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Impact of Project-Based Learning (PBL) Integrated with Google Classroom on Improving English Writing Skills in a Bangladeshi University

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Abstract. Developing tertiary students' writing skills is a crucial issue. Teachers integrate writing projects with Google Classroom to develop students' writing skills, although the impact of this learning model has not yet been determined in the Bangladeshi higher education context. This research explored the impact of project-based learning (PBL), supported by Google Classroom, on developing the writing skills of tertiary students in Bangladesh. This quasi-experimental study analyzed essays written by 30 control- and 30 experimental-group students. Additionally, in-depth interviews were conducted with 10 students to collect data. A *t* test and thematic analysis were conducted for quantitative and qualitative data analysis, respectively. This quasi-experimental research used a pre-test/post-test and control group design. The experiment was implemented for the experimental group using PBL with Google Classroom and for the control group using the conventional teaching method. The pre-test results indicate no differences between the groups ($t = 0.55, p > 0.05$) in terms of writing proficiency before the intervention. Nevertheless, the post-test yielded a *t* value of 3.43 ($p < 0.01$), which was statistically significant in favor of the experimental group. This suggests the enhancement of students' writing skills through PBL with Google Classroom. These results demonstrate the benefits of the combination of interactive activities and social interaction conducive to writing tasks provided by this blended learning strategy. The implications are that teachers can blend PBL with Google Classroom for more active learning environments that align with students with real-world writing tasks. Limitations involved a small sample size and study duration. Future work should target larger, more diverse samples and incorporate qualitative work to deepen understanding of the learning process and outcomes.

Keywords: Bangladesh; Google Classroom; project-based learning; tertiary students; writing skills

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1. Introduction

Writing skills in English have become fundamental in the 21st century in attaining academic success, scaling up communication skills, and broadening professional achievement, especially in the context of South Asian countries (Fonseca & Peralta, 2019; Shobikah, 2017). Despite hurdles, teachers, students, and politicians have emphasized the evaluation, essence, and far-reaching effect of teaching and learning English in Bangladesh. Thus, universities teach English for academic and professional success. Academic success is largely attributed to writing, one of the four main English language abilities (Zafar & Khan, 2017). Writing abilities are hard to teach to university students, especially in Bangladesh (Ahmed et al., 2024). Owing to time constraints and other issues, the traditional classroom program does not always help students to write (Basal, 2015). Both sides continue to negotiate and struggle to cover all the learning material, making it impossible to teach at an individual level or through door-to-door problem-solving (Al-Besher, 2012).

Hence, the essence and practice of project-based learning (PBL) are needed in the Bangladeshi curriculum to improve writing skills, eliminate the use of jargon in communication, and enrich professionalism in teaching. According to Lu (2021), PBL via Google Classroom is essential for tertiary students' English writing skills at the university level. Google Classroom makes learning paperless and flexible, helping students improve their writing. The Google Classroom method for teaching writing is also effective (Kashkool, 2021). Therefore, tertiary education teachers, especially in Bangladesh, want to use Google Classroom for project-based writing instruction (Hasan et al., 2020).

In fact, many Bangladeshi tertiary English language teachers teach writing using PBL (Rashid & Rana, 2021). In Bangladesh, however, Google Classroom does not include PBL (Zafrin, 2018). In the context of Bangladesh, writing classes teach grammar, paraphrasing, summarizing, and more. Most first year college students must take two writing classes (Rashid & Rana, 2021). Students produce drafts on numerous themes or cover essay writing in terms of course materials (Rashid & Rana, 2021), and writing skills help students to excel in the following semesters and at university. It has also been found that students struggle with adequate time to cover all syllabus topics (Alam et al., 2022). As a result, from the administrative side, tasks are not completed in time according to the course schedule. Regular class teachers therefore struggle to cover all the content.

Enhancing tertiary students' writing can be effectively achieved through PBL, which is anticipated to boost practice frequency and improve writing skills (Praba et al., 2018). Cahyono et al. (2024) proposed that English educators incorporate extra writing assignments within PBL approaches to further benefit students. Various educators implement creative methods to enhance students' writing abilities, frequently involving additional writing tasks. Tools such as Google Classroom support the exchange of feedback between students and teachers, thereby accelerating the development of writing skills. Google Classroom and PBL boost students' writing (Islam, 2019; Rabbi et al., 2018; Saidu & Al Mamun, 2022). Google Classroom and PBL have not been studied in Bangladesh. Google

Classroom improves students' writing skills through PBL. Thus, this study used PBL and Google Classroom to improve students' writing skills so that more teachers and students can benefit from new studies on its use and efficacy.

The distinctiveness of this research, when compared to earlier studies such as those conducted by Nguyen and Dinh (2019), Pimdee et al. (2024), Erlangga et al. (2021), and Syakur et al. (2020), lies in its focus on the application of PBL specifically for enhancing tertiary students' writing skills. Unlike Nguyen and Dinh (2019), who explored general pedagogical strategies for writing improvement, or Pimdee et al. (2024), who examined various instructional techniques, this research uniquely integrated additional writing assignments within a PBL framework. Erlangga et al. (2021) emphasized the role of technology in writing instruction, whereas Syakur et al. (2020) focused on traditional methods. This study's emphasis on combining PBL with modern feedback tools such as Google Classroom sets it apart by offering a more targeted approach to improving writing through interactive and practical methods.

This study has identified that Google Classroom can be used as a platform by tertiary students to implement writing projects. Thus, the gap that this study sought to fill was to determine the effectiveness of integrating Google Classroom with PBL to develop tertiary students' writing skills. Moreover, this study filled these contemporary research gaps by concentrating on the detailed context of Bangladeshi higher education, investigating detailed aspects of writing skills, considering both instantaneous and long-term influences, and incorporating qualitative data from students and educators. The research question for this study is: *What are students' perceptions of the impacts of integrating PBL with Google Classroom on improving their English writing skills?*

2. Literature Review

Based on the English language education history in Bangladesh, an innovative method or way is essential to effectively teach English to tertiary students. This literature review on English writing problems faced by Bangladeshi tertiary students, PBL in developing writing skills, integrating writing projects with Google Classroom, and perceptions on integrating PBL with Google Classroom in developing writing skills elucidates the gap and need for the study extensively. English is compulsory in all universities in Bangladesh. Despite not receiving special priority in education policy due to the country's 1952 language movement, English is still taught for practicality and prestige. The National Education Policy emphasizes English as an indispensable tool for building a knowledge-based society, highlighting writing and speaking. English is introduced as a compulsory subject in all secondary education streams and emphasized in colleges and universities. However, English was not prioritized in the 1974, 1976, 1988, 1991, 2000, and 2003 task forces (Chowdhury & Kabir, 2014). In recent years, considering practical needs, English has been taught with more priority. By being integrated with Google Classroom, PBL is suggested as an innovative way to develop students' writing skills.

2.1 English Writing Problems Faced by Tertiary School Students

As per the Bangladeshi education system, English as a subject has been made mandatory from grades 1 to 12, where for students from grades 1 to 10, English counts 100 marks, and for students at the higher secondary level, English counts 200 marks. Nonetheless, these methods are based mainly on such tasks because teaching is focused on reading and writing, leaving students at a great disadvantage in terms of listening and speaking. Memorization of essays for exams (Akter, 2022; Alam et al., 2022; Rabbi et al., 2018; Sharmin, 2022), lack of extra materials (Akter, 2022), workload (Sharmin, 2022), irrelevant qualifications, and insufficient training of instructors (Akter, 2022) hinder the development of essential writing skills, leaving students in Bangladesh ill-equipped to express their ideas effectively and engage in critical discourse. Immediate issues at university include few teachers being skilled in the teaching of writing, lack of training and resources, oversized classes, emphasis on grammar and vocabulary, etc. Enhancing students' language abilities calls for adequate resourcing and support for teachers and a renewed focus on writing within the curriculum.

Many university students write essays, reports, and assignments without a clear understanding of good writing practices; this leads to problems in generating ideas, organizing them, and forming a cohesive discourse (Patwary & Sajib, 2018). Most students lack fluency in English; the deficiency in knowledge of grammatical structures makes it very difficult for them to express their thoughts efficiently (Kohnke & Moorhouse, 2022). To counteract these hurdles, extra tools – such as Google Classroom – have been employed. This study employed an eight-week PBL program to increase students' writing skills resulting from the intervention.

2.2 Project-Based Learning in Developing English Writing Skills

English writing abilities can be developed in authentic circumstances by working on real-world projects as part of the student-centered method known as PBL. This approach improves students' writing skills, inventiveness, and capacity for self-directed learning, which leads to increased interest in the subject matter. PBL fosters autonomous learning, teamwork, and collaboration in addition to enhancing students' writing skills. It also has a positive effect on students' self-respect and autonomy. Additionally, it improves critical thinking and problem-solving abilities, both of which are crucial in professional and academic contexts (Dewi, 2020; Wijnen et al., 2017). This approach is further supported by Google Classroom, a practical web-based collaborative learning tool that provides an efficient setting for English as a foreign language (EFL) writing training. Peer feedback and improved student-teacher communication are made possible by its interactive elements, which are essential for improving writing performance. In this study, writing projects were integrated into Google Classroom to see whether the features of Google Classroom have any impact on students' writing development.

2.3 Integrating Project-Based Learning into Google Classroom

Nguyen and Dinh (2019) conducted research on PBL methods in Google Classroom, highlighting the importance of teachers' role in encouraging students and providing support through audio and video recordings. This approach helps students to develop their presentation skills and language use through repeated

revision of material. Teachers should also provide immediate feedback and enact rules for early and late submission of online assignments to create a sense of fairness among students. Pimdee et al. (2024) found that learning through the PBL models enhances students' scientific literacy skills to a moderate degree.

Online learning is successful through strong network connections and can transcend time and space constraints. Erlangga et al. (2021) found that PBL, through Google Classroom, enhanced students' critical thinking skills during the Covid-19 pandemic. Syakur et al. (2020) found that Google Classroom manages the learning process effectively and helps lecturers and students to participate in English language learning programs more intensively. Almaida and Jaelani (2021) reviewed the use of PBL methods in Google Classroom for teaching an EFL class, finding the results to be positive. Harahap et al. (2021) found that students become accustomed to being curious and finding solutions to challenges independently in groups if their ability to do this freely and autonomously is fostered. Google Classroom helps teachers to increase their efficiency, increase teacher-student communication, and overcome monotony among students while learning. In conclusion, Google Classroom has the potential to improve English teaching and learning, enhance students' critical thinking skills, and contribute to Education 4.0. Further research is needed to explore its effects on tertiary-level contexts in Bangladesh.

2.4 Perception of Integrating Project-Based Learning into Google Classroom

An extensive reading of relevant literature has revealed that PBL incorporated with Google Classroom can arouse students' engagement, interest, and motivation in developing their writing skills (Nguyen & Dinh, 2019). Owing to the limited class hours in traditional writing classes, students cannot always fulfill their learning expectations. They cannot even always reach the teacher because teachers stay busy with academic and administrative work. Therefore, most students may feel the need to work more to develop their writing skills. PBL incorporated with Google Classroom can meet this need in learning among students.

This new learning model or platform can increase student engagement in the classroom. Nowadays, teachers mostly face the issue of engaging students in the learning process, whether in writing or speaking. Specifically, for the writing classes, students need to be more engaged while learning with their peers or individually. They are expected to work on their writing on the new platform and maximize their writing skills development (Ramadhani et al., 2019). This platform allows them to work from home and to receive feedback on their drafts from the teacher anytime. Thus, it is an alternative or complementary option to developing writing skills. Students are expected to be motivated and interested in working and developing their writing skills through the integration of PBL with Google Classroom (Herro & Quigley, 2017).

2.5 Theory

In this study, we employed the theory of social constructivism by Vygotsky (1978). This theory served as the basis for observing the dynamics of incorporating PBL into Google Classroom in teaching writing in a foreign language context. The

theory was also employed to study the effects of PBL on online platforms. It helped to broaden our horizons on how students can work together in building meaning. According to the theory of social constructivism, knowledge is a co-constructed process that changes over time through interactions and negotiations between learners (Palincsar, 1998; Prawat & Floden, 1994). Working together to build knowledge helps students to acquire knowledge, connect ideas, and better understand the text. In addition, through negotiations and discussions, students summarize their ideas, explore conflicting ideas, and reach conclusions (Barnes, 2009). Therefore, project-based work helps to solve problems through discussions, leading to better learning. Social constructivism theory educates learners about the co-construction of meaning or knowledge and examines dissenting opinions. This is especially relevant for writing skills in online learning.

3. Methodology

A quasi-experimental research design was adopted in this study for its suitability in comparing the findings from a pre-test and post-test. Quasi-experimental designs are needed when randomization is impractical but causal inference is essential to evaluating interventions (Campbell & Stanley, 1963). The important aspects of the methodology are presented next.

3.1 Participants and Sampling

Purposive sampling was employed in this study. This type of sampling is used when the researcher is looking for a specific type of participant or when the sample size is small and the goal is to maximize the information obtained from the participants. The selection of participants is based on their ability to provide insightful information or to represent a particular perspective. We used the essays written by 30 students from an experimental group and 30 from a control group. These students were enrolled in the ENG103 course, where they learn to write essays. All the students were from the English department and were doing their language courses in the beginning semesters. In addition, we conducted in-depth interviews with 10 tertiary-level students to obtain qualitative data. These 10 students were purposively chosen from the 30 students in the experimental group. Data collected from the in-depth interviews were used as complementary to the quantitative data retrieved from the scoring of the essays written by the students in the experimental and control groups.

The target population for this study was tertiary students studying in private universities who used Google Classroom as a platform to complete their writing projects. Using the entire population in this study would be too costly and impractical (Saunders et al., 2009). The participants in this study were students in Bangladesh who were enrolled in tertiary education. Students studying at the tertiary level include those pursuing a bachelor's degree. The participants ranged in age from 18 to 21, had completed secondary education, and were pursuing a university degree at the time of study. They had "passed" English on the university's admission test. Therefore, the selected participants could be considered to have almost similar proficiency levels. These university students were chosen because they used PBL through Google Classroom to develop their

writing skills. As a result, the necessary data could be gathered from them. The interview protocol is attached in Appendix 1.

3.2 Data Collection

A quasi-experimental design was chosen to compare the effects of PBL and conventional methods in a natural classroom setting without random assignment, allowing for practical educational research (Cook & Campbell, 1979; Shadish et al., 2002; Uddin et al., 2020). This design effectively captures real-world outcomes, blending quantitative data from tests and qualitative insights from in-depth student interviews.

3.3 Control Group and Experimental Group

The sample of students in this research was divided into an experimental group and a control group of 30 students each. In the experimental group, students aimed to develop their writing skills through PBL integrated with Google Classroom. The students for this group were chosen with the permission of the institution where they were doing the ENG103 course. This experimental group consisted of both male and female students. There was a teacher in the role of writing instructor who taught students how to write an essay, accuracy in the area of topic sentences, a number of supporting points, use of cohesive devices, use of punctuation, grammatical errors, use of fragments, capitalization, etc.

The students in the control group aimed to develop their writing skills through the use of PBL without Google Classroom. They were taught in traditional face-to-face classes. No intervention using Google Classroom was made in their learning process. Otherwise, both control and experimental groups received the same treatment in the writing project. The control group consisted of one section of students of the ENG103 course. Essays written by these students were compared with those of the experimental group to determine whether PBL integrated with Google Classroom makes any difference in developing tertiary-level students' writing skills.

Thus, we sought to determine whether the new model of learning (integrating PBL with Google Classroom to develop students' writing skills) made any difference in developing writing skills among the students. The selected students were considered to have the same competency level based on the admission test administered by the university. Their equal competency level can also be ascertained by looking at the results in writing skills of the previous semester. The same teacher taught both the control and the experimental group. Moreover, their essay-writing topics were also the same. Table 1 below shows some background details of the control and experimental groups.

Table 1: Background information of the control and experimental groups

| Background | Control group | Experimental group |
|---------------------|-----------------------------|-----------------------------|
| Gender | Male and female | Male and female |
| English proficiency | Passed the proficiency test | Passed the proficiency test |
| Schooling type | Bangla medium | Bangla medium |

3.4 Research Procedures for Pre-Test, Post-Test, and In-Depth Interviews

A pre-test and a post-test were conducted with both the control group and the experimental group. The students' obtained scores in the pre- and post-tests were compared and analyzed using SPSS (*t* test). The students were assigned to write an essay on the same topic in the pre-test and then again in the post-test to ensure equal opportunity. The assignment had one prompt for writing an essay, which is presented below:

In recent times, it has been noticed that students do not study regularly due to their addiction to different games. Due to their detachment from studies, they fail to achieve the qualities they need before entering the job market. Write a five-paragraph persuasive essay on "Students should study more instead of wasting time playing online games" in 250 words. Your essay should have an introduction, a thesis statement, three body paragraphs, and a conclusion. Students will have to answer the question by writing a complete essay.

The answers were evaluated based on the criteria in the codebook (Appendix 2). These criteria include thesis statement, spelling mistakes, sentence structure, subject-verb agreement, use of punctuation marks, etc. Internal validation of the codebook was done by an expert from the institution. Then, in-depth interviews were conducted with 10 students. The in-depth interview protocol was validated by an expert. The duration of the interviews was between 45 and 60 minutes each.

3.5 Data Analysis

We analyzed the essays written by the experimental and control group students and scored each essay. We then compared the scores obtained in both pre- and post-tests of the essays written by the experimental- and control-group students. A *t* test was conducted to determine whether teaching writing skills through PBL integrated with Google Classroom has any effect on writing skills. At first, the essay writing scores obtained in both the control and experiment groups in the pre-test were compared. Then, the essay writing scores obtained in the post-test in both the control and experimental groups were compared. This was followed by a thematic analysis of the in-depth interview data. The coding process involved extracting meaning from the scripts or audio-recorded data, marking the elements with codes and breaking these into word or picture segments, analyzing the codes for repetition and duplication, and aggregating them into larger themes. The themes identified from the analysis include user-friendliness, developing micro-skills of English writing, portability and ease of access, feedback capacity, and perceptions of using Google Classroom for writing projects. In this study, we studied the progression of coding qualitative data suggested by Creswell (2003) and Uddin et al. (2020).

3.6 Intervention: Project-Based Learning Integrated with Google Classroom for Teaching English Writing Skills

Recently, English language teachers have started using Google Classroom as a platform to incorporate PBL in teaching different topics. English language teachers use Google Classroom as an effective platform for implementing PBL to develop students' English language skills. This opportunity to use Google Classroom for implementing PBL has opened a new window for teachers and students of the tertiary level in developing their English writing skills (Aktar et al.,

2022). Teachers in Bangladeshi private universities use this platform to implement PBL to develop students' writing skills.

The participating 30 students in the experimental group received several lectures and instructions on developing their writing skills in the area of essay writing. They then wrote essays and submitted them online on the Google Classroom platform. Moreover, the students were also encouraged to comment on the posts by the instructor or their peers. Thus, Google Classroom was used as a platform for interaction and engagement among students and teacher. The students were able to develop their writing skills through the interaction and engagement. The teacher was present to instruct and monitor students' activities in the essay-writing project. Thus, in this integration of PBL with Google Classroom, the tertiary-level students were expected to develop their writing skills and write a few essays. The 30 students in the control group were not included in classes involving the use of Google Classroom. The same teacher taught them the same topics as the experimental group in relation to writing essays, but they were taught in traditional classes without any intervention such as Google Classroom.

Students in the experimental group joined the Google Classroom platform and worked on the writing project. The teacher presented lessons on different parts of the essay for ten weeks. All these interactions and collaborations took place by integrating PBL with Google Classroom. Students found the platform more *"interesting and motivating to give more effort"* (Interviewee 6). This motivation, driven by online connections and collaborations, is anticipated to yield improved outcomes (Hasan & Ibrahim, 2017).

4. Results

To determine the effect of integrating PBL with Google Classroom on improving students' English writing skills, this study collected data from 10 student interviews and an essay analysis test with 30 students from an experimental group and 30 from a control group. We thematically analyzed the in-depth interviews following Creswell (2003).

4.1 Pre-Test Results (*t* test)

This study conducted a paired sample *t* test (Table 2) to determine how integrating PBL with Google Classroom improved students' English writing skills. The test yielded insignificant values ($t = 0.45$, $p > 0.05$) in this regard, resulting in no difference between the experimental and control groups. In other words, the pre-test data reveal no difference between the two groups regarding the improvement of English writing skills by integrating PBL with Google Classroom.

Table 2: Experimental analysis by *t* test (pre-test results)

| Group | N | Mean | SD | DF | <i>t</i> value | <i>p</i> value |
|--------------|----|------|------|----|----------------|----------------|
| Experimental | 30 | 6.58 | 1.03 | 58 | 0.45 | 0.653 |
| Control | 30 | 6.48 | 0.64 | | | |

4.2 Post-Test Results (*t* test)

A similar test was conducted for the post-test (Table 3). In this case, the test yielded statistically significant values ($t = 3.43, p < 0.01$), resulting in a significant difference observed between the experimental and control groups. In other words, the experimental group's average value was slightly higher than that of the control group. Therefore, a difference was observed between the two groups in relation to the improvement of English writing skills by integrating PBL with Google Classroom.

Table 3: Experimental analysis by *t* test (post-test results)

| Group | N | Mean | SD | DF | <i>t</i> value | <i>p</i> value |
|--------------|----|------|------|----|----------------|----------------|
| Experimental | 30 | 7.47 | 0.76 | 58 | 3.43 | 0.001 |
| Control | 30 | 6.83 | 0.66 | | | |

4.3 Interview Results

The in-depth interviews gathered data based on the research question: *What are students' perceptions of the impacts of integrating PBL with Google Classroom on improving their English writing skills?* The themes derived from the thematic analysis are discussed in this section.

4.3.1 Perceptions of using Google Classroom for writing projects

Most of the students interviewed for this study said that one of the ways in which they practiced writing was by using Google Classroom for writing projects. The writing project in this study (centered on persuasive essay writing with PBL via Google Classroom) included 20 online classes through Google Meet. All the interviewees confirmed having used Google Classroom to develop their writing skills in English. Interviewee 1 said: *"My thoughts are unique, so I express my ideas and thoughts through writing as a post or submission on Google Classroom."* Interviewee 10 said: *"I do my work in my spare time on Google Classroom, do uploads there, comment, and respond to comments or replies of friends about writing projects."* Another student described using smart, innovative techniques in writing projects in Google Classroom as: *"I use unique and smart techniques while working on writing projects in Google Classroom"* (Interviewee 2). Interviewee 3 described Google Classroom instructions as being very clear: *"I appreciate clear instructions for writing by Google Classroom. The instructions are at the top in a very clear format."*

Teachers would post in Google Classroom, and students would complete assignments in return. The students wrote essays with help and materials from their teacher, uploaded the essays as Microsoft Word files to Google Classroom, received feedback, and revised their drafts. Interviewee 4 stated: *"We think that as much as we practice, our writing qualities get boosted."* Google Meet allowed students to interact with one another while discussing writing projects relatively informally, an appealing feature of the system for students. One of the students mentioned: *"Google Classroom helps in the development of ideas and feedback from the writings that need to be improved"* (Interviewee 4).

4.3.2 User-friendliness

Regarding user-friendliness, students mentioned that they could write their assignments without using paper by using Google Docs instead. Students voiced the benefit of receiving instant feedback as relevant to the classroom, as this was not always the case in traditional classroom situations. Interviewee 3 elaborated on this: *"In traditional classes, we wait days to have our writing issues resolved. These days, we can receive feedback or even gain knowledge from the teacher any time online now."* Creativity and instant feedback were among the aspects that the students liked most. Interviewee 5 said: *"Google Classroom helps me participate more in writing and save time and look at my grammatical errors."* Interviewee 6 also stated: *"the teacher gives me feedback that makes me aware of my writing weak areas and also helps [in] thinking outside the box."*

4.3.3 Developing micro-skills of writing

The participating students experienced improvement in many micro-skills of writing (e.g., organization, punctuation, sentence structure, vocabulary, and grammar). Interviewee 1 said: *"I was able to ask questions in the classroom comment sections."* Interviewee 2 mentioned that: *"This model helps me to be more specific in my write-ups."* On the other hand, the students loved being able to ask their questions 24/7. Interviewee 3 said: *"In a traditional class, sometimes when you're asked questions, [they might be wrong], but here, I can ask [questions] anytime."* In Google Classroom, real-time feedback and collaborative writing were made possible, which *"promoted good grammatical use, vocabulary, and sentence structure"* (Interviewee 4). Interviewee 4 also stated: *"I came to know many new words and their meanings; this mainly came to be the material support for improving my word power."* Students also felt more confident correcting and revising their writing. For example, Interviewee 5 mentioned learning the following: *"I learned a lot of vocabulary, grammar structures, and synonyms. I gained more knowledge, and [in] online classes, there was no room for me to avoid participation."* In addition, Interviewee 6 mentioned that the practice assignments with time constraints on the new model helped them to type and write faster.

4.3.4 Portability and easy-to-access feature

The students also loved that their learning was made portable and that they could work on writing projects from everywhere. Interviewee 3 said: *"Use the opportunity to write and submit in the new learning model."* Three of the interviewees (4, 9, and 10) said they could submit assignments whether they were at home or out with Google Classroom, which was not possible in the traditional classroom. Interviewee 6 noted: *"I can keep enticing because of my hobby because I can proceed to writing day by day."* In addition, Interviewee 7 stated that: *"it allowed me to do my homework at any time, any place, providing me with regular writing practice."*

4.3.5 Feedback

Feedback from teachers was vital for improving students' writing skills. As Interviewee 1 said: *"teachers can easily mark the mistakes using Google Docs, and they can comment privately."* In addition, Interviewee 2 said: *"when I get feedback quickly, I feel that I have made a mistake, which makes me work on my writing."* One immediate benefit of using Google Classroom that the students liked was the option for

teachers to provide feedback privately. Public feedback, as provided in traditional classrooms, can demotivate students, as indicated by Interviewee 3: *“in traditional classes, that public feedback can be disheartening, and yet, teachers provide individual feedback, which is very helpful here.”* Interviewees 4 and 5 both liked the detailed feedback given via Google Classroom and appreciated the individual suggestions about how to improve their writing skills.

5. Discussion

From the paired sample *t*-test results, an influential account of PBL integrated with Google Classroom in improving the English writing skills of students emerged. The results of the pre-test at the beginning of the program displayed a non-significant *t* value (0.45) and a *p* value greater than 0.05, which implies the lack of a significant difference between the experimental group and the control group. This is consistent with the work of Akter (2022), who found that the use of PBL in the initial adoption hours can be problematic due to a lack of infrastructure and teacher readiness, all of which may delay the “out of the box” time effect of this attempt. However, the post-test results did show a significant change. The *t* value of 3.43, with a *p* value of less than 0.01, indicates that the experimental group, who used PBL integrated with Google Classroom, improved their English writing skills. This difference in results compared to the control group is significant. According to Hasan and Labonya, (2016), Ismael and Ismael (2023), and Sa’diyah and Cahyono (2019), this striking difference demonstrates the promise of PBL and tech integration to promote better educational output. After the initial difficulty of perception, as faculty and students adjusted to new pedagogical and technological tools, the performance also improved post-intervention, suggesting that the benefits of PBL play a dynamic role.

The significant difference in the post-test results dovetails with the results of Fonseca and Peralta (2019), Hasan et al. (2018), and Indah and Sukma (2024), who argued for the incorporation of regular feedback and interactive learning spaces. The findings may also have been influenced by the role that Google Classroom plays in allowing for constant feedback that is actually of high quality. Although the initial adoption of PBL may not be immediately beneficial, over time, the continued incorporation of PBL with well-integrated technology can help students improve their writing skills considerably.

The paper highlights findings from interviews on integrating Google Classroom with PBL to improve writing skills among tertiary students in Bangladesh. The results support existing literature, particularly Sa’diyah and Cahyono (2019), emphasizing PBL’s effectiveness in teaching writing. PBL encourages active engagement and real-world application, while Google Classroom provides a structured, collaborative platform. However, context-specific challenges, such as access to technology and educator readiness, may impact the successful implementation of these methods. Participants uniformly praised PBL for creating a richer, more authentic learning experience that enhanced both motivation and writing ability. Most of the interviewees referred to the transformational dimension of technology, commonly represented in Google Classroom and creative writing in groups. This is in line with what Hasan et al. (2018) and Ismael

and Ismael (2023) found, that technology integration has a positive impact on the level of writing performance, since it offers more opportunities for the students to interact regularly and to receive continuous feedback. Fonseca and Peralta (2019) further stated that Google Classroom has great potential as a tool for writing instruction – a statement that the aforementioned participants supported through the utility they found in being able to access resources and submit assignments online.

The problems highlighted by interviewees, such as lack of tech capacity and inadequate teacher training, match the findings of Akter (2022), who identified the same principal barriers in Bangladesh. Similarly, Herro and Quigley (2017) contended that their interview data provide further evidence of a call for sustained professional development to provide teachers with the skills to be able to implement PBL as well as meaningfully integrate technology. The value of receiving regular feedback to improve writing, a point emphasized by Indah and Sukma (2024), also surfaced in the interviews. One of the major changes in writing, as mentioned by participants, was that their writing improved considerably due to receiving almost immediate feedback from teachers via platforms such as Google Classroom. The study found that continuous engagement and interaction through digital tools play a definite role in enhancing writing abilities (Hasan & Labonya, 2016; Islam, 2019).

The interview findings align with the literature (Aktar et al., 2022; Hasan & Ibrahim, 2017) on the advantages and difficulties of PBL and the use of technology in writing instruction. Based on the findings of these studies, it can be asserted that writing projects incorporated into Google Classroom are more impactful in developing writing skills compared to the use of blogs, YouTube, and other apps. The findings of these studies also emphasize that the intervention of this new learning model makes more positive impacts on developing writing compared to traditional classroom teaching (Aktar et al., 2022; Hasan et al., 2020).

6. Implications and Recommendations

The findings of this study thus emphasize that the use of PBL combined with Google Classroom develops students' writing skills. The marked progress seen in the post-test results provides the perception that this method facilitates greater participation and also transfers to the administration of written tasks. Therefore, good tools are needed to help educators embed PBL in online platforms to support collaborative and interactive learning spaces. Teacher training on PBL strategies and the workings of Google Classroom will be key. But for this to be successful, universities must have sufficient tech support to maintain this continuous blended learning model. The study's theoretical implications align with Vygotsky's social constructivism theory, emphasizing that collaborative learning through Google Classroom and PBL, fostering of peer interaction, scaffolding, and active engagement enhances students' writing skills in authentic, real-world contexts. It is recommended that the relevant authorities, including university administration, policymakers, curriculum designers, and English language teachers, be clearly advised to implement and support the integration of these approaches.

7. Limitations

Because of the small sample size and the short time span of the study, the conclusions may not be broadly generalizable. A focus on only quantitative data will not allow for an understanding of the qualitative data regarding the development of student writing and student writing experiences. Future studies should involve a larger and more varied sample and make use of a multi-methodological approach to view learning processes and potential results more holistically. A chi-square test can be conducted to see inter-group differences in this new model. In addition, a future study on the same topic can include teachers as interview participants. Furthermore, although longer term studies are needed to determine the lasting effects of integrating PBL with Google Classroom on writing, there may be a broad-based effect on students' writing skills.

8. Conclusion

This study investigated the impact of PBL integrated with Google Classroom on improving the writing skills of tertiary students in Bangladesh. The results showed that students in the experimental group, who utilized PBL via Google Classroom, improved significantly in their writing proficiency compared to the control group, who employed traditional methods. This implies that PBL, when assisted by Google Classroom, promotes active participation and social connection, both of which are important for increasing writing skills. Despite constraints such as a small sample size and short study duration, the findings demonstrate the ability of blended learning environments to encourage real-world writing activities. To better understand the learning process and effects, future research should incorporate bigger, more diverse sample sizes as well as qualitative work. Teachers are encouraged to adopt innovative teaching methods, engage in continuous professional development, and foster a supportive learning environment that inspires students to reach their full potential.

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Appendix 1

In-depth Interview Questions:

1. What are your perceptions of using Google Classroom as a writing project development platform?
2. How did you make the best use of new learning model in developing writing skills?
3. So, how did the new learning model enable you to build the individual micro-skills of writing?
4. In what ways did its portability and easy-to-access features help you become a better writer?
5. How did the feedback from your teacher on Google Classroom assist you in the growth of your writing skills?

Appendix 2

Codebook/Rubric for Essay Analysis Test (Pre-test and Post-test)

| | | | |
|----|---|----|--------------------------|
| 1 | Topic Sentence and Thesis Statement | 13 | Less and Idiomatic Words |
| | | 14 | Wide range of vocabulary |
| 2 | Number of Supporting Points | 15 | Wrong word |
| 3 | Use of Cohesive Devices | 16 | Word order |
| 4 | Sequence of Information and Ideas Logically | 17 | Parallelism |
| | | 18 | Possessives |
| 5 | Use of Punctuations | 19 | Use of Article |
| 6 | Grammatical Errors | 20 | Use of Preposition |
| 7 | Tense (Correct Sentence Structure) | 21 | Use of Correct Number |
| | | 22 | Use of Correct Gender |
| 8 | Problem with Verb (Active, passive, infinitive and gerunds) | 23 | Use of Pronouns |
| | | 24 | Subject-Verb Agreement |
| 9 | Use of Fragments | 25 | Dangling Modifier |
| 10 | Spelling Errors | 26 | Misplaced Modifier |
| 11 | Capitalization | 27 | Concluding Sentence |
| 12 | Use of sentences | | |