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Research Article

Collaboration, Digital Tools, and AI in Academic Writing: Student Experiences, Challenges, and Perspectives

Mehmet Kanık *

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ABSTRACT

Recent digital technologies have influenced different educational practices. This study examines students' experiences, challenges, and perspectives on collaborative writing and digital tools. Thirty-one students in an English Language Teaching program participated in the study. The data were collected through questionnaires, interviews, chat logs, reflective writing, and classroom observations. Data were analyzed using descriptive statistics and thematic analysis. The findings revealed that students initially had a positive attitude towards collaborative writing and digital tools, yet they faced significant challenges while handling collaboration and conflicts. Furthermore, they demonstrated a fluid approach to collaboration, shifting between positive and negative perspectives. ChatGPT provided additional support by offering suggestions and feedback during collaborative writing. Students had various expectations of digital tools, from practical benefits to concerns about ethical issues and overreliance. The study has implications for academic writing in similar contexts, which can be facilitated by collaborative practices and the use of novel digital tools.

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Statement of Publication Ethics

The study has been conducted by following publication ethics. The ethics committee approval has been obtained for the current study: Final International University Ethics Committee, 11/11/2022, 100/050/REK.001

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The manuscript has been written by a single author.

Conflict of Interest

This study has no conflict of interest.

Reference

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* Assoc. Prof. Dr., ORCID ID: https://orcid.org/0000-0002-1737-767, Harran University, Department of Foreign Language Education, mehmetkanik@harran.edu.tr

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Introduction

Students in English-medium programs usually take a variety of courses that have strong academic writing components. One such program is English Language Teaching where students enroll in reading and writing, research paper, critical reading and writing, and other content courses that require students to produce academic texts, as in programs in Türkiye and North Cyprus. These courses introduce students to academic writing conventions, including the organization of written texts, citing scholarly sources, and academic ethics and plagiarism. During the process, they face a number of challenges in academic writing (Altınmakas & Bayyurt, 2019; Yağız, 2009; Yağız & Yiğiter, 2012). One way students can overcome some of the challenges is through collaborative writing tasks where students can support one another (Elola & Oskoz, 2010; Mutwarasibo, 2013; Pham, 2021; Storch, 2019; Thirakunkovit & Boonyaprakob, 2022). However, collaborative writing has its own unique challenges (Alkhalaf, 2020; Lin & Maarof, 2013; Tammaro et al., 1997). The use of technology can further complicate the process (Zhang et al., 2022). The advances in artificial intelligence (AI) models have also added further dimensions to collaborative writing, with large language models (LLMs) potentially taking the role of a virtual collaborator, which prompts research into students' experiences surrounding these dimensions.

Hence, the current study aims to examine the issue through a process-oriented approach. In particular, the study investigates how students collaborate and how this collaboration is facilitated by technology. Examining the challenges students encounter during the process and their perceptions of these practices will provide insights into emerging dynamics in collaborative academic writing.

Literature Review

Collaborative writing refers to writing activities involving two or more students to produce a "single text" (Storch, 2019, p. 40; Zhang, 2019, p. 16). Storch (2019) distinguishes between collaborative and cooperative writing in that collaborative writing involves team members in all phases of the project, while cooperative writing involves division of tasks, but this distinction is sometimes blurred. Since, even in tasks that may involve division of tasks, students may work collaboratively on different sub-tasks or seek support and scaffold one another, in this paper, I will use collaborative learning to involve both types of group tasks.

Several studies have documented the positive effect of collaborative writing on students' writing performance (e.g., Li, 2023; Pham, 2021, 2023; Sang & Zou, 2023; Zabihi, Rezazadeh & Dastjerdi, 2013; Villarreal & Gil-Sarratea, 2020). This is relevant to Vygotsky's sociocultural theory, which claims that learning is maximized when novice learners interact with more knowledgeable others, such as parents, teachers, or peers. In this view, it is argued that learning takes place through interaction with adult guidance or "in collaboration with more capable peers" (Vygotsky, 1978, p. 86), where learners receive guidance from those possessing greater knowledge. Although this perspective suggests that learning potentially takes place within asymmetrical pairs or groups, later research has found evidence that even learners at comparable levels can support one another's learning (Storch, 2013). In this view, the partners, including peers, provide learning support, known as

scaffolding, in the form of feedback modeling, motivating, raising questions, and the like. Wood, Bruner, and Ross (1976) describe scaffolding as a "process that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts" (p. 90). During collaborative writing tasks, students can provide scaffolding to one another either as peer support or as collective scaffolding (Donato, 1998; Storch, 2002). For instance, Storch (2013) states that collaborative dyads (exhibiting high mutuality) created opportunities for scaffolding, which in turn enhances students' writing quality. In this respect, this aligns with Vygotsky's (1978) concept of Zone of Proximal Development (ZPD), where the support is provided in line with the learner's needs. Studies suggest that scaffolding in collaborative writing promotes both language development and metacognitive skills like planning and revising (Chen & Yu, 2019; Storch, 2019).

Drawing on mutuality and equality and focusing on dyadic interaction, Storch (2013) characterizes different patterns of dyadic interactions, namely expert/novice, collaborative, dominant/passive, dominant/dominant, and cooperative. Chen and Yu (2019) suggest that pairs demonstrating high mutuality, those labeled as expert/novice and collaborative, provide more opportunities for learning than the others because of a higher degree of scaffolded support available in such grouping. Watanabe and Swain (2007) found that collaborative patterns of interaction contributed to learners' achievement more than other patterns. Yet, Zhang (2019) did not find a positive effect of collaboration type on the quality and accuracy of collaboratively-produced texts. These variable findings may be due to how students perceive and engage with collaborative tasks.

One factor that may influence students' engagement with collaborative writing is their attitudes towards the nature of collaborative writing practice. Studies show that students who work in pairs or groups in collaborative writing demonstrate a positive attitude towards it (e.g., Dobao & Blum, 2013; Ubaldo, 2021; Zeng & Takatsuka, 2009). However, students' attitudes may not be a static phenomenon. Chen and Yu (2019), for example, found evidence that participants demonstrated dynamic attitudes towards collaborative writing in different tasks, which generally influenced their behaviors. The study also highlights that peer assistance should be perceived as valuable by the interactants for it to be helpful. When it is the case, learners may develop a positive attitude to collaborative writing (Chen & Yu, 2019), which, in turn, can potentially enhance the benefits students can get from relevant practices. The findings suggest that students' engagement may be a dynamic process, as attitudes and perceptions may change over time as students engage in extended or sustained collaborative writing practices. Three sources for this dynamic nature of attitude were found to be learners' beliefs and experiences, perceived value of peer help, and group dynamics. Similarly, Zhai (2021) conducted a study on collaborative writing in the context of Chinese as a foreign language and found that students' motivation toward collaborative writing changed over the course of the writing process between positive and negative. In Zhai's (2021) study, time constraints, group incongruity, and linguistic challenges were identified as influential factors.

Another aspect theoretically relevant to collaborative writing is languaging, which means "the process of making meaning and shaping knowledge and experience through language" (Swain, 2006, p. 98), where students can learn "both through and about language"

(Swain, 2006, p. 106). Collaborative writing provides a medium for languaging as learners engage in verbal or written exchanges to negotiate meaning or to clarify ideas while revising texts. According to Swain (2006), learners benefit from languaging cognitively because they externalize thoughts, which allows learners to think about and refine their understanding. During collaborative writing tasks, learners engage in peer or group discussions about the content and language, which in turn can lead to more profound comprehension as well as better textual output, which demonstrates languaging. Storch (2013), for instance, states that collaborative writing tasks provide ground for languaging when learners express their reasoning, discuss word choices, and create arguments together, improving their language and writing skills. Several studies have documented that languaging benefits learners in various ways, including improved grammatical accuracy, increased awareness, and critical thinking (Kim & McDonough, 2011; Sang & Zou, 2023; Swain et al., 2009). These studies and discussions thereof have revolved around collaborative writing, including human agents.

In recent years, however, collaborative writing has taken a different turn with the advent of generative artificial intelligence language models like ChatGPT, which can act as virtual collaborative agents in academic writing tasks and has changed the way collaborative agents act because of providing human-like dialogue and common accessibility and creating content unlike other collaborative agents before them that offered fewer support (e.g. scheduling assistants, language editing support software) (Kim, 2023; Luther et al., 2024). While older collaborative agents were tools, LLMs can act as partners or reformulators (Lapkin et al., 2002; Swain, 2006). Thus, AI tools are emerging as virtual collaborative agents in learning L2 and academic writing, offering support and guidance to language learners (Osawa, 2023). Engaging with these tools may have relevance in rethinking sociocultural theory, languaging, and collaborative learning (O'Donnell & Hmelo-Silver, 2013) as they may impact students' learning, behavior, and attitude. Yet, how likely they can act as a human collaborator is yet to be examined. In a study by Yang et al. (2022), students had an AI voice chatbot as a conversational partner, and it enhanced students' use of English. Such AI ıtools can provide real-time feedback, suggest improvements, and help with language-specific challenges, potentially enhancing the writing process for non-native speakers (Zheldibayeva et al., 2025). AI-driven technologies can provide personalized, adaptive, and interactive learning experiences adjusted to individual learners' needs, which promotes student engagement, autonomy, and proficiency in language instruction (Umar, 2024). By acting as virtual writing partners, AI tools can help scaffold learning, allowing students to engage with more complex writing tasks than they can manage independently. In this way, AI tools are in the process of transforming L2 academic writing by offering support to learners. They enhance communicative performance and personal language development, turning the academic writing process into an additional learning space (Ou et al., 2024). Yang et al. (2022) examined AI-human collaboration in a study where students and AI wrote a fictional story. They found that students perceived the AI tool as an active writer they were collaborating with. Likewise, the researchers also demonstrated a neutral to positive perception of the chatbot as an English conversation partner. Students believed they improved their language skills with the help of AI chatbot. Other studies found that AI

tools can provide feedback, which affects students' output (e.g., Kinder et al., 2025; Mahapatra, 2024). Yet, the integration of AI technologies into academic writing or collaborative work raises important ethical issues ranging from plagiarism to loss of agency (Khatri & Karki, 2023). As these technologies continue to develop, their role in L2 academic writing will likely expand, which will necessitate continuous evaluation of their impact on language learning and writing pedagogy (Mohebi, 2024) in general and their integration in collaborative writing practices in particular. Furthermore, how students perceive AI may potentially influence how they engage with AI and collaborative work. Therefore, it is important to understand students' perceptions and experiences.

Research Questions

This study aims to seek answers to the following research questions:

RQ1. How does collaborative writing influence social dynamics in group-based academic tasks?

RQ2. What are students' perceptions of the use of digital tools?

RQ3. What challenges do students face in collaborative writing and in using digital tools during academic writing tasks?

Methodology

Research Design

The study utilized a mixed-method research design with data triangulation across various phases to ensure robustness of research. While quantitative data helps reveal general trends, qualitative data allows for a more in-depth examination of a phenomenon (Creswell and Clark, 2017; Dörnyei, 2007), and methodological triangulation and data triangulation enable the data to confirm and corroborate one another, which contributes to validity and reliability (Dörnyei, 2007; Rothbauer, 2008).

Publication Ethics

This study was undertaken by complying with ethical guidelines governing research methodology and publication standards.

Context

The study was conducted at a private international university in Northern Cyprus with an international body of students and academics. The students in the study received frequent academic writing tasks because the program they enrolled in required continuous assessment tasks, particularly academic writing assignments, which made this context appropriate for a study on academic writing. The questionnaire used in the study had questions addressing the frequency of academic writing tasks. The results indicated that the majority of the participants (62.5%) received academic writing assignments a few times a month, while 18.8% received them more than once a week. Half of the participants reported

that they received five or more assignments during the semester when the data was collected for the study. These results indicate that it was common for the participants to receive academic writing tasks. Yet, despite a high number of assigned tasks, half of the students reported that they worked independently on academic writing assignments. Only 6.3% worked with a classmate. This shows that students were not frequently involved in collaborative writing tasks.

Participants

The study involved 31 sophomore students in the English Language Teaching (ELT) program of the university. They were selected because they registered for a research methods class that involved academic writing tasks such as critical summaries and research reports. The participants were informed about the study in class by the instructor at the beginning of the semester, and students were recruited through informed consent. The study group included 20 females and 11 males, with a mean age of 22.68, ranging from 19 to 27. Although the majority of the students were from Türkiye, there were students from other countries such as North Cyprus (4), Russia (3), Uzbekistan (2), Morocco (1), and Chad (1).

Sixteen students reported self-perceived English proficiency. The percentages of their proficiency levels are as follows: nine of them (56.3%) were identified as B2, five (31.4%) were identified as C1, and one was at the B1 level, while the other one was at the C2 level. Participants also reported proficiency in additional languages, including French, German, Japanese, Kurdish, Moroccan, Russian, Turkish, and Uzbek, either as a native language or additional languages.

Procedures of Data Collection and Analysis

The data in this study were collected through a questionnaire, semi-structured interviews, classroom observations, written reflective accounts, students' collaborative communication via technology, and their interactions with an AI chatbot. At the beginning of the semester, students completed a questionnaire on their overall academic writing practices, perceptions of academic writing, and use of online tools, including AI models. The questionnaire included fixed-choice and open-ended questions. The questionnaire also included demographic questions. In the next phase, they were asked to work in groups of three or four, during the class that the students were enrolled in, with the research project and report writing task providing the data. Then, each group created a chat group dedicated to project communication, supplemented by, of course, in-class and face-to-face interactions.

In computer lab sessions, students created ChatGPT accounts if they did not have one and worked collaboratively on a computer to write prompts on ChatGPT for feedback on their writing. In addition to receiving feedback on their writing, the students also used it for tasks such as receiving suggestions on generating effective interview questions and on analyzing data, as well as different phases of the project. The AI tool somewhat functioned as an additional collaborative agent in the process. Throughout the semester, the instructor

observed students' engagement with the tasks and their behaviors during the tasks. Towards the end of the project, students were asked to provide a written account of their experiences with collaboration and the use of AI tools in their project. Furthermore, six students (four female and 2 male) were interviewed through semi-structured interviews to provide deeper insights. Students' questionnaire responses to fixed-choice questions were recorded in spreadsheet software, and the qualitative data were coded using emerging thematic codes.

Quantitative data from the questionnaire were analyzed using descriptive statistics. Qualitative data from interviews, written accounts, classroom observations, chat group communications, and chatbot interactions were analyzed using content analysis. Emerging themes and trends were identified and categorized to illuminate students' experiences with collaboration and digital tools.

Findings

This section presents the findings of the study, organized into two subsections to address the research questions: collaborative writing and digital tools. These findings, together, illustrate how collaboration and the use of digital tools like AI technologies interplay in academic writing.

Collaborative Writing

To address RQ1, which examines how collaborative writing influences social dynamics in group-based academic tasks, and RQ3, which examines challenges students face in collaborative writing and the use of digital tools, this section explores students' experiences and challenges with collaborative writing, mainly focusing on group dynamics and peer learning. For the class students were enrolled in, they were to write critical summaries, conduct educational research, and write a research paper. First, the students had an overall positive attitude towards collaborative academic writing at the beginning of the semester as the majority of those who took the survey reported that they think that it helps develop overall language proficiency (81.25%) and academic writing skills (68.25%) and they do not see a negative effect on their overall language proficiency (87.5%). Interesting to note here is that they see more benefits in improving their overall language proficiency than in academic writing skills.

To delve deeper into students' experiences with collaborative writing, one source of data is students' communication while handling different phases of the tasks. The participants established collaboration groups on a messaging service through which to communicate throughout the group writing project, which is writing a research paper. During the process, they were tasked to review literature, design research, collect and analyze data, write findings and discussion, and finalize the research paper. The chatlogs were analyzed to scrutinize their collaborative efforts, further validated by the analysis of the interview and survey data. The analysis revealed the following themes: collaboration, group dynamics, writing process, conflict and challenges, and harmony and facilitation.

Students seem to have had a collaborative approach to the process. Each seems to have taken on specific tasks such as finding articles, drafting summaries, and working on

different sections of the research paper or process. They sometimes overlapped in tasks as seen in their discussions on which members should find specific articles and which ones handle summaries. They often established a division of tasks, but usually sought to establish a plan, as illustrated by the following quotes.

> I'll work on the introduction, and you can cover the methodology part.
>
> We need to work on literature review today and tomorrow maximum. Monday, we review our work and then work on the rest of the survey because it's easier.

A similar approach to collaborative writing by the students was also evident in the interview data. Students expressed how they delegated texts during the process, as in the following quote.

> The tasks have been delegated, like everyone is responsible for different tasks for different parts.

Through the writing process, they also maintained collaboration to ensure a joint decision-making approach and collective authorship. They frequently discussed elements of the paper, such as the project title or research questions, often by taking votes. They also reviewed each other's contributions and provided feedback. Furthermore, they were negotiating about the coherence of the text they were jointly producing. This finding on collaborative writing is evident in the following statements:

> We read each other's definitions and highlight the points we think are useful. And then we can arrange the text accordingly. We need to read them anyway as we're gonna combine everything.
>
> (Name) you need more work on your articles I guess.
>
> Wouldn't it work if everyone wrote a few sentences for the conclusion, and then we put them together?

The next theme that emerged from the data is group dynamics, particularly gleaned from role negotiation, decision-making, and conflict management. When it comes to role negotiations, there seems to be an establishment of roles. Some took the initiative and suggested topics, deadlines, and so on, while others agreed to assigned tasks and followed up with contributions. These roles were assigned based on perceived skills by the member who took the lead role, yet they were flexible and provided mutual support within assigned roles. This finding was captured in these statements.

> (Name) could you help me with writing Survey's Description
>
> I started it anyway, once I finish I'll send you so that you could fix it

Role negotiations were naturally accompanied by decision-making. When it came to key decisions, they often voted or reached a consensus. Other times, they discussed external feedback as a group to make decisions. The following quotations reflect this finding.

> We need to think of a good title for the research before Tuesday class. As you know this one doesn't seem academical. Let's think and share with each other in the group, then we vote for one.

Yet the data included opposite views, such as concerns about the difficulty of decision-making and the time-consuming nature of group conferences, as illustrated by the following comment:

> When it comes to group projects and we have to write something together, it's quite difficult to gather all the ideas together, since all of us have different styles, levels, perceptions and concepts.
>
> It takes too much time when we get together.

The writing process was also a central theme in collaborative communication, with planning and structuring, feedback exchange, and iterative revision becoming topics of conversation during the writing of the research paper. Regarding the structure of their work, students actively engaged in discussions to decide on the organizational structure of their work, including a general outline and sections such as literature review, methodology, research questions, etc. This planning stage points to students' awareness of research structure and standards. The following exchange reflects this finding.

> We have a plan. It's pretty obvious what we need to do. / First as far as I know, we have to summarize our summaries. And then, write the literature review. Then find our main study questions. Am I right? Then plan the methodology / This is what he made us do today. / We have a deadline for the literature review, we need to do it first.

Group members also provided feedback on each other's work, such as refining title ideas and even checking each other's article selections for relevance and quality. The following quotation, for instance, demonstrates how students can provide direct feedback.

> You wrote it beautifully, thank you, but that wasn't the point. Hopefully, I can explain it. Now, we wrote all the articles separately, right? Instead of evaluating them individually, we are asked to write them by establishing connections between them … While explaining these, we are asked to form connecting sentences and include the percentages or figures, if any, from there, as well.

The members of research groups were involved in this iterative process. Sometimes they revised their work based on peer feedback, and at others in line with the suggestions from their professors, which indicates flexibility and adaptability. The following exchange illustrates how the students were open to feedback as well as refining their work based on new insights.

> What you sent was too general, so we couldn't include it. … The FINDING part from your article lacks the results section. Lastly, (Name) and (Name), you two need to finalize the CONCLUSION part. Once that's done, you can send the finalized document to the group. / Okay, I'll send it in the evening. Besides this, there's nothing else left, right? I can add something from the text I sent you for the results section because I had shared it as a result section. / The ABSTRACT (which we'll write together) and your FINDING part are all that remain. / Okay, let's directly add it to the end of the conclusion section. / Can we split that and finish it on Monday?

Students' positive attitude to feedback was also expressed during the interviews, as in the following quote.

> One of them might say to me, for instance, while we're writing an article or doing an assignment together: 'Don't just leave it like that. Try to use different words in some places or make it a bit more elaborate here.'

The process, of course, did not always run smoothly, with occasional disagreements and challenges in coordination, which points to some of the difficulties of collaborative writing, which means group dynamics also involved conflict management. There were, at times, concerns over task distribution or frustration over the negative evaluation of other group members, which reveals a misalignment in expectations and, in this case, leads to tension. At times, minor conflicts in choosing titles, articles, and methods emerged and were resolved through discussion and compromise, indicating a good level of negotiation and communication. For example, the following exchanges are a case in point here.

> (Name) you need to submit at least 1 summary to us, because the summary you have submitted were not relevant. The teacher said so. Otherwise, we will get a lower grade. / Ok, but last time I asked can I submit new one you said no. But I will new one thanks.
>
> Guys, the problem is that we cannot distribute our duties evenly. Me and (Name) finished this literature review yesterday for all of us and we are coming up with most of the ideas. I understand that it's difficult since we're working online etc, but we two are already doing a lot for this and we really don't have the time and power nor it's our responsibility to check if others are doing their work properly. Im not asking too much here, since again, I understand the difficulties of working in a group, and that some people are more busy outside, but let's at least do the work that we have to do on our part properly so that no one would need to correct it later.

Eventually, they focused more on task completion and made a conscious effort to minimize disagreements. This perspective was articulated as follows:

> It's fine to point out such things, but when you use caps or dots, it seems rude. If we wanna work as a group we have to stop stressing out and if we have some problems we need to solve them by communicating in a normal way, not in a blaming way etc. This is how the group works, we have to learn how to do stuff together without all this.
>
> We are all good don't worry.

Interview data reflects similar sentiments.

> Other than that, some people, for instance, avoid their responsibilities a lot. For example, there's something they need to write, but they don't. This affects all of us psychologically in a negative way. We keep saying we need to finish the assignment, and we get stressed. It's all because of just one student's irresponsibility, like not wanting to do it. Or, when there's an assignment they need to complete, they try to put it on someone else.

They also encountered challenges regarding coordination, including scheduling and pacing along the way. Some group members apparently felt frustrated over how the work did not move forward at the desired pace, as they had difficulty coordinating group meetings to finalize tasks. Such challenges sometimes led to a desire to adopt a quicker and individual approach due to the difficulty of collaborative decision-making, which seemed to halt the process for the groups, as depicted in the following utterances:

> Everyone's schedule is so different; we're not getting things done.
>
> Everyone has different ideas; this is getting complicated.
>
> Let's just each add our own sentences to the summary.

Students also expressed such concerns in the survey data and expressed a preference for individual work, which is interestingly in conflict with how they value the group projects in enhancing their overall language proficiency and academic writing skills. What follows are examples of this matter:

> When it comes to group projects… it's difficult to gather all ideas together.
>
> I hate to do group works. I just have to accept if my group members are irresponsible. My grades depends on my fate if I have successful and hardworking group mates.

There were also conflicts due to different standards and expectations. While a participant questioned the iterative process by indicating that ongoing revisions is not necessary, another stated that the professor would expect it to be polished. There were differences in how group members viewed quality standards, with one pushing for additional revision while others did not deem it necessary.

In contrast to such conflicts and challenges, collaborative writing also reflected harmony and facilitation. It seems like it is something that has two facets. Group members, often, demonstrated improved idea development, mutual support, and practices of collective authorship. Collaboration seems to have encouraged participants to brainstorm and expand ideas, and help one another in developing deeper insights than they could possibly do on their own, a point that demonstrates how collaborative discussion can enrich the content by integrating diverse perspectives of different group members, as the following exchanges clearly show.

> What do you think of these? / Well, if we put it this way, it has to be us proving that it really DOES affect it. Considering the title. If you don't want it to be a question I'd say we just put Childhood trauma and education. This way we are not claiming anything. / Yeah, I see what you mean.
>
> For the part about 'where did you learn this from,' I wrote family, social media, etc. Does that work? / Very logical.

During the process, group members provided mutual support and engaged in skill sharing by acknowledging the strengths of various group members. They were aware that group tasks could run more smoothly if task distribution were handled based on the strengths each group member brought to the table. There was usually a supportive group dynamic, which welcomed expressing needs without feeling uncomfortable. Some participants shared the following during the interview, for example:

> For example, (Name) had a higher level of English and knowledge compared to the rest of us. He managed and organized our group very well….We had someone to ask questions or to solve any issues that came up.
>
> There's the saying 'one hand has a sound, two hands have a louder sound.' That's definitely the case here. For example, when one person works on an assignment, they might produce something more average. But if everyone shares their ideas, if everyone contributes, the result can be more original and deliver higher performance.
>
> The teacher isn't the only one teaching us something. We can also learn from the friend sitting next to us. For example, they can share things they've learned in their daily life or while studying English—things we don't know. In group work, they can share those things with us, and we can learn from others as well.

Similar perspectives were expressed in the survey data.

> Those with higher levels need to recheck parts done by those with lower levels to be sure there are no mistakes.
>
> Maybe I can learn a lot of things from my group members.
>
> Sharing information helps us. Sometimes we may not know a word or information our friends can helps us.

During this process, they ensured collective authorship and that everyone in the group was comfortable with the final product. They understood collective accountability and recognized mutual interdependence, which seemed to motivate group members, as gleaned from the following statements:

> One person can't do it alone, after all; it requires shared ideas.
>
> We all have the conclusions of our articles ready. If everyone shares their article's conclusion in the group, we can establish the connections.

Some students also expressed that they feel they get social benefits such as managing communication, socializing at a personal level, and getting to know others better. They also recognize how such projects help international students to socialize and feel less isolated in the host country during their sojourn. The following quotes from the interview data highlight these benefits.

> In another way, these group assignments definitely strengthen our relationships in a positive way, especially in terms of friendship within the class. We also get to know each other better. In some way, we also manage to communicate with our foreign classmates in the class.
>
> It did help me improve other skills such as, communication, listening, and managing skills. Also I gained some patience skills if it counts as a skill.
>
> It has definitely improved my communication skills and making friends ... all of my group came to my apartment … I was cooking something and it was nice … For me, it was really an enjoyable process. We got to know each other better. And we became kind of lifelong friends as well.

These findings suggest that collaborative writing is mostly positive despite some challenges. Collaboration enhanced generating ideas, supported learning from one another, and built a stronger sense of shared responsibility, which together prove the worth of collaborative writing as an educational practice. During the process, it was evident that such a practice encourages delegating tasks, peer feedback, and social benefits, even with apparent challenges. These findings show how group learning works in general in this context. Yet, this group project involved technology integration in the form of computer-mediated (CMC) communication and the assistance of AI tools. The next subsection looks at how AI tools like ChatGPT affect students' experiences.

Students' Perceptions of the Use of Digital Tools

To address RQ2, which explores students' perceptions of the use of digital tools, and RQ3, which examines challenges students face in collaborative writing and in using digital tools, this subsection analyzes students' engagement with digital technologies. During the process, students heavily relied on technology. One form of technology they used was CMC, in the form of handling group communication and collaboration over a messaging application, which turned out to be the primary platform for real-time discussion, decision-making, and file sharing. In addition to this, they employed Google Forms to create surveys and collect data. During the process, they communicated over the messaging platform to receive iterative feedback, such as "Should I add these now with the other questions into survey?". Furthermore, they also worked together on Google Docs and Google Sheets as mentioned in their chatlogs. They also used Google Scholar to navigate academic sources and digital platforms to conduct the interviews. They used AI tools, specifically ChatGPT, to get assistance. One form of assistance was feedback on their collaboratively produced writing. They received feedback, studied it, and asked for further feedback. Finally, they compared their version with the one rewritten by the chatbot reformulator. The chatbot seemed to provide clear feedback on language issues in the group writing, as well as feedback on the overall quality of the method section and organizational and paragraph-related issues. Below are feedback examples from ChatGPT's output.

> 52 people submitted questionnaire" should be "52 people submitted the questionnaire" or "52 people completed the questionnaire.
>
> Use consistent verb tense: Maintain consistent verb tense throughout the methodology. For example, if you start with "We obtained data," continue using past tense throughout.
>
> Revise the aim of the study: Reframe the aim of the study to clearly state that you intend to explore students' perceptions of mobile language learning apps, rather than assuming you understand them.

During the process, they had some concerns over handling the project over the messaging app, distributing tasks, and overseeing the whole process, which resulted in some frustration as one student expressed:

> We cannot organize anything from here.

However, students had an overall positive attitude toward online tools. The majority of the students (87.5%) who took the survey admitted that they used online tools, applications, and resources like ChatGPT, and they demonstrated a positive attitude towards such tools. A great number of them believed that using these tools helped develop both language proficiency (93.75%) and academic writing skills (81.25%), and did not see an ethical issue in using these tools (62.5%).

This positive outlook was gleaned from the data at times, which highlight how the use of digital tools like ChatGPT, paraphrasing tools, translation, and software programs during the group writing process enhanced performance. For example, the following quotes illustrate how collaborative work on Excel facilitated group problem-solving and how they benefited from the digital tools for idea generation and drafting, language polishing, and delegated writing on shared documents.

> We had to analyze the answers we received. We used Excel. Since we did it as a group, I think it improved our thinking skills.
>
> We use ChatGPT... for getting ideas and improving language... We didn't only copy and paste. We just use it for getting ideas.
>
> The tasks have been delegated... everyone is responsible for different parts.

These show that group collaboration and technology were strongly interwoven during the project, and the students used CMC and AI tools. This strong use of technology was reflected in the data. The qualitative data retrieved from the short reflection, interviews, and open survey questions highlight both positive attitudes and concern and skepticism, especially of ChatGPT. The responses to reflective writing illustrate various attitudes, from excitement and enthusiasm to caution, which are echoed in the interview and survey data as well. Overall, the themes of initial expectations, varied comfort levels with technology, perceived benefits, motivation and engagement, concerns about misuse and overreliance emerged in the data.

Participants started the activities with the AI chatbot with varied expectations. Many students seemed to lack familiarity with the tool, which made the experience a novelty for them, and their view of and attitude towards the tool changed as they engaged in the activity, shifting from skepticism to appreciation of its capabilities. Gaining first-hand experience made an impact on their attitude, which had been apparently shaped more or less by the

common hearsay amongst the students, mostly as a source of plagiarism. This initial lack of familiarity and changing attitude can be seen in the following remark.

> I didn't know ChatGPT before
>
> Before this activity, I thought we do not to use ChatGBT. Because it is really risky … And we looked our grammatical or organization and the other mistakes. ChatGBT is more useful than I thought.

Responses indicated a different comfort levels with technology among participants. While some found the tool clear and easy to use, others expressed challenges in using it. One participant stated the following, which highlights the need for support and guidance in using the tool effectively.

> I am not very good with technology, so I would say it is a bit difficult for me to use such tools. I think some kind of experience is needed to learn how to use it properly.

A major theme that emerged in the participants' reflective accounts is the perceived benefit of the tool in enhancing their writing skills. Participants seemed to value its potential to identify and correct mistakes in their writing, which results in improving overall writing quality. This highlights that the participants considered that the tool may have a long-term effect on their academic progress and saw an educational value in using it. While engaging with the tool, they also felt the ease in getting feedback easily and immediately. The following quotations reflect this finding.

> I think the activity can be useful for academic writing skills.
>
> I can see my mistakes and improve myself.
>
> Easy to use, I just write my problem and AI finds a solution.

This finding was also observed in the survey and interview data, as participants expressed the benefits they saw in the use of ChatGPT both for classes and even with relevance to continuous learning and development. Participants expressed:

> I'm using ChatGPT to improve my overall language. I use it to get ideas and improve my vocabulary. It helps me get ideas and get my points across well. ChatGPT is of great help.
>
> I just use ChatGPT for getting ideas and improving my languages well, outside my university classes as well.

In addition to recognizing the utility of the tool, the participants also found it engaging, which potentially instills motivation in them to engage in learning tasks. The students themselves seemed to recognize this motivational effect of employing the chatbot within the learning task, especially those who prefer hands-on activity or are somewhat kinesthetic learners. This viewpoint was voiced by some participants.

> Using technology during lessons is a very interesting idea, it makes students motivated.
>
> I observed during the lesson that each student was very excited.

Despite this positive attitude towards the utility of this tool, the participants were apprehensive or had a cautious approach to it. They seemed to be concerned in two respects. One was about the tool's potential to lead students to engage in plagiarism if misused, and the other is related to overreliance on it, as they realize that if they just copy and paste, they do not develop their skills, which, otherwise, would excel if they invest effort in the tasks. The following quotations exemplify this observation.

> It's nice to have apps... but they tend to decrease brain work in general, students spend less time thinking because there's a device that would 'think' for them.
>
> If you use a translation app or a dictionary, there is no ethical issue with that, but if you use such tools as ChatGPT, you're not doing any work by yourself, which is not ethical and is called plagiarism.

These remarks highlight that the students advocate responsible use of the tool while recognizing the rich benefits it can potentially offer to them. This conflicting reaction to the integration of chatbots in learning tasks is also reflected in the participants' outlook on the future. While some admitted that they would use it in the future and recommend it for its utility, "but not always", others seemed to prefer to avoid the possible negative outcome and conveyed a preference for traditional methods of learning, which implies that they might not fully integrate it into their academic routine. The following quotations encapsulate this sentiment.

> I would recommend this tool because it is a practical helper for anyone with internet access.
>
> It is easier for me to do my assignments without any AI help.

The findings from the analysis of chat logs, interviews, reflections, and open-ended questions revealed various perspectives where students appreciated the assistance of technology and, at the same time, were cautious of becoming too dependent on it. Furthermore, the analysis underscored both advantages and disadvantages of working collaboratively, especially in managing group dynamics and peer learning. The students demonstrated a desire for autonomy and scaffolding from technology, peers, and professors. Yet, a balance in individual and group projects to promote both independent learning and teamwork abilities is also highlighted in the findings of the study.

Discussion

The findings demonstrated insights into collaborative writing and the use of technology in collaborative academic writing. When it comes to group dynamics, with relevance to Storch's (2013) patterns of dyadic interaction, although the grouping was not based on dyads, the findings demonstrate that different groups experienced different types of collaboration, such as collaborative, dominant/passive, and expert/novice (Storch, 2001; 2002). Sometimes, for instance, one or two members of a group assumed the main role and did most of the work. Interestingly, this sometimes happened not because of the choice of the dominant member, but because of a lack of contribution by the passive members, which led some members who took the main responsibility to complain and not enjoy the collaborative experience. On the contrary, in the expert/novice dynamic, students expressed that there was a more knowledgeable member, and how they benefited and learned from him. When students did not feel mutual effort, however, frustration arose in group members who were more willing to contribute and invested more effort in the group project. This finding corroborates the findings in Zhai's study (2021), where group incongruity is a factor that may lower student motivation in group work. Also in the current study, students started the project with an overall positive attitude towards collaborative work, yet during the process, negative perceptions arose because of the challenges of coordination and unequal distribution of tasks. This is in line with Chen and Yu (2019), who state that "learners' attitudes towards collaborative writing can and do change" (p. 93).

The present study also revealed that groups can demonstrate formations beyond Storch's (2013) categorization of dyadic interaction. For example, in one group, two students took the role of expert participants, another that could be characterized as novice, where the other two often supported, yet all three were contributing. There was, however, another group member who took the passive role, where her contribution to group interaction and dynamics was minimal, and she was often blamed for not contributing. This shows that in group interactions, as opposed to dyadic interaction, a mixture of different patterns (e.g., expert/novice/passive) seems to be possible. As Zhang (2019) stresses, "categorizing a pair into one collaboration type based upon the predominant collaboration pattern without reserving any information on other less dominant patterns renders it impossible to see a full picture of the dynamics of collaboration" (p. 18). Since students' behaviors, perceptions, and attitudes can change during the collaborative writing process, their involvement should not be approached statically, but in a more dynamic one by observing them with a process-oriented point of view.

Furthermore, Storch (2019) made a distinction between collaborative writing, where they contribute to all aspects of the project, and cooperative writing, where students delegate portions of tasks. In this study, the students frequently delegated work; nevertheless, there was a great deal of overlap, and they worked together on what each student individually produced. Thus, this finding reveals that it is not easy to draw a line between collaborative and cooperative work because of the iterative process and overlap in students' individual and joint efforts during group writing projects.

In the current study, I observed group dynamics and writing interactions that closely relate to Collaborative Learning Theory. In the data, students acknowledged how they supported and learned from one another in the collaborative writing tasks despite some challenges. The data also showed that in general, the task established conditions for positive interdependence, where learners' achievements are linked together (O'Donnell & Hmelo-Silver, 2013). In this study, the students put effort into reaching agreement on topics, writing standards, resolving conflicts, and building consensus on content and structure, and deciding on revision strategies, which together demonstrate the cognitive and social benefits of collaboration. In this respect, the collaborative nature of the tasks could be said to foster critical thinking and problem-solving, and in this project, the collaborative efforts were facilitated by the integration of technology.

However, the data also displayed some frustration with group projects. Some participants complained about unequal distribution of tasks and some members' assuming a greater role. Since positive interdependence is essential for effective collaboration (Johnson & Johnson, 2005), the absence of it in some phases of the group work poses a problem due to varying language proficiency and engagement levels. To avoid such negative outcomes, teachers or professors need to add more structured frameworks or role assignments to the projects to ensure that the responsibilities are equally distributed and that learners face individual accountability because "in many cases, simply presenting mutual learning goals did not create a perception of positive interdependence" (Johnson & Johnson, 2005, p. 328). Then, learners could develop the necessary skills to benefit fully from collaborative learning experiences.

A related finding is that as students engaged in collaborative dialogues face-to-face or over technology, they seem to have learned from each other, especially in the form of more novice learners looking to those who are perceived as "more knowledgeable other" as evident in this comment by a participant: "(Name) had a higher level of English and knowledge compared to the rest of us. He managed and organized our group very well….We had someone to ask questions or to solve any issues that came up." Others also acknowledged that they shared ideas, learned words, and improved their writing. This is in line with Vygotsky's (1978) sociocultural theory, which posits that individuals can potentially develop "as determined through problem-solving under adult guidance or in collaboration with more capable peers" as opposed to development through "independent problem solving" (p. 86). In line with sociocultural theory, Swain (2000) proposes collaborative dialogue, which she considers as joint problem-solving and knowledge-building dialogue where students engage in both cognitive and social activity to construct knowledge. In this study, group projects seem to have fostered collaborative dialogue where participants described group work as a way to share ideas, learn new vocabulary, and improve writing skills. This aligns with Swain's idea of collaborative dialogue, through which peers co-construct knowledge. Furthermore, participants valued peer feedback while they engaged in collaborative tasks, noting how it allowed them to refine their work. As Swain highlights, participants, through collaborative dialogue, noticed and addressed gaps in their linguistic knowledge with peer support.

Relevant to sociocultural theory is also the use of ChatGPT in this study. Stojanov (2023) reports her own experience with ChatGPT as a more knowledgeable other from the perspective of Vygotsky's sociocultural theory. Despite the limitations of ChatGPT 3.5 that she employed, she asserts that ChatGPT can act as a more knowledgeable other and scaffold learning, and thus help move the learner through zones of proximal development (ZPD). This, of course, does not mean that ChatGPT can provide personalized and nuanced guidance, a factor that may help facilitate scaffolded learning (Wang et al., 2024). Thus, the question of whether ChatGPT can be characterized as a more knowledgeable other begs further inquiry because AI provides static feedback requested by the learner while human interactants can provide dynamic scaffolding adjusted for the needs of the learner. Thus, the findings of this study cannot assess ZPD through AI interactions. Yet, it is necessary to rethink sociocultural theory considering human-AI interactions.

The collaborative work in the present study was intertwined with engaging with digital technologies, which the students used at different times, ranging from a text messaging application to an artificial intelligence chatbot. Text messaging provides synchronous and asynchronous communication, which supports constructivist practices that allow students to collaborate, share resources, and build on each other's ideas. They also interacted with chatbots to receive feedback and improve their work due to this interaction with the technology. In their study, Rambe and Bere (2013) found that using mobile text messaging promoted social constructivist learning. The use of this technology tool also enhances social presence, which Garrison et al. (1999) consider essential in learning within a community of inquiry. According to Anderson and Garrison (1998), constructivist learning is collaborative, where parties involved both take responsibility for the construction of

meaning and engage in interaction that helps them ensure group comprehension and generate knowledge, a process that tends to be more complex than traditional instructional scenarios. Yakar et al. (2020), in their review, approach mobile learning as constructivist learning as they promote ubiquitous interaction, dynamic learning networks, and informal learning settings. The learning tasks assigned to students in this study promoted such characteristics, leading to a social constructivist learning experience. More recent papers (e.g., Guo et al., 2024; Jayasinghe, 2024; Kim & Adlof, 2024) support the use of ChatGPT as a constructivist learning mechanism to promote active learning, context, collaboration, conversation, reflective thinking, scaffolding and construction. In this study, students used ChatGPT as a virtual collaborative agent and a reformulator in that the chatbot provided them with feedback and generated ideas, offered directions in their research process, thus facilitating the collaborative academic writing experience, acting as a scaffold.

In the current study, students were utterly concerned about relying too much on AI and not improving themselves, and their skills deteriorating in the process. Recent ethical frameworks also raise similar issues related to AI (e.g., Bird et al., 2020; Hogenhout, 2021). Organizations like the European Union and the United Nations emphasize that AI should not cause people to lose human agency and autonomy. In other words, AI systems should not replace human decision-making, which is relevant to the current study at the micro level, as the participants were cautious about losing their agency.

Conclusion

The study examined ELT students' experiences, challenges, and perspectives on collaborative writing and AI tools as they engaged in a group research project. This study showed that although students first embraced collaborative writing and digital tools like ChatGPT, challenges in group dynamics and concerns about overreliance and ethical issues underlined the need for structured support. Teachers should address group management issues and possibly take a role in group formation and provide clear instructions on how to manage the group writing process (Yağız, 2009). Furthermore, the students expressed concerns about the use of AI tools. With experience in the lab, the students became better informed about the possibilities of the tools without engaging in unethical practices. This suggests that guidance and supervision can potentially mitigate some of the challenges that come with collaboration and integration of digital tools.

The findings revealed that the new LLMs can provide feedback and in a way act as a scaffold, which, however, require further scrutiny as it is not clear whether chatbot's automated feedback provision can work like intersubjective human scaffolding within Zone of Proximal Development because the study does not have evidence that the AI tool can adjust support in line with the needs of the learners. Yet, this is an area of inquiry for future research to better evaluate if LLMs can really act as a scaffolding tool in line with the sociocultural theory of learning.

The study was conducted in a specific setting with a small number of students. In addition, there was a possibility of Hawthorn effect as the students were aware that they were observed. Thus, further exploration in diverse settings in different research designs is needed. However, the findings of the study can contribute to the growing body of research

on collaborative writing and integrating digital tools in academic writing, particularly in settings similar to the context of this study. Further research could also examine possible long-term impact of the use of AI tools with respect to student autonomy in academic writing. As digital tools like LLMs are integrated more into academic writing, the ethical integration of these tools will be essential to maximize learning while addressing challenges in digitized collaborative learning environments.

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