://doi.org/10.14705/rpnet.2017.eurocall2017.731>
- Tsiakyroudi, M. (2018). Exploring the effectiveness of Edmodo on Greek EFL B1 learners' motivation to write. *Research Papers in Language Teaching and Learning*, 9(1), 96–112. <http://rppl.t.eap.gr>
- Tusino, Sukarni, S., & Rokhayati, T. (2021). Hybrid Synchronous and Asynchronous Language Learning in Writing Class: The Learners' Psychosocial Perspectives in Indonesia. *New Educational Review*, 65, 190–199.  
<https://doi.org/10.15804/ner.2021.65.3.15>
- Villalba, S. M. (2022). Blogging in action: Teaching English within the project-based learning approach. *Computer Assisted Language Learning Electronic Journal (CALL-EJ)*, 23(1), 63–77.

- Wang, Q., Quek, C. L., & Hu, X. (2017). Designing and improving a blended synchronous learning environment: An educational design research. *International Review of Research in Open and Distance Learning*, 18(3), 99–118.  
<https://doi.org/10.19173/irrodl.v18i3.3034>
- Wang, S., & Seepho, S. (2017). Facilitating Chinese EFL learners' critical thinking skills: The contributions of teaching strategies. *SAGE Open*, 7(3), 1–9.  
<https://doi.org/10.1177/2158244017734024>
- Wihastyanang, W. D. , Kusumaningrum, S. R. , Latief, M. A. , & Cahyono, B. Y. (2020). Impacts of providing online teacher and peer feedback on students' writing performance. *Turkish Online Journal of Distance Education (TOJDE)*, 21(2), 178–189.
- Wijayatiningsih, T. D. , Bharati, D. A. L. , Faridi, A. , & Fitriati, S. W. (2021). Students' voices on implementing blended synchronous learning in teaching genre- based writing. *Proceeding of the Sixth International Conference of Science, Education, and Technology (ISET) 2020*, 574 (Iset 2020), 700–704.
- Wijayatiningsih, T. D., Bharati, D. A. L., Faridi, A., & Fitriati, S. W. (2022). Scaffolding for learners' writing literacy through blended learning in an Indonesian EFL context. *Journal of Asia TEFL*, 19(1), 336–344.  
<https://doi.org/10.18823/asiatefl.2022.19.1.26.336>
- Williams, L. , & Lahman, M. (2011). Online discussion, student engagement, and critical thinking. *Journal of Political Science Education*, 7(2), 143–162.
- Wilson, A. (2020). Penerapan metode pembelajaran daring (online) melalui aplikasi berbasis android saat pandemi global. *SAP (Susunan Artikel Pendidikan)*, 5(1), 66–72.  
<https://doi.org/10.30998/sap.v5i1.6386>
- Wright, B. M. (2017). Blended learnings student perception of face-to-face and online EFL lessons. *Indonesian Journal of Applied Linguistics*, 7(1), 64–71.  
<https://doi.org/10.17509/ijal.v7i1.6859>
- Yang, Z., & Spitzer, L. (2020). A case for hybrid learning: Using a hybrid model to teach advanced academic reading. *ORTESOL Journal*, 37, 11–22.

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