

Investigating the Effects of Individual and Collaborative Digital Multimodal Composing on EFL Learners' Willingness to Communicate: A Mixed-Methods Study

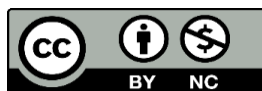
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Article Info	Abstract
Article type: Research Article Article history: Received May 16, 2026 Received in revised form June 12, 2026 Accepted June 13, 2025 Published online June 13, 2026 Keywords: Digital Multimodal Composing, EFL Learners, L2 Writing, Mixed-method Design, Willingness to Communicate.	Digital multimodal composing (DMC) is a meaning-making practice that combines textual, visual, and auditory modes through digital technologies. Despite growing interest in DMC, little research has examined collaborative DMC or compared its effects with individual DMC. The role of DMC in fostering learners' willingness to communicate (WTC) in L2 writing, which is a significant predictor of their language performance, remains underexplored. This study presents the findings of a mixed-methods investigation examining the impact of individual and collaborative DMC on English as a foreign language (EFL) learners' WTC. This study employed a quasi-experimental pre-test-post-test design within a mixed-methods framework. The effect of the DMC intervention on EFL learners' L2 WTC was assessed quantitatively, followed by qualitative analysis of interview data to provide deeper insight into learners' attitudes toward the intervention. Three intact classes of 96 EFL learners were chosen and randomly assigned to two experimental groups and a control group. In experimental groups 1 and 2, students were subjected to individual and collaborative DMC, while students in the control group were exposed to traditional monomodal writing. DIALANG placement test, pre-test and post-test writing tasks, and semi-structured interviews were used to collect data. Quantitative data were analyzed by using word counts from pre- and post-test writing tasks as an indirect measure of L2 WTC, and qualitative data were analyzed through thematic analysis. According to quantitative findings, individual and collaborative DMC practices increased students' WTC. Collaborative DMC was also more effective than individual DMC in improving WTC. The findings contribute to L2 pedagogy by demonstrating the potential of DMC, particularly collaborative DMC, to foster learners' WTC.

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Introduction

Researchers and practitioners have noticed the dramatic shift away from paper-based monomodal communication towards screen-based multimodal communication in cyberspaces, highlighting the dichotomy between the multimodal experiences students have outside of school and the verbocentric methods prevalent in most academic contexts. The modern communication environment is expanding beyond linguistic aspects to encompass a wide range of nonverbal modalities alongside the written form (Yi et al., 2020). Literacy, then, is no more only the capacity to read and write (Jones & Hafner, 2012). Learners who cannot read and write multimodally will be disadvantaged in the current world, where traditional monomodal literacy has failed (Lankshear & Knobel, 2003; Zhang & Yu, 2023). This emphasizes the gap between monomodal classroom procedures and students' actual multimodal experiences.

To better equip students to face the challenges of today's world (van Leeuwen, 2017; Weninger, 2019), scholars and practitioners, especially in the field of second language learning, began to incorporate DMC, as a new literacy practice, into language learning curricula and design pedagogies that would welcome this construct (e.g., Gee, 2004; Hafner & Ho, 2020; Li, 2020; Lim & Polio, 2020; Miller & McVee, 2012). Digital Multimodal Composing (DMC) describes a new literacy practice that combines different semiotic modes, including, but not limited to, images, soundtracks, and video clips, into a single piece of writing (Hafner & Miller, 2019; Jiang, 2017; Yi, 2021). Video production, audio podcasting, PowerPoint creation, digital storytelling, infographic making, and bilingual e-book creation are all examples of DMC (Jiang, 2023; Li & Pham, 2022). Previous research suggests that students' participation in the authentic communicative environment fostered by DMC may aid in developing their multiliteracies and semiotic awareness (Belcher, 2017), improving learning motivation (Jiang & Luk, 2016), promoting learner autonomy (Hafner & Miller, 2011), enhancing students' voice (Hafner, 2015), and constructing positive identities that are inaccessible in traditional classrooms (Wilson et al., 2012). There is also evidence that DMC practices benefit the L2 learners' collaborative writing skills (Bloch, 2007; Oskoz & Elola, 2016; Vandommele et al., 2017; Yang & Wu, 2012).

Collaborative Writing (CW), initially described as 'singular texts/plural authors' (Ede & Lunsford, 1990), entails a process whereby students collaborate, make decisions, and negotiate meaning to produce a single text for which they share co-authorship and accountability (Storch, 2013). CW research has expanded to include a wider range of L2 learning contexts, including tasks, modes, and environments. While monomodal writing is currently more common in CW literature (Li & Zhang, 2021), the combination of multimodal and collaborative writing has led to the development of collaborative DMC. As a pedagogical activity, collaborative DMC involves two or more learners using digital tools and a variety of semiotic resources to jointly generate a single multimodal product (Li & Zhang, 2021). Collaborative DMC, as argued by Li and Zhang (2021), can help L2 students develop digital literacy and collaborative skills, and prepare them to take an active role in real-world digital tasks. The limited corpus of existing

research on collaborative DMC examines students' interactions during DMC, collaborative products, and perceptions during DMC (Hafner, 2015; Kim & Kang, 2020).

Although previous research has documented various pedagogical benefits of DMC, the potential relationship between these benefits and learners' willingness to communicate (WTC) has not been sufficiently theorized. From the perspective of WTC theory, several characteristics of DMC may create conditions conducive to increased communicative readiness. For example, DMC often involves authentic audiences and meaningful communicative purposes, which may enhance learners' motivation to express themselves in the target language. The creative and multimodal nature of DMC may also provide learners with alternative avenues for meaning-making, potentially increasing their confidence and reducing the pressure associated with exclusively text-based communication. In addition, DMC has been linked to increased learner autonomy and stronger authorial voice, factors that may foster learners' sense of agency in L2 use. Furthermore, collaborative DMC creates opportunities for peer interaction, shared decision-making, and mutual support, all of which may reduce communication anxiety and facilitate learners' willingness to engage in communicative activities. Therefore, although empirical evidence remains limited, there are theoretical reasons to expect that both individual and collaborative DMC may positively influence L2 WTC, albeit potentially through different mechanisms.

Despite learners' linguistic competence, many language teachers observe that students remain reluctant to use the target language for communication. This discrepancy between language ability and actual language use has directed researchers' attention toward WTC, a construct that seeks to explain why some learners actively engage in communication whereas others avoid it. WTC determines whether a learner seeks out or avoids communication in the L2. L2 WTC often refers to 'a readiness to initiate conversation in an L2 at a specific time with a particular person or persons (MacIntyre et al., 1998). According to MacIntyre et al. (1998), L2 WTC is the most immediate predictor of L2 use, and thus, helping learners develop WTC should be the ultimate objective of L2 education. Qualitative studies also uncovered several additional potential influences on L2 WTC, such as interlocutors, topics, and tasks (Cao, 2011; Cao & Philp, 2006; Peng, 2014), teaching styles, and the teacher's support and immediacy behavior (Peng, 2014). Multimodality is potentially another factor that could impact L2 WTC. Previous research has explored L2 WTC in relation to multimodal affordances and transmediation in digital storytelling (Peng, 2019a; Shen et al., 2022). It is still debatable, nevertheless, whether collaborative and non-collaborative DMCs differ in their impact on L2 WTC. Furthermore, L2 WTC is not limited to speaking and extends to other skill areas of listening, reading, and writing (MacIntyre et al., 2001).

Collaborative DMC, however, remains relatively unexplored, and comparative studies between individual and collaborative DMC are scarce. In addition, research on L2 WTC in writing has remained peripheral, and the nature of WTC in written communication is still substantially unexplored. Although theoretical arguments suggest that individual and collaborative DMC may influence learners' WTC through distinct pathways, empirical

evidence comparing these instructional approaches remains absent. Consequently, it remains unclear whether the collaborative affordances of DMC provide additional benefits for learners' L2 WTC beyond those associated with individual multimodal composing. This study aims to investigate the effects of individual and collaborative DMC strategies on EFL learners' L2 WTC, to fill gaps in the DMC literature and to address the call for more research in this domain. The following questions guided this study:

- Does individual DMC have a significant effect on L2 learners' WTC?
- Does collaborative DMC have a significant effect on L2 learners' WTC?
- Is there any significant difference between the effects on individual and collaborative DMC on L2 learners' WTC?
- What are learners' attitudes and perceptions toward DMC in individual and collaborative groups about L2 learners' WTC?

Literature review

DMC and Theoretical Frameworks

DMC is relevant to various fields of study (including linguistics, applied linguistics, education, and communication); it has been shaped by a wide range of theories, including theories of translingual practices (Canagarajah, 2012), sociocultural theory (Vygotsky, 1978), and systematic functional grammar (Halliday, 1985). Although DMC is associated with various theoretical perspectives, multiliteracies and multimodality are widely regarded as its primary theoretical frameworks because they directly explain the use of multiple modes and literacies in digital meaning-making practices.

The New London Group (1996) drew attention to multiliteracies, emphasizing the multiplicity of communication modes as cultural and linguistic diversity in the contemporary era. The term 'multiliteracies' emerged in response to changing social situations, and the dynamic nature of literacy serves as its foundation (Grapin & Llosa, 2020; Provenzo, 2011). The multiliteracies approach promotes the development of new literacy pedagogies that consider the increasing complexity and interrelation of multiple modes of meaning, such as textual, visual, aural, spatial, gestural, and behavioral modes (Miller, 2010). Multimodalities posits that various modes contribute to the meaning-making process in order to build communication ensembles (Kress, 2010). The term 'modes' describes structured collections of semiotic resources used to construct meaning, such as writing, music, image, speech, gesture, and body posture (Jewitt, 2008). Furthermore, the multimodality framework highlights the dynamic interactions between different communicative modes during meaning-making processes when communication takes place (Smith et al., 2017). DMC, therefore, is an expansion of multiliteracies and multimodalities that encourages using numerous modes of communication to express meaning, compelled by the multimodality of contemporary human communications (The New London Group, 1996).

DMC in the L2 Context

Numerous studies have been conducted on the pedagogical application of multimodal composition in L2 learning and teaching (e.g., Yi et al., 2020). Previous studies on DMC in L2 contexts have covered a variety of topics, including DMC processes, students' perceptions of DMC, and the effects of DMC on language and identity development (Li & Akoto, 2021). Recent scholarship has continued to document the pedagogical potential of DMC in L2 education while simultaneously highlighting the complexity of its implementation. For example, Kang and Kim (2023) demonstrated that learners' perceptions of DMC evolved, with students generally viewing DMC as beneficial for English learning despite fluctuations in their engagement across different tasks. Similarly, Pham and Li (2023) reported that EFL students held predominantly positive perceptions toward both individual and collaborative infographic-based DMC tasks, particularly regarding opportunities for creativity, multimodal meaning-making, and audience awareness. Collectively, these findings suggest that DMC may provide learners with meaningful and motivating opportunities to communicate beyond traditional monomodal writing practices. However, learners' experiences with DMC are not uniformly positive and appear to be shaped by task characteristics, technological demands, and individual learner differences. (Kang & Kim, 2023; Pham & Li, 2023)

Shin et al. (2020) explored L2 learners' orchestration of language and images into multimodal writings utilizing multimedia technologies and metalanguage development to create a nonlinear multimodal composition. Recently, Kim et al. (2022) took a closer look at implementing DMC tasks in a Korean high school English classroom. Using an integrated perspective grounded in task-based language teaching (TBLT) and multimodal literacies, the effects of guided and unguided pretask planning on peer engagement during pretask planning and on DMC task performance were explored. The results suggested that the DMC task would yield better results. In addition, some evidence suggested a tenuous link between the quality of DMC task outputs and English writing ability.

Regarding students' perceptions, previous studies have focused on perceived affordances, barriers, and mediating factors in DMC (Li & Akoto, 2021). Kim and Belcher (2020) required students to produce both DMC and standard writing on the same topic of their choice as part of their mandatory writing lesson. Findings revealed that students generally held positive attitudes towards DMC, particularly its usefulness for meaning-making, yet had mixed perceptions of its effectiveness in improving writing skills. Jiang et al. (2020) primarily used perceptual data and a case-study methodology to investigate the empowering impact of DMC on an ethnic minority student's positive identity construction and investment in EFL learning.

Previous research also examined the impact of DMC on language gains, metalanguage development, and identity development (Li & Akoto, 2021). Jiang et al. (2020) conducted a qualitative longitudinal case study of an EFL undergraduate student from a Chinese minority ethnic group. DMC was found to have encouraged this student to participate in EFL learning, bridging the linguistic and digital gaps and establishing a positive ethnic identity concurrently developing the identity of a multimodal composer and multilingual speaker. Kim and Belcher

(2020) conducted a small-scale empirical study with Korean EFL college students comparing digital multimodal composition to traditional writing. They reached both types of writing in terms of syntactic complexity and accuracy, and found that traditional writing was more syntactically complex than DMC. However, no substantial variation in accuracy was discovered. Cho and Kim (2021) contrasted the characteristics of DMC and traditional writing as they pertained to a summary and response assignment completed by Korean EFL high school students. Using analytical rubrics and coding for content and linguistic features, they found no statistically significant differences between DMC and monomodal writing.

Recent investigations have also expanded the scope of DMC research beyond writing performance to include broader learner-related outcomes. Abdelhalim (2025), for example, found that DMC positively contributed to EFL learners' writing self-regulation and self-efficacy. Similarly, Zhang and Yu (2025) argued that DMC competence encompasses not only linguistic knowledge but also learners' ability to coordinate multimodal resources to achieve communicative purposes strategically. These developments indicate a shift in DMC scholarship toward understanding DMC as a multidimensional construct involving cognitive, affective, and sociocultural dimensions of language learning. (Abdelhalim, 2025; Zhang & Yu, 2025). In the Iranian context, Hajizadeh et al. (2023) employed a qualitative approach to investigate how young twins create DMCs. Using various sources, including individual interviews, diaries, and observations, their study found that creating short instructional videos can enhance multiliteracy and help learners acquire English.

Collaborative DMC

Students can negotiate meaning across many modes and semiotic resources in multimodal writing when they collaborate to produce multimodal texts (Cheung, 2022). As writing is, by nature, a social activity, technology provides a catalyst for collaborative, digital, multimodal composition. Creating multimodal texts enables students to practice the digital literacy skills necessary for success in the contemporary world and to reap the language-related advantages of collaborative writing (Storch, 2021). Recent research on computer-mediated collaborative writing has highlighted the significance of multimodal writing tasks. Collaborative digital multimodal writing may foster the growth of learners' collaborative and digital literacy skills, both of which are important for completing authentic tasks learners might encounter in the digital environment (Li & Zhang, 2021).

According to Li and Zhang (2021), most research on collaborative writing focuses on monomodal writing. Despite the growing popularity of digital multimodal writing in L2 classrooms, research on collaborative DMC is still in its infancy. More recent scholarship has reinforced the importance of collaborative dimensions of DMC while simultaneously emphasizing the need for further empirical inquiry. Jiang and Hafner (2024), in outlining a research agenda for DMC in L2 classrooms, identified collaborative DMC as one of the most promising yet underexplored areas of inquiry. Specifically, they argued that collaborative DMC may function as a space for meaning negotiation, translanguaging, and shared knowledge

construction. Nevertheless, empirical evidence concerning the affective consequences of collaborative DMC remains limited. In particular, little is known about whether collaborative DMC exerts differential effects on learners' WTC compared with individual DMC practices. (Jiang & Hafner, 2024). Few studies addressed the application of collaborative DMC in multilingual classrooms, focusing either on the writing process or writing products.

Li and Pham (2022) studied EFL college students in an ESP course in Vietnam. They utilized Visme to complete two infographic tasks: one in groups and one individually. Researchers found no evidence of a statistically significant difference in the accuracy of students' DMC products produced together versus individually. Additionally, there was no statistically significant difference in the quality of infographics created under either condition. Cheung (2022) investigated interactions among three pairs of EFL students in an English for Academic Purposes (EAP) course at a university in Hong Kong as they worked together to complete a multimodal writing task. The dynamics of peer interactions were investigated through their interaction patterns, utilizing semiotic and multimodal resources, and languaging functions. The more cooperative partners employed a variety of prompting and feedback strategies to support their discussion, as revealed by the data. The pairings also revealed significant tendencies to focus on the texts rather than the multimodal components during the writing process.

In both its individual and collaborative forms, DMC might be studied in relation to several affective factors in language learning, one of which is L2 WTC.

Willingness to Communicate in L2

Since its introduction into the L2 context, the notion of WTC has piqued the interest of scholars and practitioners alike, from both theoretical and pedagogical perspectives. Contrary to L1 WTC, which is considered to be a personality trait, L2 WTC is conceptualized and empirically demonstrated to have both trait, state, and dynamic characteristics (MacIntyre et al., 1998; MacIntyre & Legatto, 2011; Wood, 2016; Yashima et al., 2018).

Prior studies have shown that context significantly impacts L2 WTC. Studies have primarily focused on educational contexts such as L2 classrooms (e.g., Wen & Clément, 2003; Hsu et al., 2007), while more recent studies have paid close attention to digital or extramural contexts (Lee & Hsieh, 2019; Reinders & Wattana, 2014). Some studies have asserted that online chatting can boost L2 WTC, as online contexts are less stressful and more motivating for students to speak the L2 than in traditional face-to-face settings (Freiermuth & Jarrell, 2006; Kissau et al., 2010). Besides, in a game-based learning project conducted by Reinder and Wattana (2014), L2 students demonstrated higher levels of L2 WTC, as digital affordances provided a comfortable setting in which they were more confident to start a conversation. Lee (2019) also interviewed 98 EFL students to investigate possible influences on EFL learners' WTC in the extramural digital environment. Findings revealed that informal technology use in extramural settings might promote L2 WTC. These digital situations are less anxiety-inducing than face-to-face ones, offering social support and additional psychological advantages. Recent

developments in L2 WTC research have also drawn attention to the importance of context-specific conceptualizations of WTC. For instance, Zhang and Zhang (2024) argued that writing-related WTC constitutes a distinct dimension of communicative readiness and developed a validated scale to capture learners' willingness to engage in L2 writing activities. Such findings underscore the multifaceted nature of WTC and suggest that communicative willingness may manifest differently across instructional contexts and modalities. Consequently, examining WTC within DMC environments may provide valuable insights into how technologically mediated composing experiences shape learners' readiness to communicate in the target language. (Zhang & Zhang, 2024).

Previous studies have investigated the association between L2 WTC and multimodal affordances from a multimodality standpoint. For example, Peng et al. (2017) examined how L2 WTC relates to multimodal affordances, including the teacher's speech, gestures, and gaze. Intermodal relations in this study were found to affect momentary changes in classroom WTC, underscoring the need for language instructors to identify and orchestrate multimodal semiotic resources to enhance students' WTC and classroom engagement. Peng (2019a) also surveyed 2058 university students' perceptions of multimodal pedagogic effects. It was reported that teachers' effective use of gestures, spatial positioning, and audio/video were significant predictors of students' WTC. However, the perceived effects of PowerPoint slide visual design were not found to be substantially predictive of WTC. In a separate study, Peng (2019b) examined how L2 learners' WTC is responsive to the multimodal affordances available in the classroom. According to the findings, individuals' linguistic and emotional characteristics, as well as classroom conceptual factors, all impacted WTC. There were also subtle correlations between WTC and kinesthetic, auditory, and visual modalities. In the DMC literature, more recently, Shen et al. (2022) investigated the potential of digital storytelling, a DMC practice, to foster EFL students' transmediation-based WTC. Findings demonstrated that L2 WTC increased significantly when writing postscripts rather than prescripts. Three transmediation-generated interpretants were identified to be connected to students' elevated L2 WTC: expanded retrospective narratives, deepened perception, and evoked sentiments. Taken together, previous research suggests that DMC has the potential to promote learner engagement, support identity construction, and facilitate various aspects of L2 development.

Nevertheless, several important gaps remain. First, although DMC research has proliferated in recent years, relatively little attention has been devoted to its relationship with learners' WTC, an important psychological construct associated with language learning success. Second, existing WTC studies have primarily examined face-to-face classrooms, online interaction, or gaming environments rather than DMC practices. Third, despite increasing interest in collaborative DMC, direct comparisons between collaborative and individual DMC remain scarce, particularly with respect to affective outcomes. Consequently, it remains unclear whether different forms of DMC differentially influence learners' readiness to communicate in the target language. Addressing these gaps, the present study investigates

the effects of individual and collaborative DMC on EFL learners' L2 WTC and explores learners' perceptions of DMC experiences.

Method

Design

This study adopted a quasi-experimental pretest-posttest design because the participants were recruited from intact classes and random assignment was not feasible in the educational setting. This design enabled the researchers to examine the effects of the intervention while maintaining the natural classroom context. Quasi-experimental designs lack randomization but employ other strategies to control for extraneous factors (Ary et al., 2014). In addition, a sequential explanatory mixed-methods approach was used to conduct this investigation because quantitative data alone could not provide a comprehensive understanding of learners' responses to DMC. The qualitative phase was therefore conducted to explain and elaborate on the quantitative findings. Mixed-methods research integrates quantitative and qualitative approaches within a single study. In explanatory sequential mixed-methods research, quantitative data are collected and analyzed first, followed by qualitative data collection and analysis to explain or elaborate on the quantitative results. Accordingly, the impact of the intervention, namely DMC, on EFL learners' L2 WTC was first examined quantitatively using a quasi-experimental pretest-posttest design. Subsequently, qualitative interview data were collected and analyzed to further elaborate on the quantitative findings and gain a deeper understanding of learners' attitudes towards the intervention.

Participants

The target population of the present study comprised adult EFL learners enrolled in private language institutes throughout Iran. The accessible population was drawn from learners attending the private language institute Razi Language Center in Kermanshah, Iran, during the data collection period. The study participants were 96 EFL learners selected through convenience sampling, which entails selecting a sample based on its accessibility, availability, time, or location (Ary et al., 2014) and involves employing convenient participants for the researcher. All participants in the study were male and female Persian native speakers aged 18 or older who were learning English as a foreign language at the A2 proficiency level and had no prior experience with DMC. They were drawn from three intact classes and came from educational backgrounds unrelated to English. During the quantitative phase of the study, one class, with 34 students, was randomly assigned to experimental group 1 (i.e., the individual DMC group).

In contrast, the other class, comprising 32 students, was assigned to experimental group 2 (i.e., the collaborative DMC group). Finally, the last class of 30 students was assigned to the control group (i.e., the traditional monomodal group). In the qualitative phase, after the DMC program, 14 male and female volunteers from both the individual and collaborative DMC

groups participated in semi-structured interviews (see Appendix A) to reflect on their experiences with DMC and to express their views and attitudes regarding its impact on their L2 WTC.

The sample size was deemed sufficient to identify possible differences among the three groups while maintaining adequate statistical power for the intended analyses. For the qualitative phase, interview data were analyzed by one of the researchers. To ensure reliability, a second expert independently reviewed the thematic analysis process, and any inconsistencies were resolved through discussion, thereby ensuring inter-rater reliability (Gass & Mackey, 2000).

In addition, following ethical guidelines, participants' informed consent was obtained prior to data collection after they were presented with sufficient information about the study. They were also assured that the confidentiality and anonymity of their data and identities would be maintained during the study.

Instrumentation

Instruments for collecting data included:

DIALANG Placement Test

This online assessment instrument was originally administered to participants to confirm that their English proficiency was comparable. Based on the Common European Framework of Reference (CEFR), DIALANG measures an individual's English proficiency through tests of reading, writing, listening, grammar, and vocabulary but excludes speaking for technical reasons, and offers them levels from A1 (beginners) to C2 (those who have mastered the language).

Pre-test and Post-test Writing Tasks

To evaluate participants' WTC in L2 writing, a pre-test was administered at the beginning of the DMC program, and a post-test was administered at its conclusion. They were both traditional monomodal writing tasks on subjects relevant to the participants' daily lives and consistent with the genre used throughout the research. Such considerations will mitigate the influence of writing topic and topic familiarity on writing performance (Yoon, 2017). The following topics were covered in the pre- and post-test writing tasks:

Pre-test: Describe your first day at the university.

Post-test: Describe your best friend and how you met for the first time.

Semi-Structured Interviews

After the DMC program, 14 male and female volunteers from the individual and collaborative DMC groups participated in a semi-structured interview (See Appendix A), to reflect on their experiences with DMC and articulate their ideas and attitudes regarding its influence on their L2 WTC. The interview protocol consisted of three main open-ended questions focusing on learners' preferences for traditional essay writing versus DMC video production, their experiences with individual versus collaborative DMC work, and the perceived impact of DMC

on their WTC in English. These questions were intentionally limited in number to encourage depth of reflection and allow participants sufficient time to elaborate on their experiences. Follow-up probing questions were also employed where necessary to further clarify and expand participants' responses.

Each interview lasted around 15 minutes and was conducted in the student's native language, Persian. Individual semi-structured interviews were recorded, transcribed, and translated into English for subsequent data analysis. To further evaluate the trustworthiness of the interview data using member-checking techniques (Creswell et al., 2003), the interview questions were clarified to the participants to verify the accuracy of their responses.

Data Collection Procedure

In this study, the pedagogical framework established and piloted by Liang and Lim (2021) was utilized to scaffold students' authoring of digital multimodal texts in experimental groups 1 and 2. This framework, informed by Systemic Functional Theory and Design Thinking, consists of three fundamental domains: (a) critical domain (metalanguage), (b) creative domain (design thinking) (c) technical domain (digital tools). This framework drove the creation of a lesson package that was implemented with these two experimental groups:

1) Lesson One (Critical domain): The instructor presented metalanguage to the students, including form, engagement, message, and integration. Thus, the students were exposed to several video production genres, the importance of location and subject, the effect of distance, address, and angle.

2) Lesson Two (Creative domain): The instructor described the many stages of the design thinking process and offered an example of storyboards. Then, students identified their videos' intended audience and outlined the aim of their videos. Brainstorming ideas, storyboarding, and providing peer feedback followed.

3) Lesson Three (Technical domain): Students received assistance with their technical knowledge and abilities, including editing and recording.

4) Lesson Four (Evaluation): The teacher offered students feedback on the merits and faults of their work and suggestions for improvement.

The researcher/teacher delivered the explanations for Lessons One, Two, and Three in face-to-face meetings and brief videos (Appendix B), which students could see as often as required. To better demonstrate the practical application of DMC before the program's initiation, the researcher/teacher created a sample DMC video (Appendix C). Inshot, a well-known and user-friendly smartphone application, created the study's videos. DMC videos comprised images, audio, text, and/or voiceover. It should be noted that the researcher also served as the instructor during the intervention, which may have introduced potential expectancy effects and researcher bias. To mitigate this issue, instructional procedures were fully standardized through structured lesson plans and uniform materials across groups. In addition, all participants received identical instructional content, and no information about the study's expected outcomes was provided.

Participants were given a placement test, DIALANG, to ensure they were all at the same English language proficiency level. DIALANG (<https://dialangweb.lancaster.ac.uk>) is an online diagnostic system that tests reading, writing, listening, grammar, and vocabulary in the target language to determine a person's proficiency in several languages, including English. It adheres to Europe's CEFR as a basis for measuring language proficiency, providing test-takers with proficiency levels ranging from A1 to C2. At the time of data collection, the system was fully accessible and operational, although it has since become unavailable. A one-way ANOVA was utilized to compare the English proficiency levels of the three groups. The results indicated no statistically significant differences among the groups, confirming their initial homogeneity in language proficiency. The participants in experimental group 1 (n=34) were exposed to individual DMC, in which students created their videos alone. In contrast, participants in experimental group 2 (n=32) engaged in collaborative DMC, in which they were divided into pairs or trios and collaborated on video productions. Students in experimental groups 1 and 2 completed a 12-week EFL course that included instruction in personal narrative paragraph writing. Inspired by digital storytelling, the personal narrative genre was selected for this study since it demands the narration of a story, which looks easier and more engaging to transmit through DMC. Each participant in experimental group 1 and each group in experimental group 2 produced a total of three DMC videos, with each video taking three weeks to produce. The videos varied from one to four minutes in duration and were created on the following three topics:

1. Write about the best gift you have ever received.
2. Write about a tragic moment in your life.
3. Write about the things you do in your alone time.

After submission, the researcher/teacher provided feedback on the video projects' language, content, and technical elements (i.e., editing and the different modes used), among others.

Except for DMC, all experimental group procedures were repeated for the control group (n=30). More specifically, the control group participants practiced traditional monomodal writing and were not exposed to DMC. They were assigned the same three topics to write on using simple text. All three groups received identical instructions and materials throughout the course. As with the experimental groups, each participant in the control group was expected to submit three essays, with three weeks to finish each. As with the experimental groups, the researcher/teacher provided feedback on the essays' language and content. It should be noted that the collaborative DMC condition included peer interaction (discussion, negotiation, and co-construction), whereas the individual and control conditions did not.

At the beginning of the course, before the DMC intervention, all students took a writing pre-test to assess L2 WTC. To measure participants' WTC at the end of the program, a writing post-test was also administered, distinct from the pre-test but comparable in nature and genre. In addition, at the end of the course, individual interviews were conducted with 14 volunteers from the experimental groups to determine their perspectives on DMC.

Data analysis

Quantitative Analysis

In order to address the first, second, and third research questions—that is, to investigate the effects of individual DMC and collaborative DMC on L2 WTC. Also, any significant difference between the effects of individual and collaborative DMC on L2 WTC, following Choe (2017), who took the number of words produced by the participants in different periods as an indirect measure of L2 WTC and Xen et al. (2022), who utilized the prescripts' and postscripts' word counts as the indicator of their L2 WTC, the number of words produced by the students in the pre-test and post-test writing tasks were counted as an indirect measure of writing WTC. Previous L2 WTC research also used comparable indirect measures, such as counting turns, classifying them into coding schemes, and computing the WTC ratio (Cao & Philp, 2006; Khazaei et al., 2012; Yashima et al., 2018). This approach was based on the idea that WTC in writing may be indirectly measured by considering the number of words a person is willing to write in a given timeframe (Choe, 2017). The normality of the WTC pre-test and post-test scores was assessed prior to the main analysis. Because the distributions violated the normality assumption required for parametric procedures, WTC gain scores were calculated for each participant by subtracting the pre-test word counts from the post-test word counts (Pallant, 2010). Subsequently, a Kruskal–Wallis H test was conducted to determine whether there were statistically significant differences in WTC gain scores among the collaborative DMC, individual DMC, and control groups. When the Kruskal–Wallis test yielded a significant result, post hoc pairwise comparisons using Dunn's procedure with Bonferroni adjustment were performed to identify which groups differed significantly from one another.

Qualitative Analysis

The interview data were examined using thematic analysis (Boyatzis, 1998). The interviews were initially recorded and transcribed. Then, key themes regarding EFL students' attitudes and perceptions toward DMC were extracted from the interview transcripts using open thematic coding. The data sets from both groups were compared and disaggregated to identify similarities and differences in participants' experiences and ideologies within individual and collaborative DMC groups. A second expert researcher reviewed the thematic analysis procedures, and any discrepancies were discussed to ensure inter-rater consistency (Gass & Mackey, 2000).

Findings

Quantitative Findings

To address the first three research questions, learners' L2 WTC scores were analyzed. Initially, descriptive statistics were computed for the pre-test and post-test WTC scores. The skewness and kurtosis values indicated deviations from normality. Therefore, WTC gain scores were calculated by subtracting pre-test scores from post-test scores, and nonparametric analyses were

employed. Table 1 presents the descriptive statistics for the pre-test and post-test L2 WTC scores.

Table 1
Descriptive Statistics for the Pre-test and Post-test L2 WTC Scores

Variable	N	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Pre-test WTC	96	24.00	121.00	78.14	19.47	2.59	-3.17
Post-test WTC	96	65.00	221.00	111.39	31.00	2.29	2.28

The gain scores were subsequently calculated for each participant. Table 2 displays the descriptive statistics for the gain scores of the three groups.

Table 2
Descriptive Statistics for the L2 WTC Gain Scores of the Three Groups

Group	N	Minimum	Maximum	Mean	SD	Median
Collaborative DMC	32	15.00	154.00	63.94	33.66	54.50
Individual DMC	34	0.00	66.00	29.32	15.29	27.50
Control Group	30	1.00	17.00	5.00	3.30	4.00

As shown in Table 2, the collaborative DMC group obtained the highest mean gain score, followed by the individual DMC group, whereas the control group exhibited the lowest gain score. To determine whether these differences were statistically significant, a Kruskal–Wallis test was conducted.

Table 3
Results of the Kruskal–Wallis Test for L2 WTC Gain Scores

Variable	H	df	p
Gain WTC	67.21	2	< .001

The Kruskal–Wallis test revealed a statistically significant difference among the three groups in L2 WTC gain scores, $H(2) = 67.21$, $p < .001$. This finding suggests that at least one group differed significantly from the others in terms of improvement in L2 WTC.

To identify the specific group differences, post hoc pairwise comparisons were conducted using Mann–Whitney U tests with Bonferroni adjustment.

Table 4*Post Hoc Pairwise Comparisons for L2 WTC Gain Scores*

Comparison	U	Z	p	Result
Collaborative DMC vs. Individual DMC	250.50	-4.33	< .001	Significant
Collaborative DMC vs. Control Group	4.50	-6.91	< .001	Significant
Individual DMC vs. Control Group	131.00	-5.56	< .001	Significant

The post hoc analyses indicated that the collaborative DMC group achieved significantly greater gains in L2 WTC than both the individual DMC group and the control group. Furthermore, the individual DMC group demonstrated significantly greater gains than the control group. Therefore, both collaborative and individual DMC interventions positively influenced learners' L2 WTC. However, collaborative DMC proved significantly more effective than individual DMC in enhancing L2 WTC.

Regarding the research questions, the findings suggest that individual DMC significantly improved learners' L2 WTC (Research Question 1), collaborative DMC also significantly enhanced learners' L2 WTC (Research Question 2), and collaborative DMC had a significantly stronger effect on L2 WTC than individual DMC (Research Question 3).

Qualitative Results

Qualitative data collection and analysis were conducted to explore students' perceptions of DMC and to gain a thorough understanding of the quantitative results. The qualitative phase was not intended to compare learners' experiences across the individual and collaborative DMC conditions; therefore, the interview protocol did not include questions specifically designed to elicit such comparisons. Rather, the interviews focused on participants' perceptions of how engaging in DMC activities influenced their WTC in English. Semi-structured interviews were conducted with 14 volunteer participants from the individual and collaborative DMC groups. Learner 1 (L1), Learner 2 (L2), ..., and Learner 14 (L14) were used as participants' pseudonyms to protect their identities. The following themes emerged from a thematic analysis of the transcribed interviews regarding learners' attitudes toward DMC's impact on L2 WTC.

There was a statistically significant increase in individual and collaborative DMC groups in L2 WTC. This finding was confirmed by the interviewees from both groups who embraced DMC as a facilitator of their L2 WTC. The respondents provided additional plausible explanations for this increase.

Some students affirmed that, unlike traditional writing, DMC better captures the audience's attention. With more attentive audiences, students are more willing to communicate in the L2 (Improved audience attention). For instance, a student remarked:

Video production can attract and maintain the audience's attention way better than a piece of writing. This fueled my desire to make DMC videos and communicate with my audience. (L1)

Several students who were personally interested in content creation and video production reported that producing DMC videos appealed to them far more than traditional writing. They, therefore, seem to have experienced higher L2 WTC (Appealing to content-creating enthusiasts). One such student asserted:

I have long been producing online video material. I couldn't wait to use DMC videos to display my skills. Besides, compared to traditional writing, it was far more comfortable for me. I suppose people keen on content creation would be fascinated by DMC. (L14)

Others said that making DMC videos is more straightforward than writing a typical essay, since people spend much of their time on their phones daily. Therefore, they are more comfortable, willing, and accustomed to producing such videos than writing paper-based essays (Easier for individuals with frequent phone use). A participant reported:

I'm on my phone most of the time, so it's easier to make something on my phone than write on paper. (L6)

Intent on communicating in the L2, students highlighted DMC as a form of art that unleashes students' creativity, making the entire experience memorable (More creative). One student, in this regard, stated:

I found video production fascinating. It's far more memorable than writing on paper. It's a type of art, and it requires creativity.

Some individuals showed improved self-confidence due to DMC, which also boosted their WTC (Improved confidence). One of them explained:

When I was involved in DMC video production, I was more confident with my English proficiency. I felt confident enough to communicate with my audience in English. (L11)

Furthermore, members of the collaborative DMC group underlined teamwork, task division, and the opportunity to work with their friends, which made the experience pleasurable and led to improved WTC in their L2 (Teamwork and task division). In this respect, a participant revealed:

Teamwork is enjoyable, especially when you get to pick your teammates. I partnered with my friends to make the DMC videos, and we enjoyed doing so. (L4)

Another participant clarified:

Although producing DMC videos is quite time-consuming and requires more work, working in a team allows for task division, through which all the tasks will be divided between various members. As a result, you could focus on the task you fancy more. (L11)

Finally, several participants asserted that while involved in DMC video production, they felt less anxious and more relieved. Hence, were more eager to express themselves in their L2 through the videos (Lower anxiety). One such participant said:

In my opinion, producing DMC videos lowered my anxiety. As a result, I was more interested and willing to deliver my message to my audience in English. (L7)

Despite not being substantiated by statistical analysis, a few participants reported that DMC weakened their L2 WTC. For some students, DMC appeared time-consuming and

burdensome, leading to reluctance to complete the task (Time-consuming and cumbersome). For example, a student mentioned:

Producing a DMC video takes much time since you must prepare photographs, films, and music before combining them into one video. (L2)

Another student added:

Video production is troublesome; you must collect content, edit the video, and more. At times, I wanted to quit. (L5)

Another issue that seems to have lowered students' WTC is the difficulty DMC presents to individuals with poor editing abilities (Difficult for individuals with poor editing skills). A student stated:

I prefer writing traditional texts because I normally find video editing challenging and complicated, which irritates me. (L8)

Several students demonstrated favorable attitudes regarding L2 WTC associated with DMC and indicated they were more willing to communicate their messages using DMC. At the same time, a few students reported lower L2 WTC associated with DMC, suggesting a tendency to convey their messages through traditional monomodal writing rather than DMC. The identified themes are shown in Table 5.

Table 5

Students' Perceptions Towards WTC Associated with DMC

Facilitating WTC	Debilitating WTC
Improved audience attention capture	Time-consuming and cumbersome
Appealing to content-creating enthusiasts	Difficult for individuals with poor editing skills
Easier for individuals with frequent phone use	
More creative	
Improved confidence	
Teamwork and task division	
Lower anxiety	

Discussion

The present study examined the effects of DMC on EFL learners' L2 WTC, comparing individual and collaborative implementations with traditional monomodal writing, and explored learners' perceptions of the intervention.

The findings indicated that individual DMC significantly enhanced learners' L2 WTC compared to the control condition. This improvement appears to be driven by reduced language anxiety, increased self-confidence, and higher engagement during multimodal production. Anxiety reduction, in particular, has been widely recognized as a key factor facilitating communicative readiness in L2 contexts (Dewaele, 2019; Khajavy et al., 2018). In addition, the novelty and creative demands of DMC likely contributed to increased motivation and WTC, consistent with prior research highlighting the role of innovative, meaning-focused tasks in promoting WTC (Mystkowska-Wiertelak & Pawlak, 2017; Shen et al., 2022). Learners also reported greater enjoyment and stronger awareness of the audience, both of which further supported communicative engagement.

Collaborative DMC also had a strong positive effect on L2 WTC. Qualitative evidence suggests that this improvement was largely associated with increased peer interaction, task division, and reduced individual cognitive load. Working collaboratively enabled learners to negotiate meaning, share responsibility, and benefit from peers' strengths, creating a supportive environment for communication. These findings align with research emphasizing the role of peer familiarity and interactional comfort in facilitating WTC (Cao & Philp, 2006). However, it is important to note that the collaborative condition inherently provided richer interactional opportunities than the other conditions, suggesting that the observed effects may reflect both the task's multimodal nature and the influence of peer interaction.

When comparing the two experimental conditions, collaborative DMC produced greater gains in L2 WTC than individual DMC. This difference appears to stem from the social affordances of collaboration, which amplified the benefits of multimodal composition. Learners reported increased enjoyment, reduced anxiety, and higher engagement when working with familiar peers. Additionally, the distribution of technical responsibilities allowed less confident learners to focus more on language production, thereby facilitating communication. Nonetheless, this advantage should be interpreted cautiously, as it may not be attributable solely to DMC, but also to the added impact of structured peer interaction.

Overall, learners expressed highly positive attitudes toward DMC. They perceived it as a less anxiety-provoking and more enjoyable alternative to traditional writing, while also fostering creativity and engagement. The use of digital tools and mobile-based applications contributed to perceived ease of use, making the task more accessible than conventional essay writing. Furthermore, the presence of an audience-oriented output enhanced authenticity and motivation, supporting previous findings that multimodal writing increases engagement through meaningful audience awareness (Kim & Belcher, 2020). Despite these benefits, some participants reported challenges related to time demands and limited technical skills, which occasionally hindered participation.

Taken together, the findings suggest that DMC facilitates L2 WTC through a combination of affective, cognitive, and social mechanisms, including reduced anxiety, increased enjoyment, enhanced creativity, and stronger audience awareness. While both individual and collaborative

implementations were effective, the stronger impact of collaborative DMC likely reflects the combined influence of multimodal production and increased peer interaction.

Conclusion

The present study set out to investigate the effects of individual and collaborative DMC on EFL learners' L2 WTC and to explore learners' perceptions of DMC experiences. By integrating quantitative and qualitative approaches, this study sought to provide a more comprehensive understanding of DMC's role in fostering learners' readiness to communicate in the target language.

The findings revealed that both individual and collaborative DMC were associated with significant increases in learners' L2 WTC. Moreover, collaborative DMC resulted in significantly greater gains in L2 WTC than individual DMC. The qualitative findings complemented these results by illustrating how learners perceived DMC as an engaging and meaningful literacy practice. Participants highlighted several factors that they believed facilitated their WTC, including improved audience engagement, enhanced confidence, increased creativity, reduced anxiety, the appeal of DMC for learners interested in content creation, the accessibility of mobile technologies, and, in collaborative contexts, the benefits of teamwork and task division.

These findings contribute to the growing body of research on DMC in L2 education by extending previous work beyond linguistic outcomes to encompass an important psychological dimension of language learning—L2 learners' WTC. In particular, the finding that collaborative DMC was more strongly associated with gains in L2 WTC suggests that the social and interactive dimensions of multimodal composing may provide additional opportunities for learners to negotiate meaning, support one another, and engage more actively in communicative practices. As such, the study advances current understandings of how multimodal pedagogies can be employed to promote not only language production but also learners' readiness to use the target language.

The findings also have important pedagogical implications. They suggest that DMC can be incorporated into L2 writing classrooms as a valuable complement to traditional monomodal writing activities. Language teachers are encouraged to provide learners with opportunities to communicate through multiple modes of meaning-making, including linguistic, visual, and auditory resources. Given the stronger outcomes associated with collaborative DMC, teachers may prioritize collaborative multimodal projects when aiming to enhance learners' WTC. Furthermore, because some learners reported difficulties related to video production and editing, explicit instruction and technical support should accompany DMC implementation. Educational institutions and curriculum developers may therefore wish to recognize digital multimodal literacy as an increasingly important component of contemporary language education and provide the necessary resources and training to support its integration.

Several limitations should be acknowledged when interpreting the findings. First, the study relied primarily on the quantity of written production as an indirect measure of L2 WTC, supplemented by interview data. Since L2 WTC is a complex psychological construct, future studies should consider incorporating additional direct measures, such as validated self-report scales, to strengthen its assessment. Second, the interviews were conducted only after the intervention, limiting insights into how learners' perceptions may have evolved over time.

Third, although participants from both DMC conditions took part in the interviews, the qualitative component was designed to explore learners' perceptions of DMC generally rather than to compare experiences across the two conditions.

Building on these limitations, future research should adopt longitudinal and mixed-methods designs that capture learners' experiences at multiple stages of DMC interventions. Researchers may also investigate the effects of individual and collaborative DMC on other aspects of language learning, including writing development, motivation, learner autonomy, language anxiety, and identity construction. In addition, future studies could explore teachers' perceptions of DMC and examine institutional factors that facilitate or hinder its implementation across diverse educational contexts.

In conclusion, the present study's findings suggest that DMC is a promising pedagogical approach for promoting EFL learners' WTC. As language learning increasingly occurs within digitally mediated environments, incorporating multimodal forms of communication into classroom practice may help prepare learners to participate more confidently and effectively in the communicative demands of the twenty-first century.

Bio-data

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Appendix

Appendix A: Interview Questions

1. Do you prefer writing traditional essays or making DMC videos? Why? How different are they?
2. Do you prefer working on your own or collaborating with others when making DMC videos? Why?
3. Did DMC help you become more willing to use English to communicate with other people? Please elaborate on your answer.

Appendix B: Videos providing further explanation in Lessons One, Two, and Three

Lesson One:

https://drive.google.com/file/d/1DlyByt38e7OkhupaYRHjzIXKccX_ol5Y/view?usp=sharing

Lesson Two:

https://drive.google.com/file/d/1V295r6x_5E8aC0eSNmE0yKarQqnytBck/view?usp=sharing

Lesson Three:

<https://drive.google.com/file/d/1yt3MKoESA1PLJwsKGsJfaZaKa5wBKz7u/view?usp=sharing>

Appendix C: A sample DMC video

<https://drive.google.com/file/d/18lZfbx3fFH95k5vBAj79Z6LkI5PfGfGo/view?usp=sharing>