International Journal of Language Pedagogy
Vol. 5, No. 1, pp 192-204, November 2025
E-ISSN 2777-1229, P-ISSN 2797-1783
DOI: https://doi.org/10.24036/def2x342

Enhancing English Scientific Writing through Team-Based Project: EFL Students' Perspectives in Higher Education

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Received: August, 23, 2025 Revised: Oktober, 15, 2025 Accepted: November, 1, 2025

Abstract

Team-based project (TBP) is an innovative learning model that promotes students' active participation and collaborative knowledge construction in English language learning. Nevertheless, limited research has examined how TBP facilitates English scientific writing among English as a Foreign Language (EFL) students in higher education. This study investigated EFL students' perceptions of the implementation of TBP in generating English scientific writing. A mixed-methods design was employed involving 62 undergraduate students enrolled in a *Scientific Writing* course at a reputable private university in Jakarta, Indonesia. Quantitative data were collected through a 20-item Likert-scale questionnaire and analysed using descriptive statistics (means, standard deviations, and percentages), while qualitative data were gathered through semi-structured interviews and analysed using thematic analysis. The findings revealed that students perceived TBP positively across four dimensions: English scientific writing development (M = 3.85), creativity (M = 3.95), learning motivation (M = 3.87), and learning opportunities (M = 4.00), indicating high levels of agreement with the effectiveness of TBP. Interview data further showed that collaborative planning, peer feedback, and shared problem-solving enabled students to produce higher-quality scientific writing and increased their confidence in academic writing. The study recommends integrating TBP into *Scientific Writing* course to strengthen students' academic writing competence and collaborative learning experiences.

Keywords: EFL students, English learning model, higher education, scientific writing, team-based project

Introduction

One of the activities of academicians is producing a scientific writing. Scientific writing is the outcome of thinking and reasoning and it might comprise theory, research, and experience syntheses (Vasset et al., 2024). Producing a scientific writing in the form of a research article, conference paper or critical review is an activity which requires some language competencies such as in word selection, sentence arrangement, and idea organization. It also requires knowledge of conventions in publication such as integration of the results of previous studies, management of sources and references, and adherence to journal article formats (Gastel & Day, 2022; Hassan et al., 2021)**.** In addition, a scientific document should have clear, concise, and emotionless language (Katz, 2009). Moreover, it demands skills in stating the purpose, explaining the methodology, and presenting and discussing the results (Paul & Criado, 2020) because the purpose of scientific writing is to communicate ideas, make arguments, and engage in scholarly debate (Kongsat, 2020).

In Higher Education, students must fulfil one of the requirements of their study completion by producing a scientific writing. They need to find some relevant literature in their special fields of study to read and use them to support ideas for their academic papers or undergraduate theses. To produce good scientific writing in English, they are guided by supervisors with whom they could discuss their ideas and written work to get some feedback for better idea presentation (Truong & Tran, 2022). In

scientific writing, there are at least two critical features of the writing process. The first is goals orientation and arrangement which are achieved through three recursive processes: planning, sentence generation, and revision (Hayes & Flower, 1987). The second is deep attention to the communication matrix consisting of four elements: audience, purpose, format, and assessment (Cargill & O'Connor, 2021). However, students commonly get some difficulties to produce good academic writing. They have difficulties in deciding the research topic, formulating the research questions, finding the relevant supporting ideas from references, as well as paraphrasing ideas from sources properly (Alawdi, 2023). The difficulties in producing good scientific writing also affect their confidence and motivation to continue producing scientific writing in English (Altınmakas & Bayyurt, 2019). Other difficulties the students face in producing English scientific writing include how to develop research instruments, how to collect and analyze the data, as well as how to present the results of data analysis. Moreover, students were not creative and critical enough to generate ideas due to the condition in the learning process that tends to be teacher-centred (Samanhudi & Linse, 2019).

Reflecting upon the difficulties that the students face in producing scientific writing in English, it is important to design an innovative learning model which can lead to the creation of a participative and active learning environment for students. Such a learning environment would be able to encourage the students to write creatively and critically (Wu et al., 2020). The learning environment is a team-based project model. A team-based project is a method that can be used to initiate a shift in culture both inside and outside of the team, from an individualistic to a collective mindset (Burrell et al., 2015). It is an effective teaching strategy that inspires students and gets them ready for the careers. Additionally, it enables teachers to teach in a more fulfilling way and helps students meet standards and perform well on tests that require them to demonstrate in-depth knowledge and thinking skills (Larmer et al., 2015). Team-based project (TBP), also known as project-based learning, is an instructional strategy that gives students some autonomy to study, explore, and investigate during the learning process by encouraging them to complete pertinent projects (Chiu, 2020). A team-based project with learning objectives and activities centered around a central guiding question can assist students in building knowledge and honing their learning skills (Saad & Zainudin, 2022).

Despite the increasing adoption of TBP in higher education, previous studies have primarily examined their effectiveness in improving academic achievement, collaborative learning, engagement, and language skills across different disciplines (Almulla, 2020; Aranzabal et al., 2022; Arries et al., 2021; Astawa et al., 2017; Bailey et al., 2020; Lightner et al., 2007; Zha et al., 2021)**.** However, limited attention has been given to how EFL students perceive the implementation of TBP in English scientific writing courses, particularly regarding its contribution to improving writing skills, fostering creativity, enhancing learning motivation, expanding learning opportunities, and the challenges encountered during collaborative writing. Understanding students' perspectives is essential because their experiences provide direct evidence of how TBP facilitates or hinders the development of academic writing competence, thereby informing the effective design and implementation of collaborative learning in teacher education. Addressing this gap, the present study extends previous TBP research by integrating quantitative and qualitative evidence to provide a comprehensive understanding of students' perceptions and the obstacles they experience during TBP implementation in a *Scientific Writing* course. Specifically, this study addresses the following research questions:

(1) How do students perceive the implementation of team-based project in generating English scientific writing?
(2) What obstacles do students encounter during the implementation of team-based project in generating English scientific writing in higher education?

Methods

Research Design

This study employed a sequential explanatory mixed-methods design, in which quantitative data were collected and analysed first, followed by qualitative data to explain and elaborate the quantitative findings (Creswell & Creswell, 2018). The quantitative phase involved an online survey questionnaire that measured EFL students' perceptions of the use of team-based projects (TBP) in generating English scientific writing. The preliminary survey results were subsequently used to develop the semi-structured interview protocol by identifying the key dimensions requiring further exploration, namely students'

perceptions of improvements in scientific writing skills, creativity, motivation, and learning opportunities during the TBP implementation. Accordingly, the interview questions were designed to elicit detailed explanations, examples, and experiences that could clarify and enrich the quantitative findings. The qualitative data comprised interviews with selected students who had completed the questionnaire, enabling a more comprehensive interpretation of the survey results.

Participants

This research was conducted at one reputable private university in Jakarta, Indonesia. The participants were chosen using a purposive sampling technique as this study required some inclusion criteria such as those who were undergraduate students of English language education program, joined *Scientific Writing* course, and implemented TBP. Of 62 students, all the students participated in the questionnaire, showing a response rate of 100%. Meanwhile, in the qualitative data collection, some participants were selected for the interview, considering the genders, ages, and diverse students' competencies. The demographic information of the participants is presented in Table 1.

Table 1. Demographic information of the participants (N = 62)

Categories	Sub-categories	Number	Percentage	Total
Gender	Female	50	81%	100%
	Male	12	19%	
Age	20 years old	16	26%	100%
	21 years old	30	48%	
	22 years old	6	10%	
	> 22 years old	10	16%	
Home locations	Bekasi	11	18%	100%
	Bogor	5	8%	
	Depok	2	3%	
	Great Jakarta	39	63%	
	Tangerang	4	6%	
	Outside Java Island	1	2%	
English course background	No	3	5%	100%
	Yes	59	95%	

As shown in Table 1, most participants were dominantly female (81%), and rest of them were male students (19%). Most of the respondents were 21 years old (48%) and the rest varies from 20, 21 and more than 21 years old. Most of the participants lived in the area of Great Jakarta (63%). Some of their home locations were Bekasi (18%) and Bogor (8%) in which Bekasi and Bogor are in West Java region. Some were from Tangerang, Banten province (6%) and 2% of them were from outside Java Island. Related to their previous activities in taking an English course, most of them had ever taken an English course (95%).

Teaching Procedure

As the research used a team-based project in the Scientific Writing course, some steps were introduced to the students. Firstly, they were asked to make some teams and provided with some essential questions related to the topics of the English learning obstacles. Secondly, the students in each team designed a plan as well as created the schedule for doing some activities such as finding the relevant sources, developing the instruments, doing the research, analyzing the data, writing and reporting the results of the article draft as the final project. Thirdly, the students in a team worked and discussed the progress of their project while being monitored by the researcher (the first author) who guided and advised the students in working on the project as well as to encourage them to take active participation. Fourthly, each team was invited to present their article draft that would be submitted and published in nationally-accredited journals, and the other teams and the lecturer delivered some feedbacks for article improvements. The last step was to evaluate their experiences of writing an article draft in teams to be submitted in one online journal system as the reflections to be better in the future (Helle et al., 2006; Kokotsaki et al., 2016; Krajcik & Blumenfeld, 2006; Solomon, 2003).

Data Collection and Data Analysis

After the steps of writing instruction were held, the instrument in the form of a questionnaire was distributed to all of the students and a list of questions were developed for semi-structure interviews involving some selected students. In the distribution of the questionnaire the students were informed that the completion of the questionnaire did not affect their course grade so that they would not feel anxious when responding to the questionnaire. They were also informed that the data from the questionnaire were used only for the purpose of research. The questionnaire used for quantitative data contains 20 statements adapted from Wu et al. (2022) and Apoko (2024), and each statement has five options of different values varying from strongly disagree (1) disagree (2), neutral (3), agree (4) to strongly agree (5). Because there is no negative statement in the questionnaire, there will be no reverse value. The questionnaire used to examine the students' perceptions on the implementation of team-based project (TBP) in generating English scientific writing had four categories, each of which consists of five statements. The four categories are (1) improvement of English scientific writing skill (Statements 1-5), (2) creativity promotion (Statements 6-10), (3) motivation on the team-based project instruction (Statements 11-15), and (4) learning opportunities in team-based project (Statements 16-20). The reliability of the questionnaire was evaluated through Cronbach's Alpha, resulting a coefficient of 0.892 which signifies very good internal consistency.

The survey data were analyzed using a descriptive analysis for mean and standard deviation. In the interpretation of the results, responses are highlighted on two poles: positive (strongly agree and agree) and negative (strongly disagree and disagree). This means that responses of strongly agree and agree options are combined in the computation. This is also the case for the responses of strongly disagree and disagree. Because of the need to see the tendency, the neutral responses are ignored in the analysis. Meanwhile, the qualitative data were collected from the interviews. Before participating in the interview, the students were told that the participation in the interview session was voluntary in nature. There were 10 EFL students who were willing to join the interview session. The students (S) who joined the interviews were S3, S5, S9, S13, S16, S26, S30, S40, S42 and S45. Five major questions were asked in the interviews. They are:

(1) Do you think your skill in scientific English writing improves in team-based project?
(2) How does the team-based project instruction improve your research skills?
(3) Were you excited about producing an article within your team in the team-based project? Why?
(4) What do you think of the benefits of the team-based project instruction?
(5) What were the obstacles you found in the team-based project instruction?

Each student had 15-20 minutes for the interviews. The participants' responses were recorded and transcribed into written form of interview data. The interview data were analysed using the qualitative descriptive approach of Miles et al. (2014). All interview responses were transcribed verbatim and read repeatedly for familiarisation. Meaningful segments were assigned initial codes, which were then grouped into categories and refined into themes based on recurring patterns related to scientific writing skill development, creativity, motivation, and learning opportunities. The themes were reviewed against the original transcripts to ensure consistency, and representative quotations were selected to support the interpretation of the findings.

Result and Discussion

1. The Students' Perceptions on The Implementation of Team-Based Project in Generating English Scientific Writing

After the data from the questionnaire were analyzed, they are presented according to the order of the categories of the EFL students' perceptions. The results of data analysis of the respondents' perceptions of the EFL students' improvement of scientific writing skill are shown in Table 2.

Table 2. EFL students' improvement in scientific writing skill

No	Questions	SD	D	N	A	SA	%	Mean	STDV
1	I know how to write an article in English better than before.	1.61	3.2	16.1	61.29	17.7	100	3.90	0.78
2	I am able to express my ideas in writing an article.	1.61	3.2	25.8	56.45	12.9	100	3.76	0.78
3	My vocabulary in academic styles increases.	1.61	3.2	22.5	56.45	16.1	100	3.82	0.8
4	I am a better English writer than I was before.	3.23	3.2	19.3	59.68	14.5	100	3.79	0.85
5	My understanding on Scientific Writing course has improved.	0.00	4.8	11.2	62.90	20.9	100	4.00	0.72

Table 2 shows that EFL students knew how write an English article better (79.03%), and few of them still did not know how to write an article better (4.84%). In addition, more students were able to express their ideas to write an article in groups (69.35%), and 4.48% of the students lacked of ideas to express in academic English. Dealing with English vocabulary in academic styles, they could also increase it (72.58%), yet few students (4.48%) had not increased their English vocabulary. Another result indicated that the EFL students had affirmative opinions on how they could write an article better (74.2%). Meanwhile, 6.46% of the students could not be better English writers. Related to their improvement in scientific writing, they found that their understanding of the course has improved (83.87%), yet only few of them (4.48) their understanding of the course has not improved.

To support the results of the analysis of the quantitative data, the qualitative data are employed. In connection to if students' scientific English writing improves in TBP, all of them had affirmative responses. Qualitatively, four students (S3, S9, S30, and S42) said that their writing improves faster as team members could cooperate to correct language errors, to produce ideas better, and to share scientific data and references to be more accurate.

S3 : "Yes, we can check our writing fast. Collaborating with my own team can help verify the accuracy of scientific claims, data, and references included in the writing. Besides, we can strengthen the quality of our project."

S9 : "Yes, scientific English writing can improve when working together in generating a project because collaborative efforts allow for peer feedback and constructive criticism. Through collaboration, team members can identify and correct language errors, enhance clarity in writing, and collectively refine the overall quality of the scientific content."

S30 : "Yes, because by working in groups I am able to cooperate more to produce maximum results, can exchange opinions, and know other people's opinions well."

S42 : "Yes, because I can explore many scientific words that I have never found before and implement it in my current project. I also discuss about how to do the project together, so it improves my teamwork skill as well."

Based on the results, EFL students perceived that they could improve their English in scientific writing skill as they understood what to write and were able to produce their ideas for an article. Moreover, their vocabulary in academic styles also increased. Thus, the ability to write an article was also better, and the students gained practical knowledge and could increase writing skills in a TBP environment (Aghayani & Hajmohammadi, 2019; Lu, 2021; Marnewick, 2023). This result is also in line with Wu's et al. (2022) study showing that students who have received team-based learning modules perceive a greater improvement in their technical writing skills than those who did not. With the intervention, it also improved students' skill performance and their writing efficiency (Hampton et al., 2022).

The results of data analysis of the respondents' perceptions of the EFL students' creativity promotion are shown in Table 3.

Table 3. EFL students' creativity promotion

No	Questions	SD	D	N	A	SA	%	Mean	STDV
6	I contribute and share my ideas with others.	1.61	0.0	19.3	56.45	22.5	100	3.98	0.76
7	I think more creatively than before.	0.00	3.2	24.1	59.68	12.9	100	3.82	0.69
8	I ask my team members to write better.	0.00	1.6	20.9	67.74	9.68	100	3.85	0.6
9	The collaborative activities encourage me to keep an open mind.	0.00	1.6	9.68	69.35	19.3	100	4.06	0.6
10	The activities among us improve my research skills.	0.00	1.6	9.68	72.58	16.1	100	4.03	0.57

Dealing with EFL students' creativity promotion as shown in Table 3, most of them stated that they could contribute and share their ideas with others (79.03%), and very few of them could not contribute their ideas to their teammates (1.61%). They also agreed that they could think more creatively after the team-based project was introduced (72.58%), yet 3.23% of the students still had less creativity to write. Moreover, 77.42% of the students had positive ideas to ask their teammates to write better than before. Meanwhile, 1.61% of the students were still passive to other members. Another result pointed out that by having collaborative activities, more students became open mind to discuss (88.7%), while very few students were still reluctant to join in groups (1.61%). Related to their research skills, it was found that the activities facilitated by the lecturer could promote their research skills (88.71%) and could not increase the research skills (1.61%).

The qualitative feedback also strengthens how the TBP instruction promotes students' creativity in their research skills. Four students (S9, S16, S26, and S42) clearly had positive opinions. They thought that TBP provided feedback and critiques from the peers, encouraged them to complete the project faster, created a conducive environment, and shared more ideas to discuss.

S9 : "Working in a team allows me to benefit from the diverse perspectives, knowledge, and expertise of my teammates. Each team member may have unique research approaches and insights, exposing me to different research methodologies and sources. When working in a team, I receive some feedbacks and critiques from my peers."

S16 : "Because of group work, we can finish the research faster than doing it alone. With my friends, I can divide the work and get focused on my own first, and after everything that we have done, we checked it to get the corrections."

S26 : "Team-based project provides a conducive environment for growth and improvement in my research skills. The synergy created by collaboration allows me to capitalize on each other's strengths, address weaknesses, and tackle complex problems more effectively."

S42 : "Because the team-based project instruction makes me explore various articles and discuss it together. From the discussion, we read many scientific words and the technique about how to write research. So, we can gain more understanding about writing a research paper."

In line with this current result, the students perceived that TBP implemented in the classroom could promote the students' creativity. This could be seen how they contributed and shared their ideas with teammates. TBP also encouraged the students to open mind for a group discussion. In TBP, the

psychological safety was one of the elements in enhancing the students' interaction and creativity in teams (You, 2021). Another study showed that a relationship between students' creativity and the classroom environment accommodated with team-based project learning (Maor et al., 2023). In addition, the groups of students who were using a project-based learning received significantly higher creativity scores on fluency, flexibility, originality, and usefulness (Chang et al., 2022; Chen et al., 2022; Pan et al., 2023).

The results of data analysis of the respondents' perceptions of the EFL students' motivation on the TBP instruction are shown in Table 4.

Table 4. EFL Students' motivation on the team-based project instruction

No	Questions	SD	D	N	A	SA	%	Mean	STDV
11	I enjoy doing the project of an article.	0.00	3.2	25.8	58.06	12.9	100	3.81	0.7
12	I am excited about the collaborative activities.	0.00	1.6	24.1	59.68	14.5	100	3.87	0.66
13	I appreciate the feedback from the lecturer about the project.	0.00	1.6	8.06	46.77	43.5	100	4.32	0.7
14	I do not feel worried to write in English any more.	1.61	3.2	50.0	38.71	6.45	100	3.45	0.74
15	I participate actively in group-based activities.	0.00	1.6	20.9	64.52	12.9	100	3.89	0.63

Table 4 indicates that more EFL students felt enjoyable to do the project of writing articles in groups (70.96%), and 3.23% of them felt bored. In relation to group work, the students were excited about collaborative activities (74.2%) and appreciated the project feedbacks from their lecturer (90.32%). However, there were 45.16% of students who did not longer worry to write their articles in English. In fact, they could take part actively in group-based activities (77.42%), and only 1.61% of them passively participated in it.

The qualitative analysis also demonstrates how EFF students were motivated and excited about producing an article within their team. Four of the students (S13, S16, S42, and S45) found that they were excited to work together to generate a draft of an article to submit in the journal. They said that publishing an article was fun for them and not really hard for them as each of them had their own responsibilities and they could help one another to overcome the difficulties.

S13 : "I was very excited at the time of collecting data directly in the field because here I experienced first-hand how difficult it was to collect data. Besides, the way to publish an article or journal was also fun in my opinion."

S16 : "I just consider that producing an article is not easy and not hard, too. Especially for our research, the participants were really helpful. I am enjoying every writing phase, even there is a kind of difficulties that we faced while writing the article."

S42 : "It is exciting because it trains us to be an open-minded person. we can exchange our ideas as well and combine our ideas together."

S45 : "Because my team is willing to work together, be responsible, help each other when there is confusion, difficulty and so on. Besides, my team also has enough understanding about the theme of the article that we want to produce as there are many phenomena about the theme we researched."

In this results, EFL students perceived that their motivation on the TBP instruction also increased. Pan et al. (2023) pointed out that the students significantly had their learning motivation (Duke et al., 2021), mainly in self-efficacy as well as in their enjoyment (Apoko, 2023). They themselves felt happy to do a project in groups, were excited about collaborative activities, and participated actively in

generating a project of the article in groups or with their peers (Afzal & Crawford, 2022). In addition to contributing the students' motivation, TBP also improve independent student learning (Wijayatiningsih et al., 2023).

The results of data analysis of the respondents' perceptions of the EFL students' learning opportunities in TBP are displayed in Table 5.

Table 5. EFL students' learning opportunities in team-based project

No	Questions	SD	D	N	A	SA	%	Mean	STDV
16	I have a lot of opportunities to ask some questions to my team members.	0.00	1.6	16.1	61.29	20.9	100	4.02	0.67
17	I have a lot of opportunities to write English.	0.00	1.6	17.7	64.52	16.1	100	3.95	0.64
18	I have a lot of opportunities to train my team members.	0.00	0.0	33.8	53.23	12.9	100	3.79	0.66
19	I have a lot of opportunities to correct my mistakes.	0.00	1.6	16.1	59.68	22.5	100	4.03	0.68
20	I have a lot of opportunities to learn from my team members.	0.00	1.6	9.68	59.68	29.0	100	4.16	0.66

As indicated in Table 5, EFL students gained various opportunities related to their engagement in team-based project. Most of them had many opportunities to address some questions to their own teammates (82.26%). They also had more opportunities to practice writing academically (80.65%). Moreover, they could train their teammates to write English better (66.13%). However, 33.87% of the students had no opinions on the statement. Then, they had opportunities to correct their own mistakes (82.26%). Thus, they had many opportunities to learn from their own teammates (88.71%), meanwhile 1.61% of them had less opportunities to learn from their friends.

In relation to how team-based project instruction offers some opportunities, qualitatively three of the students (S5, S26, and S45) totally also agreed that TBP in *Scientific Writing* course provided opportunities for the students such as learning from each other's skills, creating collaborative learning that could share knowledge and skills, and making them more disciplined. However, S40 felt that in some conditions, she found some difficulties when discussing the project with her teammates.

S5 : "Yes, I agree that team-based project instruction offers several benefits. Team-based projects bring together individuals with different backgrounds, experiences, and expertise, leading to a broader range of perspectives on the topic, manage complex projects effectively, and can learn from each other's skills."

S26 : "Yes, I agree that it offers some benefits. It creates collaborative learning. Working in a team allows members to learn from each other. They can share knowledge, skills, and best practices, enhancing the overall learning experience for everyone involved."

S40 : "I partially agree. Team-based project instruction offers some advantages, such as making the project easier to do as we can divide the part of work with the team. The team can help each other on that project. However, sometimes I get some difficulties when I discuss our project with my teammate."

S45 : "The benefits that I can work together in a team are more disciplined, responsible, respect different opinions, willing to accept other people's

suggestions and criticisms. Besides, we can learn together without feeling embarrassed or awkward."

This result of the study highlights that EFL students had more learning opportunities offered in team-based project such as addressing some questions to their own teammates, practicing to write academically, training their teammates to write English better and learning from their own teammates. These activities were then identified as understanding the roles of their teammates as well as the strengths and the weaknesses (Aranzabal et al., 2022). This result is supported by a study showing that the TBL method developed teamwork, communication, negotiation and problem-solving skills, and individual and team accountability (Ainsworth, 2021). Despite the benefits of TBP for EFL students in writing instruction, some obstacles were found such as having conflicts for ideas, unequal contributions from team members, and communication challenges (Angu, 2019; Youssef et al., 2023). In addition, TBP was considered a time-consuming method (Maros et al., 2023).

2. The Obstacles Found in The Implementation of Team-Based Project in Generating English Scientific Writing In Higher Education

Dealing with the second research question, the obstacles the EFL students found in the team-based project instruction included the unequal distribution of sharing ideas, debating of ideas to write, and the levels of teammates' motivations in completing the project. The following is the responses from S9, S13, S30, and S40.

S9 : "Some common obstacles in team-based project instruction include scheduling conflicts, unequal contributions from team members, communication challenges, conflicting ideas during decision-making, and maintaining accountability and motivation among team members."

S13 : "There are more data to collect and analyze, and frankly speaking my team and I have never used or analyzed the data directly using an application such as SPSS. Besides, it is quite difficult to get a permission to collect the data from the school. Several times my team and I were refused by the school when we wanted to do the research."

S30 : "Sometimes there are still some things when practicing the material that has been explained that make us confused. There are some debates that require more time to solve a problem. In the preparation and writing, we are still confused about where to start, so we have to read many journals as a reference."

S40 : "I found the obstacles in the team-based project on collaborating the project with my members. The members sometimes ignore when we intend to discuss, so we were late for the submission to the journal."

The obstacles identified by the EFL students in implementing TBP for generating English scientific writing are consistent with challenges commonly reported in collaborative learning environments. Unequal contributions, varying levels of motivation, and differences in commitment frequently reduce the effectiveness of team-based learning (Mannix & Neale, 2005). For example, S9 reported scheduling conflicts, communication barriers, and unequal accountability among team members. While these challenges are common in collaborative learning, they appear to be more pronounced in the EFL context because students must simultaneously negotiate ideas, collaborate with peers, and compose academic texts in a foreign language. This dual cognitive demand increases the complexity of collaboration and may discourage less proficient students from actively contributing. Moreover, EFL students often have limited experience in collaborative academic writing, making it difficult to distribute responsibilities equitably and maintain productive interactions. Similar findings have been reported by Hussein (2021), who argues that unclear task distribution and conflicting priorities among team members can reduce group cohesion and negatively affect project outcomes.

Another challenge concerned the process of collecting and analysing research data. As reported by S13, obtaining permission from schools and using statistical software such as SPSS were among the most demanding aspects of the project. These findings suggest that the difficulties experienced by EFL students extended beyond language proficiency to include methodological and technological

competencies required for scientific writing. Previous research has similarly shown that insufficient knowledge of research methods and data analysis tools often limits students' confidence and productivity in academic writing (Samanhudi & Linse, 2019). Therefore, the effectiveness of TBP depends not only on collaborative activities but also on adequate instructional scaffolding. Before students begin the project, lecturers should provide explicit training on research design, data collection procedures, ethical considerations, and data analysis software. Such preparation can reduce students' cognitive load and enable them to focus more effectively on the collaborative writing process.

Students also reported difficulties during the initial planning stage and maintaining active participation throughout the project. S30 highlighted uncertainty in determining the research focus, whereas S40 described limited participation in discussions and delayed submission of assigned tasks. These findings indicate that the primary challenge is not collaboration itself but the absence of structured collaborative regulation. In many EFL classrooms, students are accustomed to teacher-directed instruction and may lack the self-regulation, communication, and project management skills necessary for successful team-based learning. Consequently, they may struggle to negotiate ideas, make collective decisions, and resolve disagreements, particularly when producing academically demanding texts in English. Similar observations have been made by Alawdi (2023) and Altınmakas and Bayyurt (2019), who found that insufficient planning, unclear responsibilities, and low engagement often hinder collaborative academic writing. To address these issues, lecturers should adopt a more structured implementation of TBP by establishing clear project milestones, assigning specific roles to each team member, incorporating regular progress monitoring and peer evaluation, and providing formative feedback throughout the project. Integrating collaborative digital platforms, such as Google Docs or Zoom Meeting, can further facilitate communication, improve accountability, and enable lecturers to monitor individual contributions. These pedagogical strategies are expected to maximise the benefits of TBP while minimising the collaborative and methodological challenges encountered by EFL students in English scientific writing.

Conclusion

Based on the results and discussion, it is then inferred that EFL students generally perceived team-based projects (TBP) as an effective learning model for improving their English scientific writing skills. The implementation of TBP supported the development of English scientific writing skills while enhancing students' creativity, learning motivation, and opportunities for collaborative learning. Working in teams enabled students to exchange ideas, provide peer feedback, and construct academic knowledge collectively, which contributed to better academic writing outcomes. These findings suggest that TBP is a promising pedagogical approach for fostering 21st-century competencies, particularly collaboration, critical thinking, creativity, and communication, in English teacher education. Therefore, EFL lecturers are encouraged to integrate TBP into scientific writing and other English courses to promote collaborative and meaningful learning experiences.

Despite these contributions, this study has several limitations. First, the participants were recruited from a single university, which may limit the generalisability of the findings to other teacher education contexts. Second, the implementation of TBP was limited to a seven-week intervention, which may not fully capture its long-term impact on students' academic writing development. In addition, although students reported positive experiences, they also encountered challenges in coordinating ideas and collaborating effectively within their teams. Future studies should involve participants from multiple universities and diverse educational settings, employ longer implementation periods, and examine the long-term effects of TBP on preservice teachers' English proficiency, collaborative skills, and professional competence. Researchers may also compare TBP with other innovative learning models or adopt mixed-methods and longitudinal designs to provide more comprehensive evidence of its effectiveness.

Acknowledgments

We would like to deliver the appreciations to the students of Universitas XXX who were willing to participate in this research. Moreover, we appreciate the reviewers for the valuable feedback and suggestions for the improvement of this manuscript.

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