ISSN(Print): 1813-4521 OnLine ISSN:2663-7502
Journal Of the Iraqia University
available online at: https://www.mabdaa.edu.iq

Technology-Mediated Collaborative Writing in Kurdish EFL Context: Attitudes, Challenges, and Implications

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الكتابة التشاركية بوساطة التكنولوجيا في سياق تعليم اللغة الإنجليزية كلغة أجنبية للمتحدثين باللغة الكردية: المواقف، التحديات، والآثار المترتبة

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الملخص

تستقصي هذه الدراسة التجريبية تصورات الطلبة الكرد في الجامعات والدارسين للغة الإنجليزية كلغة أجنبية تجاه استخدام أداة تكنولوجية مثل Google Docs في الكتابة التشاركية، فضلاً عن التحديات التي واجهوها أثناء التطبيق.شارك في الدراسة ستة وأربعون طالباً من المرحلة الأولى في قسم اللغة الإنجليزية بجامعة صلاح الدين، حيث خضعوا لتعليم مدمج بالتكنولوجيا من خلال استخدام منصة Google Docs.جُمعت البيانات الكمية عبر استبانة مكوّنة من ٢٦ فقرة طُبّقت قبل المعالجة وبعدها، في حين جُمعت البيانات النوعية من سؤالين مفتوحين ضمن الاستبانة، إضافة إلى مقابلات شبه منظّمة مع خمسة طلاب. وتم تحليل البيانات باستخدام اختبار (t) للعينات المترابطة والتحليل الموضوعاتي.أظهرت النتائج تحسناً معنوياً في الاتجاهات العامة لدى الطلبة (p=0.007، d=0.84). كما أفاد جميع الطلبة المشاركين في المقابلات (١٠٠٪) بامتلاكهم اتجاهات إيجابية وزيادة في الثقة عند استخدام منصةGoogle Docs . إضافة إلى ذلك، كشف التحليل الموضوعاتي أن التحديات اللغوية كانت أبرز التحديات التي واجهها الطلبة، مثل الإملاء والقواعد والمفردات، في حين كانت التحديات التقنية محدودة. وتخلص الدراسة إلى أن الطلبة الكرد يمتلكون اتجاهات إيجابية نحو توظيف Google Docs بوصفه أداة للكتابة التشاركية، على الرغم من وجود بعض التحديات اللغوية والتقنية.

الكلمات المفتاحية: المواقف، التحديات، الكتابة التشاركية، مستندات جوجل، التعليم المدمج بالتكنولوجيا

Abstract

This experimental study investigates Kurdish EFL university students' perceptions towards using a technological tool such as Google Docs for collaborative writing and challenges they faced during implementation. Forty-six

first-year students at the English department, Salahaddin University participated in technology integrated instruction via using Google Docs. Quantitative data were collected from pre- and post-treatment questionnaire (26 items) and qualitative data were collected from two open-ended questions from the questionnaire and semi-structured interview with five students. The data were analysed by using paired t-tests and thematic analysis. The findings revealed that overall attitudes have been improved significantly (p=0.007, d=0.84). All students from the interview session (100%) reported positive attitudes and increased confidence using Google docs platform. Additionally, thematic analysis showed that linguistic challenges were the primary challenges such as spelling, grammar, and vocabulary. Whereas technical challenges were reported minimal. The study concludes that Kurdish students hold positive attitudes towards utilising Google Docs as a collaborative writing tool even though there are linguistic and technical challenges.
Keywords: Attitudes, Challenges, Collaborative writing, Google Docs, Technology-mediated instruction

1.1 Background of the Study

English language consists of four macro skills which are categorised into 'receptive' and 'productive' types. Receptive skills include listening and reading, whereas productive skills encompass speaking and writing (Javed *et al.*, 2013). Writing does not mean expressing ideas, emotions, feelings and sharing information per se, but rather it is a means of strengthening social ties with each other (Taki and Fardafshari, 2012). The writing process is often meant to be complex and challenging tasks especially for foreign or second language learners (henceforth, EFL) (Hyland, 2019). Unlike speaking, writing demands vocabulary, grammar, mechanics, and organisation, for EFL students. These factors are deepened by traditional writing instruction of using pen and paper that emphasises the product over process approach of collaborative writing (Moonma, 2021)Writing, as compared to other skills, is a more complex skill to define (Javed *et al.*, 2013). Thus, it is defined by academics and scholars variously. A common definition of writing skill is given by Byrne (1988) that states writing is a process of putting messages into texts so that readers can understand them easily. More recently, writing is defined by Pangaribuan and Manik (Pangaribuan and Manik, 2018, p. 179) as 'a way that students use to express their ideas, thoughts, opinions, and experiences'. They also confirm that there are some factors to influence writing such as grammar, vocabulary, punctuation and spelling.In recent years, technology-mediated collaborative writing (TMCW) has emerged as a promising pedagogical method. Online tools such as Google Docs, Blogs, Wikis, and Padlet platforms allow EFL students to write together, share ideas and provide feedback on each other's work synchronously (Ebadi and Rahimi, 2017). For some researchers Google Docs has gained popularity for its user-friendly interface (Hairuddin, 2020), real-time editing abilities (Demisse *et al.*, 2025) and accessibility across devices (Valizadeh, 2022). The platform allows multiple users to work on the same documents simultaneously to edit, comment, track change, and revert to previous drafts. Those features are well with process writing approach of writing to write multiple drafts. In the Kurdish EFL context, no research is found on the effectiveness of collaborative writing via using Google Docs. However, studies have examined the technology mediated collaborative writing (TMCW) in different contexts. Some studies have been examined TMCW in various countries such as in Bangladesh (Ara, 2022); in China (Luo *et al*., 2023); in Indonesia (Hairuddin, 2020; Mulyani *et al*., 2024); in Turkey (Valizadeh, 2022); in Ethiopia (Demisse *et al.*, 2025); and in Malaysia (Roslan *et al.*, 2025). Nevertheless, little or no research is known about Kurdish university students' attitudes towards Google Docs and the challenges they encounter while using it for collaborative writing.

1.2 Statement of the Problem

In KRI, and Kurdish higher education there is a dearth of empirical research on TMCW. Almost no research exists on students' attitudes towards Google Docs usage and its challenges they face during implementation. Demisse *et al.* (2025) state that understanding student perceptions is important for successful technology integration since students' attitudes directly influence their engagement and learning outcomes. Hence, without specific research it is hard for instructors to adopt online platforms for writing without adequate preparation for linguistics, technical and pedagogical challenges that might arise.

1.3 Research Questions

RQ1/ Do pre- and post-test treatment attitudes for students vary in the questionnaire as regards the use of technology?

RQ2/ What challenges do EFL students encounter during the implementation phase of technology-integrated instruction?

1.4 Significance of the Study

This study makes several contributions. Firstly, theoretically, as it extends existing research in the Kurdish EFL context on writing skills. Secondly, practically, it provides instructors with evidence-based insights for integrating technology into writing skills in general, and Google Docs in particular into writing classes. Thirdly, methodologically, as it depicts the value of mixed-method approach for gaining both the breadth and depth of EFL students' experiences with technology in collaborative writing.

2. Literature Review

2.1 Technology and EFL Writing

Since writing has shifted from paper and pen to screen-based tools, there has been much debate on the effectiveness of technology in EFL writing classes. Many teachers have integrated digital tools, such as screen-based technological platforms, into their writing lessons to improve the writing skills of students in EFL contexts. It is difficult to find a standard definition of technology integration; however, Protheroe (2005, as cited in AlSabbagh, 2019) defined technology use as a tool supporting innovative methods of learning that enable students to attain knowledge and learn with their peers in collaboration A plethora of studies have been conducted to investigate the effectiveness of technology on EFL writing skills and the development of positive attitudes towards it. For example, Ciftci and Kocoglu (2012) carried out an empirical study to investigate the effect of e-feedback via Weblogs on the writing of Turkish EFL students. The writing performance of the EG demonstrated significant improvement after engaging in e-feedback. Based on this study, it was proven that Weblogs possess some features that help EFL learners write better. For instance, Weblogs offer visual aids that allow participants to view their drafts multiple times, hence facilitating editing, revision, and publication. Moreover, Weblogs assisted participants in writing in a more organised way.Another study by Awada (2014) examined the effect of WebQuest in improving the writing proficiency of EFL Lebanese students. The researchers employed a process-writing approach for both the CG and EG. The CG received traditional instruction, while the EG was taught using WebQuest. The results of the study revealed that students in the EG performed better by producing clear, structured compositions. Additionally, students displayed positive attitudes towards the use of technology as an instructional platform in writing. In summary, it seems that integrating technology into the process-writing approach can effectively improve EFL learners' writing proficiency and attitudes. While there is a dearth of research on how Iraqi/Kurdish EFL students improve their writing skills through technological integration, this study employs a mixed methods (qualitative and quantitative) research design to investigate this area. By addressing this gap, the research seeks to assist Iraqi/Kurdish EFL university students in enhancing the writing skills in English, which may ultimately contribute to their academic and professional success after graduation too.

2.2 Theoretical Framework

This section presents the theoretical foundations focusing on the use of technology, Google Docs in particular, in EFL writing instruction. Every scientific study should mainly depend on theoretical foundations to justify and support the arguments about the variables under study. Three theories can be highlighted as the most important theories and modes which are interrelated: The Socio-Constructivism, Technology Acceptance Model, and Collaborative Learning Theory. These frameworks together explain how and why collaborative writing tools such as Google Docs can improve EFL students' writing skills. These theories are elaborated in the following subsections.

2.2.1 The Socio-Constructivism

According to socio-constructivism theory, which is developed by a Russian psychologist Vygotsky in 1978, learning is not just limited to a personal internal process, but rather, it is a social and collaborative effort where individuals build their own knowledge via connections, interactions and engagement with each other (Chand, 2026). This theory places important emphasis on pair-work and group work for learning. For instance, students mainly acquire knowledge by interacting with their peers and teachers. Teachers play an important role in encouraging, guiding and facilitating classroom discussions whether the discussion is in the verbal or written forms (Zhu and Atompag, 2023). Furthermore, this theory assists learners collaborate and engage them to work together to brainstorm, share thoughts and ideas, solve problems and add new information (Valizadeh, 2022). Regarding using Google Docs, socio-constructivism is vital in writing with peers collaboratively and comprehending writing skills in a Kurdish social context. In the context of this study, this theory supports the current study where Google Docs functions as a mediational platform that facilitates collaborative learning. Students on Google Docs engage in social interaction that allows them to create an interactive and fun environment. For example, students share their ideas, provide feedback, receive feedback within this framework.

While student interaction and engagement with each other, as the fundamental principle of socio-constructivism theory, is essential for the EG to improve their writing skills, it is also crucial to identify adult learners as technology-friendly users. Thus, the upcoming section focuses on Davis (1989) Technology Acceptance Model (TAM).

2.2.2 Technology Acceptance Model (TAM)

This model is developed by Davis (1989) which has been widely applied in educational contexts to explain learners' adoption of online tools such as Google docs. This model provides a framework for comprehending how learners come to accept and use new technology. TAM posits two main factors determine technology acceptance: 'perceived usefulness' and 'perceived ease of use'. The former one is the degree to which a learner believes technology integration such as Google Docs will improve their writing performance and the latter one is the degree to which a learner believes technology is user-friendly and easy to use (Davis 1989 as cited in Marikyan and Papagiannidis, 2025). According to Luo *et al*. (2023) students found Google docs helpful and easy to use and they are more likely to embrace it.

2.2.3 Collaborative Learning Theory

The third theory underlines using Google Docs in the writing course is Collaborative Learning Theory. This theory focuses on the pair and group interaction. The main element, to the successful collaboration, is sharing among learners. According to this theory, the role of the instructor becomes a facilitator rather than the leader of the class. Here, the learners should work in collaboration to gain the goal of the learning process which is producing a better writing outcome. Google Docs provides the EFL learners several features to collaborate in and outside classrooms in which learners will be able to share their ideas, thoughts and feelings. Thus, Google Docs offers the students not only a fun environment, but also an effective environment in which they exchange and share their information fast and effectively. The theoretical framework presented above is supported by a number of empirical studies, in different countries, examining technology-integrated instruction in writing. Some studies have applied these theories to investigate the effectiveness of Google Docs and other platforms in EFL settings.

Fathi, Arabani and Mohamadi (2021) examined the impact of Google Docs on Iranian learners' writing skills. The study revealed that participants (n=38) in the EG who used Google Docs for writing in collaboration demonstrated significant improvements in writing accuracy and grammatical structure. Nergiz Kartepe and Atmaca, (2024) examined collaborative writing among Turkish students for 13 Weeks. Their findings revealed that students not only improve their writing skills (such as vocabulary and grammar) but also developed greater awareness of writing as social process on learning via social interaction.Abu-Tineh *et al.* (2026) surveyed a total of 236 students who participated in the study. They examined students' attitudes in an Arab higher education. The findings indicated that the overall effect of combined cultural dimensions on technology acceptance model and each of ease of use and usefulness were relatively positive, modest and significant. Hairuddin (2020) explains that confidence develops through mastery experiences, because students successfully intend to write collaboratively using Google Docs, hence their writing confidence improves.In short, given the complexity of the current study, no single theory or model was sufficient to fully account for all the variables under investigation. Therefore, the previously discussed theories and models were adopted as guiding frameworks for understanding and developing writing skills.

2.3 Technology-Mediated Collaborative Writing (TMCW)

The term TMCW refers to the production of writing by two or more students using an online tool. Unlike traditional pair work, TMCW allows students to write asynchronously and synchronously. This feature enables EFL students to write whenever and wherever they intend (Ara, 2022). The researchers of this study found Google Docs particularly effective for TMCW due to its features such as real-time edition, comments, revision history, and so forth. Furthermore, studies across many countries have reported positive outcomes of writing in collaboration. For example, in Turkey, Valizadeh (2022) found that students who used Google Docs in Collaborative writing significantly outperformed those who wrote individually ($p<0.001$). In Ethiopia, Demisse *et al.*'s (2025) study revealed that collaborative writing using Google Docs has improved task achievement, coherence, vocabulary and grammar respectively. Moreover, in Indonesia, the results of Hairuddin's (2020) study revealed that non-English major students had positive attitudes toward Google Docs (mean=3.90) and identified internet connection as their main challenge. In a similar study by Mulyani *et al.* (2024), Indonesian secondary students found Google Docs as an effective collaborative tool for writing descriptively. And lastly in Malaysia, Ruslan *et al.*'s (2025) research finding demonstrated that Google docs had a great effect on writing performance.

2.4 Students' Attitudes Toward Technology use in Writing

Research in the past constantly confirms that EFL students hold positive attitudes toward technology integration into writing skills. For instance, in Luo *et al*.'s (2023) case study, a Chinese student noted that technology made learning 'interesting' and she 'enjoyed' using collaborative tool for peer feedback. She also expressed that Tencent Docs created a learning environment where many students collect or exchange useful ideas. In a similar study by Hairuddin (2020), Indonesian students said that Google Docs was a very 'valuable tool' for collaborative writing (mean=4.27), and that gave them a chance to share their ideas feasibly (mean=4.09). However, some researchers have noticed that attitude change may be hard to detect when students have already hold positive views from the beginning of the research, this is called a 'ceiling effect' (Awada, 2014; Luo *et al*., 2023).

2.5 Challenges of Writing and Technology Integration

When it comes to writing in a foreign language. Hasan (2025) mentions several challenges related to EFL writing that student often encounter. These challenges will be demonstrated in points below.

a. Grammatical errors: misuse of verb tenses, subject-verb agreement, and sentence structure.
b. Limited vocabulary range: having a small range of words can make it more challenging to communicate ideas and opinions effectively.
c. Spelling mistakes: misspelling words can distort writing clarity.
d. Organisation: lack of ability to structure sentences logically, this leads to fragmentation of the whole piece of writing.
e. Mechanics problem: refers to improper use of punctuation (full stops, commas, colons, and so forth), which makes the text even harder to understand.
f. Time management: the lack of ability to plan properly to plan, draft, and edit writing tasks.
g. Plagiarism: when all else fails, some students resort to 'copying' as a last chance when they are worried to finish their tasks in their allocated time. Experienced teachers can easily notice and tell an original piece of text from a copied one. Therefore, students who have copied from a source will face getting low marks or even failure.

There are also some challenges that students might face in TMCW. Linguistic challenges are most frequently reported. For example, in Ara's (2022) study in Bangladesh, students struggled with grammar, vocabulary, spelling and organising ideas. Participants stated that 'English language is very complex' as they encountered difficulties in their writing. In the same vein, in Hairuddin's (2020) study, students faced confusion at the beginning and reported difficulties in organisation of ideas.Technical challenges such as internet connectivity issues are also the most frequently cited challenge. For example, in Hairuddin's (2020) study, 36% of participants reported unstable internet connections as their primary issues. In Demisse *et al.*'s (2025) study, Ethiopian students noted instability of connection and slow connection affected their collaborative participation.Pedagogical Challenges such as over-reliance of automatic spelling corrections and concerns about idea ownership. Finally, Collaborative challenges, such as unequal participation and coordination barriers have been documented in some studies (Storc, 2005; Ara, 2022). However, the absence of these challenges has been noted in Demisse *et al.*'s (2025) study, suggesting that Google Docs features such as real-time editing and transparency may mitigate typical group work issues.

2.6 Research Gap

Despite the body of international research, no empirical studies have examined Kurdish EFL students' attitudes toward Google Docs and/or the challenges they encounter during the TMCW. The current study addresses this gap.

3. Methodology

3.1 Research Design

A mixed-method approach was employed, combining both quantitative and qualitative data collection. The quantitative data was collected through pre and post-test treatment questionnaire. The qualitative data were collected through open-ended questions and semi-structured interviews. This design has its own benefit for triangulation of findings, where quantitative data demonstrates patterns and qualitative data explains them.

3.2 Participants

Forty-six Kurdish EFL students, at College of Basic Education, Salahaddin University participated in the study. Participants are basically divided into two groups. The CG (n=23) receives a traditional method of instruction in writing, while the EG (n=23) receives Collaborative writing instruction, which is writing through Google Docs. Their ages ranged between 18-24 years. Prior to the intervention, 78.25% rated themselves as average in their technology skills, 13% as excellent and nearly 9% as poor. It is worth mentioning that only 8.70% of students

have heard of Google Docs. Moreover, there were also 5 students in the EG who participated in the interview sessions.

3.3 Instruments

Three instruments were used for data collection. First, a Writing Questionnaire (26 items) which was administrated before and after the intervention. The questionnaire consists of 26 items measured on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire measured attitudes across three categories (1) Attitudes, Motivation, and Technology Perception (8 items); (2) Technology Use and Confidence/Challenges (4 items); and (3) Writing Development and Collaborative Support (14 items). The overall reliability was excellent (Cronbach's α=0.910). The second instrument was open-ended questions from the questionnaire where asked students to describe the challenges they face during the intervention period. The third instrument was a semi-structured interview with five participants in the EG. The interview included ten questions to explore the challenges in depth (See appendices 1 and 2).This study is based on both qualitative and quantitative research design to explore the impact of Google Docs in improving the EFL writing skills for the first-year students at university, College of Basic Education, Salahaddin University.

3.4 Procedure of the Study

The intervention period lasted for 10 weeks. Students in the EG received training on using Google Docs for Collaborative writing. Later they worked in pairs and groups to do some writing tasks, receive peer and instructors' feedback via comments and suggestions. The questionnaire was administrated before and after the intervention, and interview was held after the treatment period of 10 weeks.

3.5 Data Analysis

Quantitative data were analysed using paired-samples t-tests and one-sample t-tests using SPSS 28. The Qualitative data from open-ended questions and interviews were analysed thematically. The collected data, in the form written responses and the interview transcripts, were analysed using the six-phase thematic analysis framework which was proposed by Braun and Clarke (2006). Participant codes (P1-P5) are used to maintain anonymity while allowing the researchers to trace the themes, and open-ended responses are cited by participant number from the questionnaire who answered in the pre-post intervention.

The analytical process involved six steps, proposed by Braun and Clarke (2006), as the following:

1. **Familiarisaion**: the researchers read the responses from open-ended responses and transcripts of interviews multiple times. This is to develop and understand the details of the data, searching for meanings, patterns.
2. **Generating initial codes**: the researchers identified meaningful features related to RQ2 which is about challenges students might face during the intervention of technology into writing skills.
3. **Searching for broader themes:** Then, the codes were grouped into clustering broader categories.
4. **Reviewing**: Afterward, the codes and themes were reviewed then organised into a coherent structure to ensure their alignment with the dataset.
5. **Defining and naming the themes**: a statement (name) was given to each theme for identification purpose.
6. **Producing the final report**: Lastly, a report was set with illustrative quotes.

It is worth mentioning that qualitative researchers can well-decide to combine unexpected themes into their analysis if these themes align with the overall research aims and objectives (Gay, Mills and Airasian, 2012; Braun and Clarke, 2006). In short, in the current study, methodological triangulation was employed, such as quantitative methods (pre-posttests), qualitative (open-ended questions and interviews), with the aim of obtaining a comprehensive view.

4. Results and Discussions

4.1 The First Research Question

To examine whether students' attitudes towards technology use in EFL university writing instruction changed from pre-treatment to post-treatment, paired samples t-tests were used on the EG's scores across the two attitude related categories. The results drawn from Table 1 reveal the change pattern.

Table 1: Comparison Between Pre- and Post-Intervention Scores for Each Category of Writing Skills in the EG

Category		No of students	Mean	Std. Deviation	t	p-value
Attitudes, Motivation, and	Pre-intervention	23	3.261	0.587	-1.164	0.251

Technology Perception	Post-intervention	23	3.460	0.571		
Technology Use and Confidence / Challenges	Pre-intervention	23	3.043	0.656	-1.720	0.092
	Post-intervention	23	3.391	0.714		
Writing Development and Collaborative Support	Pre-intervention	23	3.220	0.677	-3.366	0.002
	Post-intervention	23	3.773	0.403		
Overall	Pre-intervention	23	3.199	0.579	-2.856	0.007
	Post-intervention	23	3.620	0.407		

As it is shown in the table above, the first category, measuring EFL students' general attitudes toward technology in their writing skills and motivation to use technological tools such as Google Docs, showed a positive trend from pre-intervention to post-intervention. The mean score increased from 3.261 in the pre-test to 3.460 in the post test. However, this difference did not reach statistical significance $t(22) = -1.164$, $p = 0.251$)There are several factors for the lack of statistical significance in this category. Firstly, students began the intervention with relatively positive attitude ($M=3.261$), leaving limited room for dramatic change. Secondly, general attitudes toward technology trend are less susceptible to change over a short intervention period. Attitude change may require longer exposure than was provided in this study. Some studies such as Ahmad (2020) found that significant change in technology use emerged only after extended intervention periods. Lastly, the sample size (23 for EG) had limited statistical power to detect small to moderate changes, hence a larger sample size might have yielded a better statistical significance. Despite the non-significant result, the numerical increase suggests a positive direction in EFL students' general technology perception.The second category, which assessed students' confidence in using technology for writing demonstrated a more substantial improvement. The mean score rose from 3.043 at pre-test to 3.391 at post-test. This difference also approached but did not reach conventional statistical significance ($t(22) = -1.720$, $p = 0.092$).While the paired samples t-tests above address RQ2 directly, it is to be noted that when post-intervention scores were compared against the neutral value of 3 conducting one-sample t-test, the EG demonstrated significantly positive attitudes across all categories as:

-Attitudes, Motivation, and Technology Perception: ($M=3.460$, $t=3.858$, $p=0.001$)

- Technology Use and Confidence/Challenges: ($M=3.391$, $t=2.627$, $p=0.015$)

-Writing Development and Collaborative Support: ($M=3.773$, $t=9.209$, $p=0.000$)

-Overall: ($M=3.620$, $t=7.309$, $p=0.000$)

These one-sample results confirm that by the end of the intervention, EG students held significantly positive attitude above the neutral midpoint (undecided, See appendix 1). And all the p-values are smaller than 0.05 which is statistically significant.The qualitative data revealed that all five interviewed students (100%) had positive attitudes towards technology integration into writing. One student said 'technology can definitely help improve my writing (P5). Another stated 'Yes, absolutely' (P1). However, students started the experimental study with already a positive attitude. In other words, the pre-test mean of 3.261 was already above the midpoint of 3. Hence, there was not much room for improvement. Additionally, one sample t-test confirmed that positive-intervention attitudes were obviously above neutral across all categories ($p<0.0$), which indicates that participants remained positive throughout the experiment. To support this, one student stated 'technology is already part of our daily life in today's world (P2).

4.2 The Second Research Question

To address Research Question Two, qualitative data were collected from two primary sources: (1) open-ended items in the questionnaires (See Appendix 1) and (2) semi-structured interviews conducted with only five students from the EG (See Appendix 2). The interview sessions were transcribed online via a website (https://transcriptly.org).After the 6 steps of analyzation (See section 3.5), the outcomes yielded three overarching categories of challenges as: Linguistic Challenges, Technical and Access Challenges, and Pedagogical Challenges. Notably, no Collaborative challenges were reported in either the open-ended responses or the

interview, which constitutes a significant finding per se. Significant findings in each category/theme will be presented with quotations.

4.2.1 Theme One: Linguistic Challenges

This theme captures the language-related issues that students faced when writing in English while using technology. The challenges were reported both in pre-intervention and, in some cases, continued throughout. Table 2 presents the Linguistic Challenges and the codes that emerged from analysis.

Table 2: Linguistic Challenges Reported by EG Participants

Linguistic Challenge	Pre-Intervention (n=23)	Post-Intervention (n=23)	Representative Quotes
Spelling mistakes	Multiple participants	4 participants (interview)	*"the biggest problem for me is spelling if I write on paper"* (P1, Interview Q3) *"I face... spelling the words"* (Person 7, Pre-Intervention)
Grammar difficulties	Multiple participants	3 participants (interview)	*"I have grammar issues"* (Person 11, Pre-Intervention) *"I struggle the most with grammar"* (P3, Interview Q3)
Vocabulary limitations	Multiple participants	3 participants (interview)	*"lack of vocabulary"* (P2, Interview Q3) *"My lack of vocabulary, forget to use the new words I have learned"* (Person 2, Post-Intervention)
Organising ideas	Multiple participants	2 participants (interview)	*"I couldn't organise a paragraph"* (Person 2, Pre-Intervention) *"I need a lot of time to organise my ideas"* (Person 17, Pre-Intervention)
Punctuation difficulties	Multiple participants	2 participants (interview)	*"I have a problem with punctuation"* (P2, Interview Q1) *"Grammar and punctuation problem I have"* (Person 14, Pre-Intervention)

Apart from the results derived from the questionnaire, responses obtained via open-ended items in the questionnaire served to triangulate and better reinforce the quantitative data. The researchers' primary objective was to identify whether EG's overall writing skills have improved and faced any challenges and gain more insights into students' perceptions. The data from open-ended responses from EG revealed that linguistic challenges were widespread among participants before the intervention. To begin with, grammar issues were the most prominent challenge: 'I have grammar issues' (P11), 'Grammar is difficult for me' (P6), and 'I have grammar problems' (p4). Additionally, spelling issues were equally prevalent with P7 and said 'I face difficulties in spelling the words' and P22 noted 'spelling, punctuation' as main challenges of writing. Moreover, vocabulary limitations were also expressed by some participants. For example, P9 stated 'I didn't know synonyms for many words', and P10 also stated 'I didn't know synonym for many word'. Lastly, organisation challenges were also evident, with P2 said 'I couldn't organise a paragraph' and P1 noted 'Numbering the sentences, how to order the sentences when I write a paragraph' is a real challenge for him/her.Nevertheless, some post-intervention linguistic challenges also persisted despite the overall improvement in the writing skills which was demonstrated in Section 4.1.1 above. In the post-intervention open-ended responses P2 said 'My lack is vocabulary, I forget to use new words I have learned', indicating that vocabulary retention remained as a challenge. P4 also acknowledged continuous vocabulary struggles stated that 'Sometimes when I write I struggle finding high level words, or spelling while I write it can be an issue'. Moreover, P12 stated that technology could assist him/her in spelling while writing 'using technological tool like Google Docs could help me give me error correction option', suggesting that they were aware of how Google Docs that could mitigate their spelling challenges.To strengthen the validity of the results, data from semi-structured interviews with five participants were used for triangulation, allowing for cross-verification among many sources. The responses provided richer detailed answers on linguistic challenges. For instance, P1 identified grammar and spelling mistakes as primary challenges. He said 'For me, if I take myself as an example, it's spelling and sometimes grammar' (P1, Q3). He expanded his answer on the

nature of difficulties, noting that 'putting all the ideas together is kind of challenging for me' (P1, Q3). In addition, P2 acknowledged a combination of challenges and said 'Generally, it's lack of vocabulary. Sometimes I know the vocabulary, and grammar mistakes, and punctuation are my biggest problems' (P2, Q3). She also explained the vocabulary challenge as 'Sometimes, as I said, I know the right vocabulary, but I don't know when I can use it, which part of the sentence' (P2, Q3).Moreover, P3 gave a comprehensive account of linguistic challenges 'I struggle the most with grammar and sometimes organising my ideas clearly. Vocabulary is also a challenge when I want to express my complex thoughts' (P3, Q3). To further verify this challenge P4 identified vocabulary as her primary challenge, she said 'One of my biggest challenges is vocabulary. I struggle to find rich or advanced words to describe things clearly, especially when I'm trying to add details to my writing' (P4, Q3). P4 also noted punctuation as a challenge 'My second challenge is punctuation. I have to work on that too' (P4, Q3).Furthermore, P5 disclosed grammar as her main challenge. She said 'Generally, I have problems with grammar. I make so many grammar mistakes' (P5, Q3). She also identified coherence and organisaion as issues stating 'I have problem with coherence using linkers and sometimes organising ideas' (P5, Q3).Linguistic challenge was the most frequent in the study students basically struggled with spelling, grammar, vocabulary, and organising ideas. These findings are aligned with previous study in Bangladesh by Ara (2022) and a study in Indonesia by Hairuddin (2020) where similar difficulties were reported.

4.2.2 Theme Two: Technical and Access Challenges

This theme focuses on technological difficulties EFL students encountered when using Google Docs during the intervention period. Notably, these challenges were reported more frequently in the post-intervention responses than in pre-intervention data. This indicates that actual use of the Google Docs platform discovered challenges that were not predicted before. Table 3 presents the Technical and Access Challenges and the codes that emerged from analysis. **Table 3: Technical and Access Challenges Reported by EG Participants**

Technical Challenge	Pre-Intervention (n=23)	Post-Intervention (n=23)	Representative Quotes
Internet connectivity issues	1 participant	6 participants	*"weak internet connection"* (Person 15, Post-Intervention) *"slow internet connection in our country"* (Person 16, Post-Intervention) *"the connection is weak"* (Person 20, Post-Intervention)
Platform unfamiliarity	0 participants	1 participant	*"I was not familiar with the tool, it was my first time to use it, but I love it"* (Person 19, Post-Intervention)
Device/keyboard issues	1 participant	0 participants	*"It's hard to use keyboard, because I don't use them much"* (Person 13, Pre-Intervention)
Distraction	0 participants	1 participant	*"I get distracted by other social media and slow internet connection"* (P5, Interview Q3)

The table represents that in the pre-intervention technical challenges were minimally reported. Only P2 stated a connectivity issue 'Sometimes it is too difficult for me when I write, because connection is not exactly right to write everywhere'. Additionally, P13 mentioned keyboard difficulties 'It's hard to use keyboard, because I don't use them much'. No participant reported platform unfamiliarity in the pre-intervention responses, which aligns with the demographic data showing limited prior exposure to Google Docs platform.Regarding the post-intervention responses, technical challenges, especially internet connectivity issues, became more prominent in the responses. Nearly quarter of participants reported internet-related issues. For example, P15 said 'weak internet connection'; P18 noted 'slow internet connection in our country' is a main challenge; P17 stated 'slow internet connection'; P18 elaborated 'internet is a real issue such as lack of free Wi-Fi'; P20 reported 'the connection is weak usually'; and in the interview data P5 stated 'I get distracted by other social media and slow internet connection' (P5, Q3).Furthermore, internet familiarity was reported minimally, only one participant, P19, that said 'I was not familiar with the tool, it was my first time to use it, but I love it'. This response is significant because despite initial unfamiliarity with the platform, the participant developed a positive attitude towards the

tool.To further enhance the validity of the findings for this theme, the interview data from five participants were used for triangulation, supporting cross-verification of results across multiple data sources. The responses provided richer detailed answers on technical challenges. For instance, P5 presented a unique perspective, stating that connectivity and distraction were challenges 'If we talk about inside of the classroom, I get distracted by other social media and slow internet connection. When I get messages from my friends or anything like that, I get distracted easily' (P5, Q3). This answer highlights the challenge when using devices in classroom settings.

Moreover, P3 gave a different technical challenge 'Internet problem like slow internet connection and real-time collaboration when some students work on the same task' (P3, Q3). Therefore, this response highlights that slow internet connection can affect the synchronous collaborative features of Google Docs, possibly disrupting the collaborative writing experience.It is to be noted that the increased reporting of technical challenges in post-intervention responses suggests that actual use of the platform made EFL students more aware of limitations that occurred. Notably, this awareness development became more conscious for online collaboration. It tells us that despite these technical challenges, students overwhelmingly reported positive attitudes towards Google Docs use. Hence, this indicated that the advantages of the platform outweighed the technical challenges students encountered.This challenge was reported minimal. Out of 23 students in EG, only six students reported internet connectivity issues in the open-ended responses, and only one mentioned initial platform unfamiliarity. Therefore, the current study contrasts with studies like Ebadi and Rahimi (2017) where Iranian learners encountered more technical challenges. This difference may reflect improvements in Kurdish technology infrastructure for first-year students in their previous stage of education which is high-school education.

The technical challenges particularly internet connectivity issues are in line with the findings of (Demisse *et al.*, 2025) who found that Ethiopian EFL students using Google Docs faced connectivity issues and initial platform unfamiliarity. Comparing to these studies, the minimal reported challenges in the current study highlights that technology infrastructure in the KRI context may be less developed or that students had greater prior familiarity with the digital tools.

4.2.3 Theme Three: Pedagogical Challenges

This theme relates to learning process and instructional design. The pedagogical challenges emerged basically from the interview data and post-intervention open-ended responses (See Table 4).

Table 4: Pedagogical Challenges Reported by EG Participants

Pedagogical Challenge	Frequency	Representative Quotes
Preference for individual work	1 participant	*"I also don't like sharing my ideas that openly"* (P4, Interview Q5)
Concern about idea ownership	1 participant	*"Your ideas might get copied or changed without credit. That makes me a bit uncomfortable"* (P4, Interview Q3)
Over-reliance on automatic correction	1 participant	*"Over-reliance on automatic spelling and grammar suggestions is another challenge for me"* (P4, Interview Q3)
Feedback uncertainty	0 participants	Not reported

Taking some of the interviewee's responses to the 'Pedagogical Challenges' into lessons, P4 provided the most detailed account of this theme. She expressed issues about over-reliance on technology 'Over-reliance on automatic spelling and grammar suggestions is another challenge for me' (P4, Q3). This reveals that awareness of the potential negative impact of technology use which makes students depend on automatic correction rather than improving their linguistic competence on their own. This participant elaborated her concerns about ideas and ownership as she stated that 'Personally, I feel that when you share a Doc with others, your ideas might get copied or changed without credit. That makes me a bit uncomfortable. I also don't like sharing my ideas that openly' (P4, Q3, Q5). This response reveals a unique pedagogical challenge that the tension between collaborative learning and students' ownership of ideas. Further, the same participant, P4, preferred working alone as she claimed 'When I'm doing an assignment with someone else, I'd prefer working together using Google Docs' (P4,

Q5). Whereas this response indicates a preference for working in collaboration with others. Her earlier responses reveal a more complex relationship with collaborative learning tasks. In short, P4's concern about over-reliance and ideas overseership need attention. However, these concerns need clear instructions to maintain individual voice within collaborative writing activities.

4.2.4 Theme Four: Collaborative Challenges

Notably, no participants reported challenges related to pair-work, group work, coordination difficulties, or giving feedback and comments on each other's work. This absence is significant and suggests that Google Docs platform may have minimum collaboration challenges through feasible features such as clear contribution tracking, synchronous options, editing, and commenting capabilities. Thus, the minimal reporting of pedagogical challenges suggests that technology integration instruction is effectively support students writing skills at the university level. Nonetheless, the absence of reported **collaborative challenges** contrasts with studies in the literature (Demisse *et al*., 2025) on pair work, or group work. This finding suggests that Google Docs use may have mitigated typical collaboration challenges via features such as clear instructions, asynchronous option, and synchronous editing features. Similarly found that collaborative writing using Google Docs enhanced positive collaboration experiences.It is worth noting that both the open-ended and interview data revealed some interesting facts. The semi-structured interview data provided richer and more detailed accounts of challenges to answer RQ1, especially linguistic challenges and collaborative experiences. In contrast, the open-ended responses, with less detailed, provided broader coverage of the participant sample across the intervention period. For instance, the emergence of technical challenges in post-intervention open-ended responses in EG revealed that internet connectivity challenges became more prominent as students engaged with the use of Google Docs platform.

The triangulation of data from both interview and open-ended responses on linguistic challenges identify some primary difficulties in grammar and vocabulary.

5. Conclusion

This study investigated first-year EFL students at Salahaddin University and their attitudes toward Google Docs mediated collaborative writing and challenges they faced. The findings revealed that students hold positive attitudes toward technology integration in writing skills. While the overall attitudes score showed statistically significant growth, certain subcategories (like motivation or technical confidence) did not reach significance due to a ceiling effect. This ceiling effect was explained in EG as students had started the experiment with already positive attitudes, leaving limited room for statistical improvement. Furthermore, qualitative data confirmed that all interviewed students held positive attitudes and reported increased confidence. In other words, Kurdish EFL students are digitally literate and eager to adopt TMCW platforms like Google Docs.The actual barrier to success is not technical issue since technical challenges were reported minimal. However, the main foundational challenges students encountered were linguistic: spelling, grammar and vocabulary. Additionally, no collaborative challenges were reported. These findings suggest that Kurdish EFL students at university may be more technologically ready for TMCW than previously assumed and that instructors should focus more on linguistic development rather than technological issues. As Demisse *et al.* (2025) concluded, Google Docs can be an effective digital tool for improving writing skills in EFL settings. The present study extends this conclusion in university students' Kurdish context. In other words, this study provides empirical evidence that Kurdish university students are ready, willing and able to engage with TMCW, as they receive appropriate linguistic support alongside technological training.

6. Limitations of the Study

Several limitations must be acknowledged. First, the sample size of the EG was relatively small (n=23), which limits the generalisability of the quantitative findings. Second, the 10-week intervention period may have been insufficient to capture long-term changes in deeply rooted EFL learners' attitudes, contributing to the observed ceiling effects in certain categories. Lastly, the study was conducted within a single department at one university, meaning local infrastructure variation could alter the results if this is repeated elsewhere.

7. Implications

The findings of the current study support three theoretical frameworks with direct pedagogical implications. From a socio-constructivism, Google Docs effectively supports peer learning within Zone of Proximal Development (ZPD by Vygotsky). The findings evidence that students improved writing skills significantly via collaboration and the challenges are almost none. Pedagogically, university teachers should maintain structured pair-work or group work with clear guidelines, roles, and expectations.

As for Technology Acceptance Model (TAM), students reported positive attitudes, reflecting high perceived usefulness and ease of use of Google Docs. Notably, this implies that initial training on features of digital tools such as Google Docs (Blogs, Wikis, and Padlet, among others) and ensuring reliable internet access will assist EFL learners overcome any initial unfamiliarity, reinforcing positive acceptance of the model. As Ara (2022) noted, learners develop strategies by combining traditional writing methods with that of digital tools. Therefore, university teaches should balance technology with traditional methods: as one student wisely noted 'we shouldn't prevent writing on paper, the traditional one' (P1). Technology should complement not fully replace traditional writing instruction.

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Appendix 1: **Writing Skills and Attitude Questionnaire**

Please indicate the level of your agreement with each statement by selecting the option that best describes your opinion.

		Strongly Disagree 1	**Disagree 2**	**Undecided 3**	**Agree 4**	**Strongly Agree 5**
	Writing is the most difficult skill in learning English language.					
	I use the internet for writing in English.					
	Technology can help EFL learners at university.					
	Technology-integration into writing process is useful/practical.					
	I am confident when I use technology to improve my writing skills.					
	I am confident when I use technology to improve my writing skills in class.					
	I enjoy using technology in my writing lessons.					
	When I write, I face problems using technology in the classroom or at home.					
	Web-based tool (eg Google Doc) can help me identify grammar, spelling, organisation, punctuation mistakes/errors.					
.	Web-based tool can increase my interest in the learning process in general and in the writing specifically.					
.	Teachers should use technological tools inside classrooms.					
.	Teachers sometimes can give homework on web-based platforms.					
.	Teachers sometimes can give feedback on web-based platforms.					
.	Collaborative learning via a web-based tool enhances writing skills.					

.	I like to work in groups in writing classroom.					
.	I like to work in pairs/ groups face-to-face for L2 writing tasks.					
.	I like to work in pairs/ groups for L2 writing tasks through any online platforms (e.g., Wikis, Padlet or Google Docs).					
.	I see improvement when I self-assess a writing task.					
.	I would find it useful to see other classmates' feedback on my drafts.					
.	I like teacher's and peer's advice on my drafts.					
.	Mobile and computer devices are good/useful tools for writing purposes.					
.	Writing on mobile and computer devices can make my learning easier.					
.	I will be motivated to participate more if I can use mobile and computer devices.					
.	Mobile and computer devices help me to use correct grammatical structure.					
.	Mobile and computer devices help me to use vocabulary items.					
.	Mobile and computer devices help me to learn how to use linking words.					

Section (3): Challenges and difficulties (open-ended questions)

1. Are there any challenges or difficulties you have ever faced and can mention while writing tasks?

a. Yes □ b. No □

If you answered with yes, please mention these challenges and difficulties in writing?

2. Please add any other challenges or difficulties you have faced in writing with technology either in English, Kurdish or Arabic.

Appendix 2: Interview Questions for Experimental Group

Opening Script: Hello and thank you for accepting the invitation to participate in this interview. Did you have a chance to read the interview questions I sent/gave to you ahead of time? As you recall, I will be recording this interview. I will be asking you the questions I sent/gave you, and I may also add some probing questions based on your responses. Do you have any questions for me before we start?

1. Do you think technology can help improve your writing in English? Why or why not?
2. Do you usually write in English using a **computer** or **phone (Google Docs)**? Or do you write more on **paper**?
3. What problems (or challenges) do you face when writing in English? (e.g. grammar, spelling, organising ideas, vocabulary, punctuation, etc.)
4. Have you ever worked with classmates (in collaboration) to write something in English?
   - If yes: Did you do it online (e.g. **Google Docs**) or in the classroom? How did you feel about it?
5. Tell me your experience of using **Google Docs** to write with others. Did you enjoy it? Why or why not?
6. Do you think it's important when others comment, suggest, or edit your writing on **Google Docs**? Why?
7. Do you feel more confident in your writing after using **Google Docs**? In what way?
8. What is different between writing on **Google Docs** and writing on paper?
9. Do you think your writing in English has improved after this experience? (Spelling? Grammar? Punctuation? Organisation? Punctuation? Confidence?)
10. Do you think using technology like **Google Docs** should be part of writing classes? Why or why not?