



The effect of using google docs on Ethiopian EFL students' collaborative writing improvement

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Abstract

This study investigated the impact of Google Docs on the academic writing improvement of English as a Foreign Language (EFL) learners. Conducted over a 13-week period during the 2022/23 academic year at an Ethiopian university, the research examined how this digital tool affects writing quality and student perceptions. Utilizing a sequential explanatory mixed methods approach, the research employed a quasi-experimental A-B-A-B reversal design with a single intact class of 10 EFL learners from Wollo University, Ethiopia, enrolled in an Advanced Writing course. The A-B-A-B reversal design involved alternating between baseline (A) and intervention (B) phases to observe its effect on writing improvement. Data on writing quality were collected through essay writing tests, and student perceptions were gathered via interviews. Quantitative data from pre- and post-tests were analyzed using paired-samples *t*-tests and a one-way Multivariate Analysis of Covariance (MANCOVA) to assess changes in overall writing skills and sub-skills. Thematic analysis was used for the qualitative interview data. The findings from the tests revealed statistically significant improvements in students' overall essay scores, indicating a significant enhancement in their writing quality. Notably, significant improvements were observed in task achievement, coherence and cohesion, lexical resources, and grammar range and accuracy. Qualitative insights from interviews

supported these results, with students expressing positive perceptions of Google Docs due to enhanced collaboration, real-time feedback, and ease of access. The study concludes that Google Docs could be an effective digital tool for promoting collaboration and improving writing skills in EFL settings. Implications for EFL pedagogy and directions for future research are discussed.

Keywords: collaborative writing, Computer-Assisted Language Learning, online collaboration through Google Docs

Background of the Study

English is fundamental in Ethiopia's education system, serving as a critical factor for academic and professional success. It is taught from the first grade and functions as the medium of instruction, especially in secondary and tertiary education (Eshetie, 2013). English even holds the status of an additional official language in Ethiopia (Dawit, 2013). However, students' proficiency in English writing remains a significant challenge (Alamirew, 2005).

Writing is a complex cognitive process involving planning, drafting, revising, and editing, requiring high language proficiency and critical thinking (Bailey, 2019; Dobao, 2012; Graham, 2018; Hyland, 2019). These demands often pose difficulties for learners navigating academic expectations. Traditional product-oriented writing instruction in Ethiopian EFL classes emphasizes grammatical accuracy and final output over the writing process, resulting in students struggling to develop coherent ideas (Alemu & Mohammed, 2022). Difficulties in acquiring writing skills often stem from limited exposure to authentic English texts, inadequate feedback, and few opportunities for collaborative learning (Badi, 2015; Storch, 2013).

Despite its complexity, writing remains a crucial skill in second language learning. Byrne (1988) posits that mastering writing requires purposeful engagement, interaction with readers, and the effective use of logical and linguistic devices. Collaborative writing, which is defined as the joint production of a text by two or more authors, has gained recognition as an effective pedagogical approach in the EFL context (Storch, 2011, 2013). It facilitates interaction, negotiation, and scaffolded assistance, thereby enhancing language use (Li, 2014; Li & Kim, 2016).

Recently, technology-based collaborative writing approaches have emerged in EFL classrooms. Web 2.0 tools, such as Wikis, Google Docs, blogs, PB Works, Mixed Ink, Edmodo, and Artificial Intelligence (AI), enable students to co-construct and assess texts and to communicate collaboratively (Es-sarghini & Boumahdi, 2025; Fathi & Rahimi, 2024; Zhang & Chen, 2022). Many teachers have integrated these technologies into writing classes to enliven instruction, give feedback, improve writing skills, and facilitate collaboration (Fan et al., 2024; Hyland, 2019). Hyland (2019) further argues that internet-enhanced collaborative writing, particularly using Google Docs, offers multifaceted benefits. Google Docs has gained prominence for its user-friendly interface, real-time collaboration, and accessibility, making it an effective tool for collaborative writing (Mansor, 2012; Oxnevad, 2013).

Computer-mediated collaborative writing may address persistent challenges in Ethiopian writing instruction, including limited teacher feedback, inadequate authentic writing contexts, insufficient preparation, low motivation, poor language proficiency, shortage of trained teachers, and restricted access to technology (Assefa, 2019; Bazezew, 2019; Debela, 2020; Tilahun & Tessema, 2019). Therefore, the present mixed methods study will examine the impact

of Google Docs-based collaborative writing on students' writing development. This empirical study contributes to the advancement of writing pedagogy in Ethiopia.

Statement of the Problem

This study aimed to explore how computer-mediated collaborative writing, specifically through Google Docs, can enhance the writing skills of Ethiopian EFL students. Grounded in Vygotsky's sociocultural theory (Vygotsky, 1978), the research highlights the importance of social interaction, scaffolding, and language as key drivers of cognitive development in learning environments.

Collaborative writing, guided by the principles of the Zone of Proximal Development (ZPD), the space between what a learner can do independently and what they can achieve with guidance, allows students to support each other, exchange ideas, and co-construct meaning. Google Docs facilitates this process through real-time collaboration, peer feedback, and shared editing tools, enabling learners to operate within their ZPD and improve their writing through active engagement and support (Dongyu et al., 2013; Ebadi & Rahimi, 2017; Gauvain, 2019; Storch, 2013).

Building on these sociocultural principles, collaborative writing is recognized as an effective pedagogical strategy in EFL settings (Storch, 2013). By integrating Web 2.0 tools like Google Docs, additional benefits emerge, such as enabling synchronous and asynchronous collaboration, allowing students to work together in real-time or at different times and locations. Features such as shared editing and commenting can streamline the collaborative process and provide a rich environment for feedback and revision (Ebadi & Rahimi, 2017; Fan et al., 2024).

However, observations of Ethiopian EFL classrooms often reveal limited student engagement in writing tasks (Tilahun & Tessema, 2019). For example, many students encounter problems in producing coherent written texts, ranging from grammatical and lexical inaccuracies to poor organization. These challenges are compounded by traditional instructional practices that focus on individual assignments with minimal peer and teacher feedback. Such practices often lead to difficulties in idea generation, organization, and revision, resulting in anxiety and reduced motivation (Alamirew, 2005; Asres, 2014; Dawit, 2013; Zeleke, 2013).

Local studies (e.g., (Alamirew, 2005; Asres, 2014; Dawit, 2013; Habtamu, 2018; Zeleke, 2013) have documented these writing challenges. For example, Alamirew (2005) noted that many students write poorly, with numerous grammatical errors, while more recent studies by Habtamu (2018) and Tilahun and Tessema (2019) confirm the persistence of these challenges in Ethiopian higher education settings.

Although research in various EFL contexts has demonstrated the positive effects of computer-mediated collaborative writing on writing performance, motivation, and attitudes (Ebadijalal & Moradkhani, 2025; Fatima, 2024; Hoang & Hoang, 2024; Kara, 2024; Li & Kim, 2016; Li & Zhang, 2023; Seyyedrezaie et al., 2016; Suwantarathip & Wichadee, 2014; Wale & Kassahun, 2024), the specific impact of Google Docs-mediated collaborative writing on Ethiopian students' writing development remains unexamined. Google Docs has been found particularly effective in EFL contexts due to its accessibility and collaborative features. Studies by Suwantarathip and Wichadee (2014) in Thailand, Seyyedrezaie et al. (2016) in Iran, Alharbi (2020) in Saudi Arabia, and Hoang and Hoang (2024) in Vietnam have demonstrated its effectiveness in improving writing quality, facilitating peer feedback, enhancing student engagement and highlighting positive student attitudes. For example, Suwantarathip and Wichadee (2014) compared students using Google Docs to traditional face-to-face groups and found that the Google Docs group had higher mean scores and positive attitudes. Similarly, Kitjaroonchai and Suppasetseree (2022) explored the effects of online collaborative writing via Google Docs on

Asian EFL learners' writing performance and interaction, confirming its positive impact across various writing domains. Hoang and Hoang (2024) investigated the use of Google Docs-based collaboration for enhancing EFL students' academic writing skills in online learning, providing further evidence of its potential in digital educational environments. Moreover, Jalili (2024) reported a positive effect of online collaborative learning through Google Docs on the writing performance of Iranian EFL learners, highlighting the tool's effectiveness in different cultural and educational contexts.

Furthermore, Ebadi and Rahimi (2017) found significant improvements in Iranian EFL learners' academic writing skills using Google Docs for peer editing, while Wang (2019) noted its positive impact on student interaction patterns. More recently, a study conducted by Ebadijalal and Moradkhani (2025) indicated that collaborative activities in computer-mediated communication contexts positively impact writing performance and motivation. Despite this growing body of international research, Ethiopian contexts remain understudied. Thus, this study investigates the effect of employing Google Docs-mediated collaborative writing on students' writing development and assesses their perceptions of the experience. The outcomes of this study will provide insights into EFL writing pedagogy.

Research Questions

To investigate the impact of EFL students' collaborative writing development in Google Docs, this study addressed the following research questions:

1. What is the effect of collaborating using Google Docs on EFL learners' writing development?
2. How do students perceive the use of Google Docs for collaborative writing practices?

Methodology

This study adopted a pragmatist paradigm, integrating both quantitative and qualitative approaches. Pragmatism is suitable as it emphasizes practical consequences and real-world applications of research findings. The study used an explanatory sequential mixed methods design, primarily collecting quantitative data followed by qualitative data (Creswell, 2014). An interrupted time-series design enabled multiple observations before and after the intervention, robustly assessing the impact of Google Docs-mediated collaborative writing on students' writing development (Linden & Arbor, 2015). Using an A-B-A-B reversal design, we alternated between baseline writing tests (A) and interventions (B) throughout the experiment.

Participants and Setting

This study was conducted with 10 third year undergraduate students enrolled in the Advanced Writing Skills course at Wollo University, Ethiopia, during the first semester of the 2022/23 academic year. The participants were assigned to a single-case Google Docs group and taught by one of the authors. All students used Google Docs to practice expository essay writing and attended class three times a week for 50 minutes each. While the study was conducted during the 2022/23 academic year, the findings remain relevant as the fundamental challenges in EFL writing instruction and the potential benefits of collaborative digital tools continue to be significant in the Ethiopian context.

Data Collection Instruments

Multiple data sources were used to triangulate findings and enrich understanding of the phenomenon.

Writing Tests

Four expository writing tests were administered across four phases (A1B1A2B2), with pre-tests and post-tests in each of two phases to establish a baseline and measure the dependent variable. Students completed a 250-word expository essay within 40 minutes during class. Pre-test and post-test topics differed to avoid practice effects, and during intervention periods, students collaboratively wrote expository academic essays using Google Docs. The IELTS writing band descriptors, task achievement, coherence and cohesion, lexical resources, and grammatical range and accuracy (IELTS, 2023), were used to assess the essays. Essays were scored on a 1 to 9 scale in 0.5 intervals, and a rubric outlining these criteria guided peer-editing.

Several steps were taken to uphold reliability and validity in the assessment process. The IELTS writing band descriptors were chosen as the primary evaluation framework due to their well-documented content validity and widespread acceptance in EFL testing. To further strengthen validity, the essay prompts were designed to align with both the objectives of the Advanced Writing course and the IELTS assessment criteria, ensuring they reflected real-world academic writing requirements. Additionally, two seasoned EFL instructors reviewed the test prompts to confirm face validity. The scoring rubric’s internal consistency was reinforced by adopting clearly defined descriptors from the IELTS band descriptors (IELTS, 2023). To ensure inter-rater reliability, two independent raters (one of the authors and an experienced EFL instructor) evaluated a random sample of essays. Cohen’s kappa coefficients ranged from 0.750 to 0.775, indicating substantial agreement. Raters discussed any differences, and each participant’s final score was the average of the two.

Interviews

Interviews were conducted with a randomly selected subset of participants to explore their attitudes and experiences using Google Docs for collaborative essay writing (Creswell, 2014). The interview questions, adapted from Li (2014) and Li and Zhu (2017), were audio-recorded in Amharic, transcribed, and translated into English. The interviews focused on collaboration, learning experiences, and the platform’s practicality. Follow-up questions and summaries ensured accurate understanding. Interviews were conducted after the second phase of the Google Docs intervention.

Table 1. Essay writing tasks given in four phases

Writing tests	Task	Topic	Word-number	Time
Pre-test	Task 2	Writing about Qualities of a Good Friend	250	50
Post-test	Task 2	Writing about Advantages and Disadvantages of Social Networking	250	50
Pre-test	Task 2	Writing about Benefits and Drawbacks of Working Before University	250	50
Post-test	Task 2	Writing about Advantages and Disadvantages of the Internet	250	50

Data Analysis Techniques

Quantitative Data Analysis

All essays from pre- and post-tests were scored on four criteria: task achievement, coherence and cohesion, lexicon, and grammatical accuracy, using a 1 to 9 scale for overall writing and each sub-skill. The statistical analysis followed a systematic approach to evaluate the intervention's effectiveness. First, descriptive statistics provided baseline information about the data distribution. Then, two main analyses were conducted: paired samples t-tests to compare pre-test and post-test scores, and a one-way Multivariate Analysis of Covariance (MANCOVA) to examine differences across the four writing sub-skills while controlling for pre-test performance. Data were analyzed for means, standard deviations, paired samples t-tests ($p < 0.05$ indicating significance), and one-way Multivariate Analysis of Covariance (MANCOVA) in SPSS software (version 26). One-way MANCOVA controlled for pre-test covariates to assess differences in post-test scores across the four sub-skills. Normality was confirmed using Kolmogorov-Smirnov and Shapiro-Wilk tests ($p > .05$, except Post-test 1 Shapiro-Wilk: $p = .069$), permitting parametric analysis. Additionally, a visual analysis of the interrupted time series (A-B-A-B reversal design with weekly assessments) examined changes in slope and level relative to predicted pre-intervention trends (Hudson et al., 2019).

Qualitative Data Analysis

Interview data were audio-recorded, transcribed, and translated from Amharic into English. Using Creswell's (2014) six-step thematic analysis, recurring patterns were identified, and codes (e.g., "accessibility," "collaboration," "technical challenges," "future suggestions") were developed and synthesized into broader themes: Accessibility and Convenience, Enhanced Collaboration, Improved Writing Quality, Technical Challenges, Engagement and Enjoyment, and Suggestions for Future Use. Interrelations between themes were examined, and categories were supported with evidence and tabulated.

The Intervention and Procedure

This single-subject A-B-A-B reversal quasi-experimental study was conducted with a third-year English graduating class at Wollo University, Ethiopia, over 13 weeks in three stages (see Table 2).

Stage I (Weeks 1–3): Introduced collaborative academic essay writing and Google Docs. In Week 1, participants learned to write expository essays in both traditional and online settings. In Week 2, they received training on using Google Docs for collaboration. In Week 3, they completed an individual academic writing pre-test (Phase A1) to establish a baseline.

Stage II (Weeks 4–11): Comprised the treatment periods. In Week 4, an academic writing task was posted on Google Docs, and groups collaborated to produce an expository essay. Contributions were color-coded, and participants engaged synchronously and asynchronously in prewriting, drafting, editing, and revising, focusing on sub-skills (task achievement, coherence and cohesion, lexicon, and grammatical accuracy). Peer and instructor feedback informed subsequent tasks. A post-test (Phase B1) was administered in Week 6. In Week 7, the intervention was reversed for one week. A second pre-test (Phase A2) occurred in Week 8, followed by another collaborative writing task. After Week 9's pre-test, groups submitted essays, and a final post-test (Phase B2) was administered in Week 11 (see Table 1 for task details).

Stage III (Weeks 12–13): Involved collecting Google Docs revision histories, final writing products, and conducting interviews about participants' perspectives on using Google Docs for collaborative work.

Table 2. *Intervention phases and weekly procedure*

Stages	Week	Activity/Procedure
Stage I: Introduction & Pre-Test	Week 1	Participants learned how to write expository essays collaboratively in traditional and online settings.
	Week 2	Training on how to use Google Docs for collaborative academic writing.
	Week 3	Individual academic writing pre-test conducted to establish baseline.
Stage II: Interventions	Week 4	Collaborative writing task introduced via Google Docs. Participants worked in groups in the computer lab.
	Week 5	Feedback/revision provided by the instructor and peers through Google Docs.
	Week 6	Post-test after the first intervention.
	Week 7	Intervention paused for one week.
	Week 8	Second pre-test conducted.
	Week 9	Second collaborative writing task introduced via Google Docs, like the first intervention.
	Week 10	Feedback/revision provided by the instructor and peers through Google Docs.
	Week 11	Post-test after the second intervention.
Stage III: Interview, Collection of final writing products	Week 12 and 13	Collection of students' Google Docs revision history, final writing products, and interviews about their perspectives on collaborative work.

This table outlines the three stages of the research intervention, the weekly breakdown, and the activities conducted.

Ethical Considerations

This study adhered to ethical standards to ensure the protection of participants. First, informed consent was obtained from all participants; this included participants’ awareness of the intervention procedures and processes of the experiment, so every participant who took part in the study was fully granted with the right to withdraw from the process. Second, data was secured strictly. Identities of participants in this study were confidentially kept so that no real names were mentioned in this report. Third, equitable access to resources such as the internet and computers was ensured to avoid potential bias. A maximum effort was made to meet all ethical standards.

Results

This study examined the impact of using Google Docs on students’ essay writing improvement using a sequential explanatory mixed-methods design. Pre- and post-test essay scores assessed changes in writing quality, while student interviews provided insights into the platform’s effectiveness in facilitating collaborative learning and writing.

Effects of Utilizing Google Docs for Online Collaboration on Academic Writing Skills

A paired samples t-test was conducted to determine whether the mean scores of these EFL learners differed significantly before and after instruction (see Table 3).

As shown in Table 3, the paired-samples *t*-test indicates a statistically significant overall improvement in students' writing performance ($t = -9.23, p < .000$). In pre-test 1, the mean score was 2.13 ($SD = 0.27$), indicating the initial level of writing abilities. After the intervention, in post-test 1, the mean score increased to 2.99 ($SD = 0.48$). The mean difference ($MD = 0.86$) indicates a substantial enhancement in students' collaborative writing skills, affirming the positive impact of Google Docs.

To examine improvements in each sub-skill that are task achievement, coherence and cohesion, lexical resources, and grammar range and accuracy, we performed another paired *t*-test to determine if there was a significant difference in essay writing performance. The results of each language domain are presented in Table 4.

The data presented in Table 4 reveals statistically significant improvements in students' writing performance across multiple domains following the use of Google Docs. Specifically, for task response, the mean score increased significantly from 2.28 ($SD = 0.48$) to 3.25 ($SD = 0.54$), showing a large improvement ($MD = 0.98, t(9) = -9.00, p < .001$). This suggests students became much better at addressing the essay prompts appropriately. Regarding coherence and cohesion, scores rose from 2.13 ($SD = 0.32$) to 2.90 ($SD = 0.39$), also a significant increase ($MD = 0.77, t(9) = -9.86, p < .001$), indicating improved text organization and linking

Table 3. Results of overall writing performance in Pre-test 1 and Post-test 1

Writing task type	Test phases	N	M	SD	MD	t	df	p
Expository Essay	Pre-test 1	10	2.13	0.27				
	Post-test 1	10	2.99	0.48	0.86	-9.23	9	.000

Table 4. Results of learners' essay writing performances by writing sub skills

Writing task type	Descriptors	Phases (tests)	n	M	SD	MD	t	df	p
Expository Essay	Task Response	Pre-test 1	10	2.28	0.48				
		Post-test 1	10	3.25	0.54	.98	-9.00	9	.000
	Coherence and Cohesion	Pre-test 1	10	2.13	0.32				
		Post-test 1	10	2.90	0.39	.77	-9.86	9	.000
	Lexical Resources	Pre-test 1	10	2.17	0.24				
		Post-test 1	10	3.05	0.64	.87	-5.35	9	.000
	Grammar Range and Accuracy	Pre-test 1	10	1.93	0.24				
		Post-test 1	10	2.75	0.50	.82	-5.36	9	.000

of ideas. For lexical resources, there was a substantial increase from 2.17 (*SD* = 0.24) to 3.05 (*SD* = 0.64) (*MD* = 0.87, *t*(9) = −5.35, *p* < .001), showing growth in vocabulary range and accuracy. Lastly, grammar range and accuracy improved significantly from 1.93 (*SD* = 0.24) to 2.75 (*SD* = 0.50) (*MD* = 0.82, *t*(9) = −5.36, *p* < .001). These findings confirm that Google Docs effectively enhanced both overall writing ability and specific sub-skills in educational contexts. Table 4 shows that after using Google Docs, students significantly improved in all assessed writing sub-skills: Task Response, Coherence and Cohesion, Lexical Resources, and Grammar Range and Accuracy. All the *p*-values are < .001, indicating a strong statistical significance of these improvements.

To assess the sustainability of improvements following the reversal and reintroduction of Google Docs, paired samples *t*-tests compared pre-test 2 and post-test 2 scores for expository essay writing. The results in Table 5 demonstrate statistically significant differences between these measures

As shown in Table 5, the mean score increased from 2.21 (*SD* = 0.26) in pre-test 2 to 3.35 (*SD* = 0.51) in post-test 2, with a mean difference of 1.14 and a statistically significant difference (*t*(9) = −7.64, *p* < .001). These results align with findings from pre-test 1 and post-test 1, confirming that collaborative writing using Google Docs significantly improved participants’ writing performance.

To assess improvements in specific language domains i.e. task response, coherence and cohesion, lexical resources, and grammatical range and accuracy, a paired-samples *t*-test was conducted. The results are presented in Table 6, illustrating the effects of Google Docs on students’ essay writing development and the statistical significance of observed differences.

Table 6 presents the paired samples *t*-test results on the impact of Google Docs on students’ essay writing development for the second time. The findings indicate a significant improvement (*p* < 0.05) in post-test 2 scores across all domains. For task response, the mean score increased from 2.42 (*SD* = 0.44) in the pre-test to 3.58 (*SD* = 0.50), with a mean difference of 1.16 and a *t*-value of −7.91 (*df* = 9, *p* < .001). In coherence and cohesion, the score rose from 2.25 (*SD* = 0.33) to 3.20 (*SD* = 0.48), yielding a mean difference of 0.95 and a *t*-value of −6.63 (*df* = 9, *p* < .001). Lexical resources improved from 2.23 (*SD* = 0.25) to 3.45 (*SD* = 0.60), with a mean difference of 1.22 and a *t*-value of −7.27 (*df* = 9, *p* < .001). Lastly, grammar range and accuracy increased from 1.95 (*SD* = 0.16) to 3.18 (*SD* = 0.71), with a mean difference of 1.23 and a *t*-value of −5.30 (*df* = 9, *p* < .001).

In general, these results demonstrate significant gains in all writing domains, with the largest improvements in lexical resources and grammar range and accuracy. Compared to Table 4, the data suggests that continued practice with Google Docs further enhanced students’ writing skills. Furthermore, the bar chart in Figure 1 reinforces the mean scores of students’ performance on essay writing sub-skills (TA: Task Achievement, CC: Coherence and Cohesion, LR: Lexical Resource, GRA: Grammatical Range and Accuracy) over four weeks. The findings highlight that Google Docs had a clear positive impact on students’ writing over time.

Table 5. Results of overall writing performance in Pre-test 2 and Post-test 2

Writing task type	Test phases	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Expository Essay	Pre-test 2	10	2.21	.26				
	Post-test 2	10	3.35	.51	1.14	−7.64	9	.000

Table 6. Results of learners' writing performances by writing sub skills

Writing task type	Descriptors	Phases (tests)	n	M	SD	MD	t	df	p
Expository Essay	Task Response	Pre-test 2	10	2.42	.44				
		Post-test 2	10	3.58	.50	1.16	-7.91	9	.000
	Coherence and Cohesion	Pre-test 2	10	2.25	.33				
		Post-test 2	10	3.20	.48	0.95	-6.63	9	.000
	Lexical Resources	Pre-test 2	10	2.23	.25				
		Post-test 2	10	3.45	.60	1.22	-7.27	9	.000
	Grammar Range and Accuracy	Pre-test 2	10	1.95	.16				
		Post-test 2	10	3.18	.71	1.23	-5.30	9	.000

Figure 1 illustrates parallel improvements across all domains, particularly between Week 2 and Week 4. TR consistently improved, rising from a mean of 2.28 in Week 1 to 3.58 in Week 4, with a sharp increase between Week 1 and Week 2, suggesting rapid adaptation to task requirements through collaborative feedback on Google Docs. GRA showed steady growth, increasing from 1.93 to 3.18. LR exhibited significant improvement, rising from 2.17 to 3.45, highlighting how collaborative writing expanded students' vocabulary and precision. CC showed the slowest progress, increasing from 2.13 to 3.20, indicating gradual improvement in structuring essays and connecting ideas.

The most notable gains were in TR and LR, reflecting students' ability to grasp task requirements and enhance vocabulary. CC improved due to the collaborative nature of Google Docs but remained the least enhanced sub-skill. To sum up, the bar chart supports the conclusion that integrating Google Docs into essay writing fosters substantial improvements, particularly in TR, LR, and GRA.

Similarly, the following time series plot provides a visual representation of the statistical findings as measured by test averages and evaluated using an A-B-A-B reversal design over four phases. This makes it easier to interpret the trends and patterns in students' writing performance. The visual analysis examines changes in slope and level at critical transition points, providing insights into the intervention's effectiveness in students' writing performance.

As shown in Figure 2, the time series plot illustrates the effects of Google Docs on students' essay writing development across four phases in the A-B-A-B reversal design. During the initial baseline Phase A1 (Week 1), the average pre-test score was 2.13, indicating students' starting proficiency. With the intervention in Phase B1 (Week 2), the average score rose to 2.99, an increase of 0.86 points (39.8%), suggesting rapid adaptation to the platform. Increased score variability (2.25 to 4.13) indicated active experimentation with collaborative strategies. The upward trend confirmed the intervention's immediate positive impact, improving both the rate of progress and overall performance.

In the second baseline Phase A2 (Week 3), where the intervention was withdrawn, the average pre-test 2 score declined to 2.21, demonstrating a reversal in progress and emphasizing the importance of Google Docs in sustaining improvement. Such reversals are common in learning and highlight the need for continued scaffolding. With the reintroduction of Google Docs in

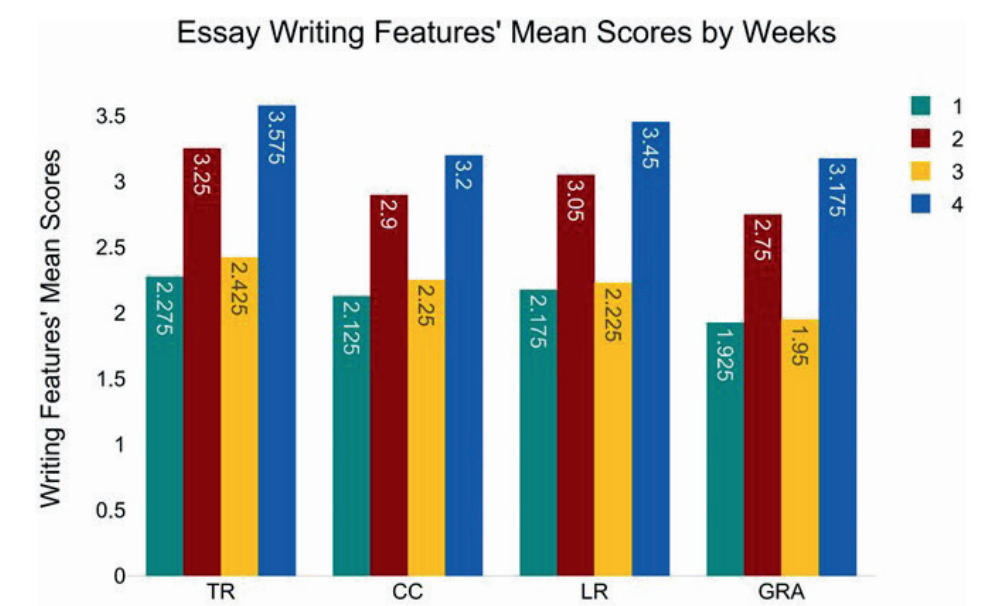


Figure 1. Essay writing performance trends in both Pre- and Post-tests by language domain

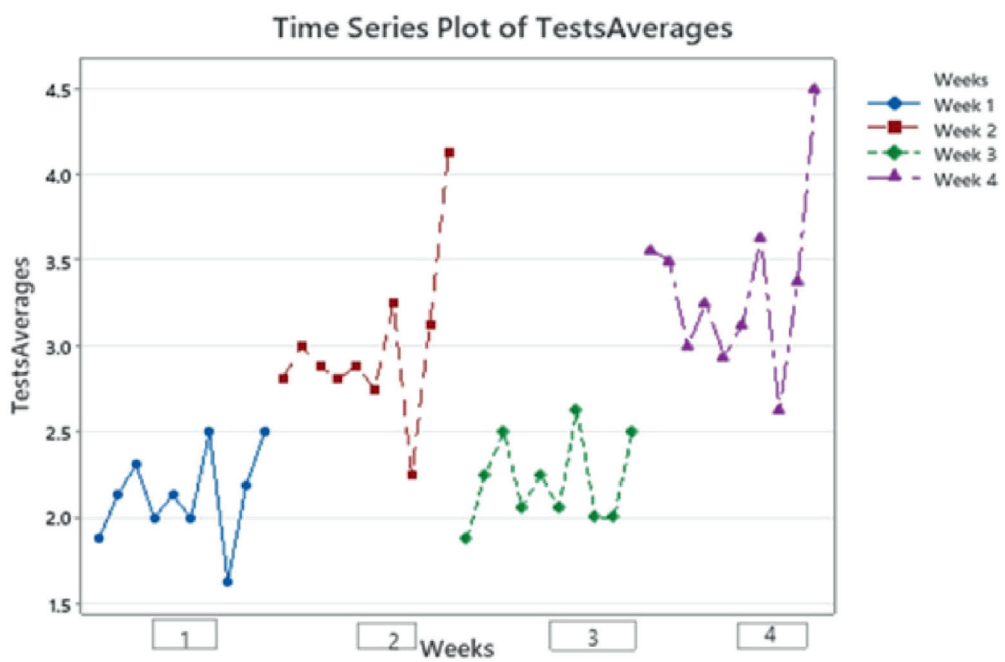


Figure 2. Visual analysis of progression of students' essay writing over time

Phase B2 (Week 4), the average post-test 2 score peaked at 3.35, a 1.14-point increase (51.4%), with scores consistently above 2.63 and reaching a maximum of 4.5. This phase showed both improved performance and greater stability, likely due to better use of collaborative features such as real-time editing, peer feedback, and structured essay organization.

The line chart also shows consistent improvement across all students, despite slight individual variations, indicating that Google Docs benefited learners at different proficiency levels. Overall, Figure 2 visually supports other quantitative findings, confirming that sustained use of Google Docs enhances essay writing proficiency. The improvements were more pronounced in the second phase, suggesting that familiarity with collaborative technologies leads to better writing outcomes. This progression reflects three learning stages: initial tool adaptation, skill consolidation, and performance mastery. Figure 3 further illustrates these phases within the A-B-A-B reversal design.

The A-B-A-B framework, in general, provides vigorous evidence of the Google Docs intervention's effectiveness. The pattern of improvement during Week 2 and Week 4 demonstrates a clear cause-and-effect relationship between the intervention and students' writing development. The reversal effect in Week 3 strengthens the validity of the design because it highlights the natural fluctuations that occur without consistent application or optimal engagement with

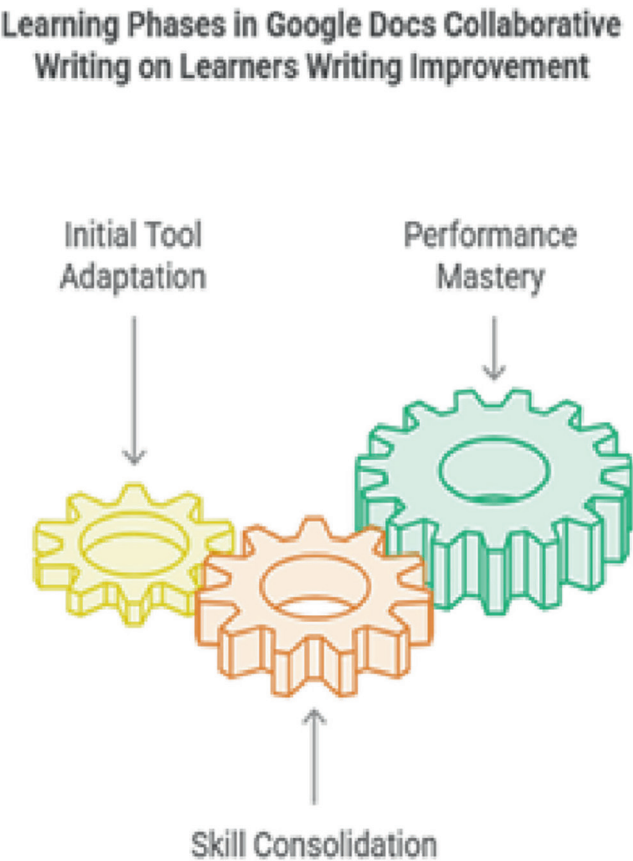


Figure 3. Learning phases while using google docs for collaborative writing

the intervention. Comparing Weeks 1 and 4, the test averages increased significantly which implies that students gradually overcame initial challenges, adapted to the tool, and benefited from collaboration.

Table 7 presents the results of a MANCOVA that assesses the impact of using Google Docs on students' writing skills, controlling for potential covariates. The analysis focuses on multiple dependent variables related to writing skills, such as Task Response, Coherence and Cohesion, Lexical Resources, and Grammar Range and Accuracy. The MANCOVA results indicate significant effects on the dependent variables, with *p*-values well below the conventional threshold of 0.05.

The results in Table 7 confirm that Google Docs significantly improved students' essay writing sub-skills after controlling for covariates (pre-test scores). The analysis shows significant gains in task response ($F = 12.677, p = .007$, Partial Eta Squared = .613), coherence and cohesion ($F = 12.386, p = .008$, Partial Eta Squared = .608), lexical resources ($F = 18.536, p = .003$, Partial Eta Squared = .699), and grammar range and accuracy ($F = 6.331, p = .036$, Partial Eta Squared = .442). Lexical resources showed the largest effect size, indicating substantial improvement in this area. Partial Eta Squared values (44.2% to 69.9%) suggest that Google Docs played a key role in these enhancements.

To wrap up, these findings underscore Google Docs' effectiveness in fostering collaborative writing and improving essay writing performance. The increase in mean scores from pre-tests to post-tests demonstrates its positive impact on EFL students' writing development. Following these quantitative results, the qualitative analysis examines students' perceptions and experiences for a more comprehensive understanding of Google Docs' role in collaborative essay writing.

Students' Attitudes on the Use of Google Docs for Collaborative Writing

To gain a deeper understanding of students' experiences and perceptions of Google Docs, semi-structured interviews were conducted with a sample of four students. Following Creswell's (2014) systematic process for thematic analysis, the interview data were coded and categorized into themes to explore students' perceptions and experiences with Google Docs in collaborative writing. The interviews revealed several insights, including the perceived

Table 7. Tests of between-subjects effects, investigating the impact of using google docs on students' essay writing sub skills development

Tests of Between-Subjects Effects						
Dependent variables	Type III sum of squares	df	Mean square	<i>F</i>	<i>p</i>	Partial Eta squared
Task Response (Post-test)	1.609	1	1.609	12.677	.007	.613
Coherence and Cohesion (Post-test)	.851	1	.851	12.386	.008	.608
Lexical Resources (Post-test)	2.602	1	2.602	18.536	.003	.699
Grammar Range and Accuracy (Post-test)	.994	1	.994	6.331	.036	.442

benefits of using Google Docs, challenges related to technology, and the improvement in collaborative essay writing skills. Table 8 presents the categories, themes, descriptions, and examples from the interview data.

Concerning the students' perceptions of the use of Google Docs for collaborative essay writing, the analysis of the interview data showed several key themes. The findings are presented based on major categories, major and minor themes, descriptions, and direct quotes from participants providing insights into their experiences.

Advantages of Using Google Docs

Google Docs is viewed as highly beneficial for collaborative writing, improving accessibility, collaboration, and writing quality.

Almost all learners highlighted the flexibility and convenience Google Docs provides in terms of location and time management for collaborative writing. The ability to access and edit essays remotely was considered a significant advantage over traditional methods of collaborative writing. For example, Participant 1 commented that "Google Docs facilitates the opportunity to go to another place and log in without any effort." Participant 3 further emphasized its convenience: "We can work on the same project in different places." Additionally, the platform's real-time updating feature saved valuable time, which Participant 4 described as, "It updates in real-time, saving time," suggesting that the use of Google Docs was more time-efficient compared to traditional methods. The ability to work on a shared document in real-time helped reduce delays caused by the need to exchange multiple drafts, as typically occurs with pen-and-paper approaches. This feature allowed students to work on assignments from different locations, contributing to more efficient time management and overcoming the limitations of needing to meet in person.

Most students viewed that the use of Google Docs significantly enhanced their ability to collaborate effectively with their peers. They emphasized that the tool's real-time editing capabilities allowed them to contribute simultaneously and improve the overall quality of their essays. For instance, Participant 2 described that "The ability to comment on each other's work facilitated better communication among group members," while Participant 3 remarked, "It was easier to work as a group since we could all contribute in real-time." This suggests that the platform fosters an interactive and dynamic environment for group writing, where feedback and contributions can be made instantly.

Besides, Google Docs enabled them to share individual knowledge and address writing errors collaboratively which led to more refined and cohesive group outputs. For example, Participant 2 noted that collaboration helped them learn essay structuring: "Collaborating helped me learn how to structure my essay better." Similarly, Participant 3 stated, "I improved my vocabulary through the feedback I received," and noted how real-time editing improved the overall output: "We can edit one essay together while the group members are at different places, which improves the final output." These examples highlight how the platform not only improves individual writing skills but also enhances the final product through group effort.

Google Docs supported knowledge exchange through collaborative learning and peer feedback. Participant 2, for instance, stated, "Different perspectives improved our essay," while Participant 4 added, "Comments from peers clarified confusing sections," highlighting how shared input refined academic work.

Challenges with Technology

Although students appreciated the benefits of Google Docs, they also faced challenges related to technical issues and the learning curve associated with using the platform.

Table 8. Categories, themes, and examples from the interview data

Major categories	Minor categories	Themes	Description	Participant examples
Advantages of Google Docs	Accessibility	Convenience and Accessibility	Participants noted that Google Docs allows easy access to documents from any location or device.	Participant 1: “Google Docs facilitates the opportunity to go to another place and log in without any effort”. Participant 3: “We can work on the same project in different places.” Participant 4: “It updates in real-time, saving time.”
	Collaboration Benefits	Enhanced Collaboration	Participants reported improved collaboration through real-time editing and commenting features	Participant 1: “The ability to comment on each other’s work facilitated better communication among group members.” Participant 3: “It was easier to work as a group since we could all contribute in real-time.”
	Writing Quality	Improved Writing Quality	Participants noted that using Google Docs led to better essay quality due to peer feedback and collaborative input	Participant 2: “Collaborating helped me learn how to structure my essay better.” Participant 3: “I improved my vocabulary through the feedback I received.” Participant 3: “We can edit one essay together while the group members are at different places, which improves the final output.”
	Collaborative Learning	Peer learning and feedback	Interactions fostered knowledge exchange.	Participant 2: “Different perspectives improved our essay.” Participant 4: “Comments from peers clarified confusing sections.”

(Continued)

Table 8. (Continuation)

Major categories	Minor categories	Themes	Description	Participant examples
Challenges with Technology	Technical Issues	Internet Connectivity Issues	Some participants experienced difficulties due to unstable internet connections affecting participation.	Participant 3: “One challenge was the instability of the internet connection... Another challenge was...confused to use Google Docs at first” Participant 4: “Slow connections affected participation.”
	Adaptability	Learning Curve with Technology	Participants expressed initial challenges in understanding how to effectively use Google Docs features.	Participant 1: “Some students who don’t have much practice may find it challenging initially.” Participant 3: “We were confused at first, but after we got familiar with it, it was simple to write collaboratively using Google Docs.”
	Enjoyment	Positive Engagement and Attitude Towards Google Docs	Most participants found the experience enjoyable and beneficial for their learning process.	Participant 4: “I enjoyed seeing everyone’s ideas come together.” Participant 2: “Google Docs is extremely useful and has a huge advantage over traditional methods.”
				Participant 1: “Most of us enjoy the interaction. I have enjoyed it myself.” Participant 3: “I was enjoying using Google Docs for collaborative writing projects; it is a new phenomenon for me.”
Overall Perception	Expanded Use	Future Use	Participants advocate for more collaboration using Google Docs and training and incorporation in curricula for effective use.	Participant 1 “I am definitely interested in collaborating with similar essay co-authors using Google Docs in the future.” Participant 2: “Including Google Docs in modules can benefit students beyond writing tasks.”

The students also identified some challenges in the early stages associated with using Google Docs. One common issue was the instability of internet connections, which disrupted the writing process. To illustrate, Participant 3 explained, "One challenge was the instability of the internet connection... Another challenge was... confusion when using Google Docs at first." Participant 4 added, "Slow connections affected participation." This issue highlights the dependence on reliable internet access for effective use of the platform.

Some participants initially struggled to understand the platform's features. Participant 1 explained, "Some students who don't have much practice may find it challenging initially," while Participant 3 shared, "We were confused at first, but after we got familiar with it, it was simple to write collaboratively using Google Docs." This reflects the need for training or guidance to help users overcome initial difficulties and maximize the platform's potential.

Overall Perception

The students reported having a more positive attitude towards writing after they utilized Google Docs for collaborative writing purposes. They found the collaborative process enjoyable and felt that it helped them improve their writing skills in a supportive environment and advocate for its continued use.

Students found using Google Docs to be an engaging and enjoyable experience. Participant 2 described it as "extremely useful and has a huge advantage over traditional methods," while Participant 1 expressed eagerness, stating, "Most of us enjoy the interaction. I have enjoyed it myself." Participant 3 called it "a new phenomenon" and appreciated its role in collaborative writing projects. Likewise, Participant 4 remarked, "I enjoyed seeing everyone's ideas come together." This demonstrates that the tool not only aids learning but also creates an engaging and enjoyable environment for students.

Many participants advocated for the continued use of Google Docs in educational settings. Participant 1, for instance, noted interest in future collaborations: "I am definitely interested in collaborating with similar essay co-authors using Google Docs in the future," while Participant 2 recommended its inclusion in curricula: "Including Google Docs in modules can benefit students beyond writing tasks." This indicates that students recognize the long-term value of the platform and its potential to enhance learning outcomes.

Discussion

This study examined the impact of Google Docs-based collaborative activities on Ethiopian university students' English academic writing skills and their attitudes toward using the tool in an online course. Statistical analyses revealed that Google Docs significantly improved essay writing skills, as shown by statistically significant differences between pre- and post-test overall scores and all writing features (Task Response, Coherence and Cohesion, Lexical Resources, and Grammar Range and Accuracy). The intervention phases (B phases/post-tests) consistently yielded higher average scores than the baseline phases (A phases/pre-tests), indicating a positive impact. For example, an increase from A1 (approximately 2.0) to B1 (around 3.0) suggests substantial improvement, while a decline in A2 followed by higher scores in B2 indicates a cumulative learning effect. The A-B-A-B design and MANCOVA analysis, with significant *F*-scores and large effect sizes, further establish a link between Google Docs and enhanced writing outcomes.

The findings align with several key studies in the field. Suwantarathip and Wichadee (2014) demonstrated that Thai EFL students using Google Docs achieved higher writing scores than traditional face-to-face groups, particularly in organization and grammar. Similarly, Kitjaroonchai and Suppasetserree (2022) found significant improvements in Asian EFL

learners' writing quality across multiple domains. Hoang and Hoang (2024) also assessed the effectiveness of Google Docs on students' collaborative writing, and the overall results showed a significant increase in students' scores. However, while the current study showed significant improvements in all the writing sub-skills, the study conducted by Hoang and Hoang (2024) indicated that participants experienced only a marginally significant enhancement in their grammatical range and accuracy, though the study also demonstrated insignificant development in their coherence and cohesion competencies as a result of using Google Docs for writing course. Similarly, in the Middle Eastern context, Jalili (2024) confirmed that Iranian EFL learners benefited from the platform's collaborative features, particularly in vocabulary development and structural coherence. These parallel findings across diverse cultural contexts suggest that Google Docs facilitates effective collaboration regardless of geographical or cultural background, lending support to this study's findings in the Ethiopian context.

The study also examined students' views on using Google Docs for collaborative essay writing. Thematic analysis of interview data revealed that most students held positive attitudes, citing improved peer collaboration, increased engagement, timely feedback, ease of use, time-saving features, enhanced organization, and remote document access. These themes are consistent with earlier studies (Alharbi, 2020; Ebadi & Rahimi, 2017; Fatima, 2024; Hoang & Hoang, 2024; Jiang & Eslami, 2022; Wang, 2019) and align with socio-constructivist theories emphasizing the value of social interaction in writing development. Students particularly appreciated the ability to edit collaboratively in real time and work synchronously and asynchronously. However, they also noted challenges with the initial learning curve and technical issues such as unreliable internet access, which are consistent with findings by Slaouti et al. (2013).

To wrap up, the thematic analysis demonstrates that students generally have positive attitudes toward using Google Docs for collaborative essay writing. The tool's flexibility and real-time collaboration features were particularly appreciated although initial technical challenges were eventually overcome with practice.

Conclusion

The findings of this study indicate that using Google Docs for collaborative essay writing significantly enhances students' writing performance. Quantitative analyses, including the A-B-A-B time series plot, demonstrate statistically significant improvements in overall scores and specific sub-skills, Task Achievement, Coherence and Cohesion, Lexical Resources, and Grammar Range and Accuracy, during intervention phases, with reversible declines during baseline phases. Qualitative feedback reinforces these results, with students commending the platform for its ease of use, facilitation of remote collaboration, and positive impact on group interaction. However, challenges such as initial unfamiliarity and technological barriers like poor internet connectivity were noted, suggesting that improved training and infrastructure could further enhance its benefits.

Based on these findings, educators are recommended to incorporate collaborative writing tools like Google Docs into their curricula to enhance writing skills, foster flexibility and interaction, and improve overall engagement in the writing process. The findings of this study have several implications for EFL pedagogy and educational policy. Integrating Google Docs into writing classrooms can provide students with opportunities for peer interaction, real-time feedback, and collaborative revision, aligning with socio-constructivist learning principles (Vygotsky, 1978). This approach can help address challenges associated with traditional writing instruction, such as limited feedback and lack of authentic collaboration

(Hoang & Hoang, 2024; Wale & Kassahun, 2024). For teachers, it highlights the need for structured training in digital tools before implementation and demonstrates the value of alternating between individual and collaborative activities to maximize learning. From a policy perspective, it suggests that educational authorities should consider technological literacy as a key component of language teaching and learning programs and develop guidelines for effective implementation of digital tools in language instruction.

This study is not without limitations. The small sample size ($N = 10$) and the use of a single intact class from one university limit the generalizability of the findings to other populations and contexts, though the A-B-A-B design partially mitigates this concern by providing multiple measurements. The quasi-experimental A-B-A-B design, while useful for demonstrating effects within a single group, lacks a control group, making it difficult to definitively rule out other factors contributing to improvement. The short duration of the intervention may not capture long-term learning effects, and the focus on expository essays alone may not reflect performance across all writing genres.

Future research should explore the long-term effects of collaborative writing tools across diverse contexts, identify the features that most effectively improve writing skills, and examine the impact of structured training programs on tool proficiency. As technology evolves, studies should also investigate how new functionalities (e.g., AI-driven writing assistants) influence collaborative writing and analyze patterns of interaction and feedback quality to provide a more holistic view of the tool's impact. Comparative studies examining Google Docs alongside other collaborative platforms would also be valuable in determining the most effective tools for specific educational contexts.

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