The Impact of Collaborative Writing on EFL Secondary Students' Individual Writing Performance, Writing Anxiety, and Writing Metacognition

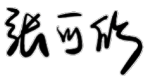
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MSc in Education (Research Design and Methodology), 2023

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Abstract

Recent educational trends emphasize the importance of social interactions in learning communities, a concept rooted in Vygotsky's sociocultural paradigm, which suggests that collaborative activities enhance learning outcomes. Building on this foundation, this study aims to investigate the long-term pedagogical implications of integrating collaborative writing practices in large EFL (English as a Foreign Language) classrooms in Chinese secondary schools. Specifically, it examines the effect of collaborative writing on individual writing performance, writing metacognition, and writing anxiety. Employing a quasi-experimental design, two rounds of collaborative writing activities were conducted over five weeks with an experimental group consisting of 117 students. A control group of 121 students engaged in regular instruction and individual writing activities with the same writing prompts. A mixed-methods approach was employed for data collection, including pre- and post-writing tests to assess individual writing performance, self-report questionnaires measuring writing anxiety and metacognition, and reflective journals completed by participants in the experimental group after each collaborative writing task. The results indicated that both groups experienced significant improvements in writing performance, with no statistically significant differences between them. Multiple group comparisons further revealed no significant differences between control and experimental groups on the change of writing anxiety and metacognition. Content analysis of reflective journals revealed that students mainly reported benefits from collaborative writing rather than negative experiences. This study provides pedagogical insights into the practical implementation of collaborative writing in large EFL classrooms.

Key Words: Collaborative Writing; L2 Writing Performance; Writing Metacognition; Writing Anxiety

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1 Introduction

1.1 Background of the study

Writing proficiency is a vital aspect in assessing students' English language skills within the Chinese educational assessment system, spanning from primary school to university levels. However, the teaching and learning of Second Language (L2) writing often present challenges for both teachers and students.

From teachers' perspectives, teachers experience overwhelming negative emotions as they attempt to give feedback on piles of compositions (Yu et al., 2021). In Chinese secondary high schools, teachers typically manage more than two large classes, each with approximately fifty students. This scenario demands considerable effort from teachers to manage evaluation and provide feedback on a hundred pieces of writing within just two or three days, resulting in immense pressure and fostering a perception of being mere "marking machine" (Lee, 2010, p. 148). Additionally, Lee (2004) found that under such demanding conditions, nearly half of the feedback provided by teachers in Hong Kong secondary schools was deemed inaccurate (e.g., errors accurately located but inaccurately corrected) or unnecessary (e.g., stylistic difference/original meaning changes marking).

From students' perspectives, while EFL (English as Foreign Language) students generally hold a positive attitude towards considering teacher feedback as trustworthy and authoritative (Cheng & Liu, 2022; Lee, 2019), they also expressed concerns about the insufficiency of this feedback. This concern relates not only to its limited quantity (Zhan, 2016), but also to its overly broad nature, which often fails to provide specific guidance (Zacharias, 2007). Furthermore, due to the single-track nature of teacher feedback, students may struggle to comprehend illegible comments or error codes, and some may even disregard the feedback altogether, diminishing the potential for improvement (Lee, 2003, 2008; Zhao, 2010).

One pedagogical strategy to address the aforementioned concerns is collaborative writing, where two or more writers work together throughout the writing process, sharing responsibility and decision-making power for producing a single text (Storch, 2013). In line with Vygotsky's (1978) sociocultural paradigm which posits that learning is a socially mediated process, collaborative writing provides a platform for learners to interact with peers, negotiate meaning, and experiment with language during problem-solving (Foster & Ohta, 2005; Storch, 2005; Swain, 2000). Empirical evidence consistently demonstrates the

effectiveness of collaborative writing in enhancing overall text quality, writing accuracy, and fluency (Biria & Jafari, 2013; Elabdali, 2021; Soleimani et al., 2017; Teng & Huang, 2023). However, most of these studies have been conducted in higher education contexts and small classes of around twenty students (Villarreal & Gil-Sarratea, 2020; Zhang et al., 2015). This leads to a gap in understanding the feasibility of implementing collaborative writing in large EFL secondary school settings and its subsequent impact on students' individual writing performance. Therefore, this study aims to provide insights into the long-term pedagogical effectiveness of integrating collaborative writing practices in large-class-size EFL settings within Chinese secondary schools.

To better understand the nature of collaborative writing, it is essential to examine its behavioural, affective, and cognitive engagements (Namkung & Kim, 2024; Phan & Dao, 2023; Zheng et al., 2022). Since affect and cognition are two primary factors shaping individual behaviour (Leary, 1990; Trafimow et al., 2004), this study investigates how these factors influence learners' behaviour in collaborative writing activities and their implications for language learning outcomes.

A crucial cognitive aspect of writing is metacognition, which involves reflecting on relevant knowledge, regulating thoughts, and strategically planning and monitoring writing activities (Flavell, 1979). Expert language users effectively employ metacognitive strategies—such as planning, organizing, revising, and evaluating—to enhance their cognitive processes during writing tasks (Azizi et al., 2017). While explicit metacognitive training has been shown to improve writing and L2 learning outcomes (Lee & Mak, 2018; Piret et al., 2020), the potential for implicit metacognitive development through peer interaction in collaborative writing remains underexplored. Engaging in collaborative writing tasks requires learners to communicate, negotiate, and reflect with their peers (Storch, 2005), creating opportunities for them to observe and adopt their peers' problem-solving strategies and self-regulation techniques. This interaction may implicitly foster their metacognitive development, thereby enhancing their writing achievement. Thus, the current study endeavours to investigate the development of writing metacognition in collaborative writing and its impact on subsequent individual writing achievement.

Another significant affective factor influencing writing motivation, attitude, and productivity is writing anxiety, which is manifested by writers' subjective experiences of tension, apprehension, nervousness, and worry associated with writing contexts (Spielberger & Reheiser, 2009). While moderate anxiety levels could act as motivator (Luo et al., 2020),

high levels of anxiety may impede idea generation, organization, and self-expression and even arouse avoidance behaviour in writing (Balta, 2018; Erkan & Saban, 2011). In collaborative writing, there is limited understanding of how interpersonal interactions and shared responsibilities among co-authoring affect anxiety levels. To this end, the present study aims to explore the development of writing anxiety in the context of collaborative writing and its impact on learners' subsequent individual writing performance.

In summary, the challenges faced by both teachers and students in the context of EFL writing underscore the need for innovative pedagogical strategies. Collaborative writing emerges as a promising approach that not only addresses the issues of feedback inadequacy and teacher workload but also fosters interaction among students, thereby enhancing their behavioural, cognitive and affective engagement in the writing process. Understanding how collaborative writing influences individual writing performance is expected to contribute to the broader discourse on effective language teaching methodologies and offer practical implications for enhancing student outcomes in EFL contexts. Furthermore, by examining the roles of metacognition and writing anxiety within collaborative writing frameworks, this study aspires to provide a more comprehensive understanding of the mechanisms underlying collaborative writing.

1.2 Aims and overview of the dissertation

The primary aim of this study is to examine the impact of collaborative writing on the individual writing performance of EFL secondary school learners. Additionally, it aims to explore the roles of writing anxiety and writing metacognition in this context, aiming to shed light on the mechanisms through which collaborative writing contributes to individual improvement.

This dissertation comprises six chapters. The initial chapter introduces the overall background of the study and explores its potential theoretical and practical significance. In chapter two, the literature review scrutinizes the theoretical and empirical rationales of collaborative writing in EFL contexts, then discusses the factors of writing metacognition and anxiety that engage in the collaborative writing process. The third methodology employs a mixed-methods design to explore the roles of metacognition and writing anxiety in collaborative writing, detailing participant selection, ethical considerations, data collection instruments, and analysis procedures. The fourth chapter results section includes descriptive statistics on students' writing achievement, anxiety, and metacognition; path analysis of the

collaborative writing intervention's effects; and content analysis of reflective journals. The fifth chapter discussion evaluates the impact of collaborative writing on EFL secondary students' writing performance, anxiety, and metacognitive skills, examining key implications and interactions among these constructs while acknowledging study limitations and suggesting future research directions. The last chapter conclusion reviews the main findings of the study, while addressing limitations and suggesting directions for future research.

2 Literature review

This review of literature is divided into two sections. The first section examines the theoretical rationale and empirical evidence to highlight the nature of collaborative writing in EFL settings. The second section explores writing anxiety and writing metacognition as key affective and cognitive factors influencing students' language learning during the collaborative writing process.

2.1 Collaborative writing in EFL settings

2.1.1 Rationale for collaborative writing

According to Storch (2013), collaborative writing refers to "the co-authoring of a text by two or more writers" (p. 2). Ede and Lunsford (1990) further identified three key features of this process: substantial interaction among authors at all stages of writing, shared decision-making power and responsibility for the produced text, and the creation of a unified written document. These features distinguish collaborative writing from cooperative writing, which involves a division of tasks among group members, with individuals assigned specific roles, such as drafting sections or editing the final piece (Dillenbourg et al., 1996). In contrast, collaborative writing emphasizes co-ownership of the text, highlighting the active engagement and negotiation of all group members throughout the entire composing process from planning to evaluation. These distinctions underscore the interactive and dynamic nature of collaborative writing.

From a sociocultural perspective, collaborative writing serves as an effective approach for enhancing L2 linguistic and writing skills (Englert et al., 2006; Storch, 2005; Villamil & de Guerrero 1996). Social constructivist theory posits that cognitive development is not solely an individual process but deeply influenced by social interactions and cultural contexts. In light of this perspective, individuals acquire linguistic knowledge and writing skills through their interactions with others, where cultural tools such as language, symbols, and societal practices play a crucial role in shaping cognitive processes. Next, the nature of collaborative writing activities will be further analysed through the lens of social constructivism, focusing on key constructs within the sociocultural paradigm: regulation, mediation, and the Zone of Proximal Development (ZPD).

According to Vygotsky (1978), the self-regulatory abilities develop from other-regulation in social interactions and are subsequently internalized by learners for independent use.

Other-regulation involves learner "act[ing] both as subjects of another person's regulatory behaviors and as actors regulating another person's behaviors" (Bodrova et al., 2011, p. 18). In collaborative writing, peer assistance could be viewed as a form of other-regulation, which may potentially lead to self-regulation as learners autonomously address problem-solving tasks (De Guerrero & Villamil, 2000). During the co-construction of sentences, learners may develop metacognitive skills related to error detection and reflection on language production through peer interactions, namely other-regulation (Brumfit, 1977; Edge, 1989). This metacognition concerning error identification becomes internalized and potentially aids their subsequent individual writing efforts (Sato & Lyster, 2012). Additionally, a learner's initiative to question or reject peer's proposals also indicates a progression from other-regulation to self-regulation (Villamil & de Guerrero, 2006), since this transition highlights the learner's increasing autonomy in regulating and evaluating their writing processes.

The second key notion in sociocultural theories is mediation, defined as "the process through which humans deploy culturally constructed artifacts, concepts, and activities to regulate … the material world or their own and each other's social and mental activity" (Lantolf & Thorne, 2006, p. 79). In the context of L2 writing, mediation serves as a bridge between social interactions and individual cognitive processes. It utilizes both symbolic tools, such as language, and physical tools, like computers, to facilitate communication and negotiation of meaning among peers (Bitchener & Storch, 2016). One important aspect of mediation is Swain's (2006) concept of "languaging," which refers to the process of making meaning and shaping knowledge through language (p. 98). Languaging plays a critical role in enhancing learners' self-regulation during feedback exchanges, as it involves self-directed inquiries and explanations that address linguistic or content concerns (Suzuki, 2012). For example, learners may engage in self-talk to better understand complex information or to manage frustration when faced with challenging language tasks (Watanabe, 2014). In collaborative writing, 'speech for the self' articulates how languaging mediates L2 writing development. Through private speech and collaborative dialogue, learners co-construct written texts, actively negotiating meaning and refining their understanding of language (Lantolf, 2000). This engagement not only enhances their writing skills but also fosters deeper cognitive processes, enabling learners to internalize language structures and writing conventions more effectively (Storch, 2013).

The third construct from sociocultural paradigm is Zone of Proximal Development (ZPD), known as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through

problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p.86). The assumptions surrounding interactions within the ZPD provide a theoretical foundation for the importance of grouping peers with similar proficiency levels so as to facilitate effective collaboration within their respective ZPDs seeking for similar linguistic development. In the context of collaborative writing, effective scaffolding can significantly enhance learners' experiences and outcomes. Aljaafreh and Lantolf (1994) outline three principles for effective scaffolded assistance within the ZPD: graduated, contingent, and dialogic scaffolding. Graduated scaffolding involves providing tailored guidance from more capable peers, adjusting support based on the learner's evolving needs. Contingent help emphasizes that assistance should be responsive to the learner's signals of self-control and autonomy, as both excessive and insufficient support can hinder development. Dialogic scaffolding positions the learner as an active participant rather than a passive recipient of knowledge, promoting a dynamic, bidirectional, and interactive writing process. This approach encourages learners to engage with each other actively, fostering a learner-oriented environment where they can collaboratively explore ideas and refine their writing skills through shared dialogue.

In conclusion, sociocultural constructivism provides a robust theoretical foundation for the significance of collaborative writing by highlighting the essential role of social interaction in language learning. While that theory generally suggests that collaborative writing could enhance learners' language outcomes, the validity of these claims in authentic classroom settings requires further empirical research on exploring the impact of collaborative writing on individual writing performance. Furthermore, the concept of "languaging" serves as a theoretical basis for improving writing metacognition, enabling learners to articulate their thoughts and reflect on their writing processes. However, the extent to which this practice translates into tangible learning outcomes also needs empirical validation. Additionally, the principles of other-regulation and ZPD create an ideal collaborative environment that fosters support, potentially alleviating feelings of isolation and pressure associated with writing tasks. Nevertheless, it remains to be seen whether such collaborative contexts effectively reduce writing anxiety among learners through empirical examination. Thus, grounding the exploration of these factors in sociocultural constructivism not only emphasizes their interconnectedness but also highlights the necessity for further research to validate and expand upon these theoretical insights.

2.1.2 Effects of collaborative writing on individual L2 writing performance

To assess the impact of collaborative writing on individual L2 writing performance, researchers primarily focus on complexity, accuracy, fluency, and overall rubric scores as key measures (Elabdali, 2021). Research on the effects of collaborative writing on individual L2 writing performance reveals mixed outcomes, highlighting both potential benefits and limitations. Storch (2005) found that a four-week collaborative writing experiment with 18 ESL college students in Australia significantly improved grammatical accuracy, complexity, and task fulfilment. Similarly, Chen (2019) reported that 78 EFL college students who engaged in a sixteen-week collaborative writing practice showed better accuracy, fluency, and overall quality in their texts immediately and two months later, although organizational quality improvements did not persist. In Pham's (2021) study, 62 college students engaging either in cooperative writing (division of labouring different part of the essay) or collaborative writing (co-author all the parts of the essay) also saw significant improvement in writing fluency. However, not all studies show consistent benefits across all writing aspects. Shehadeh (2011) found that while 18 EFL college students from the United Arab Emirates produced higher quality texts in vocabulary, organization, and content after sixteen weeks of collaborative writing, there were no significant gains in grammar or mechanics. Similarly, Özdemir (2024) observed that 21 Turkish pre-college students improved in accuracy (error word rate) and fluency (average sentence length) after six weeks of collaborative writing, but there was no significant difference in complexity (complex linguistic structures). While there is evidence to suggest that collaborative writing may improve accuracy and fluency, its impact on other aspects of writing, such as complexity and organization, appears less consistent. This variability highlights a gap in the literature, pointing to the need for more comprehensive research to confirm the effects of collaborative writing in authentic classroom settings. Future studies should aim to explore these effects across larger and more diverse populations, as well as over longer periods, to provide a clearer understanding of how collaborative writing can be effectively integrated into L2 writing instruction.

While much of the evidence supporting the effectiveness of collaborative writing comes from higher education EFL settings, it is also important to consider its impact in secondary school contexts as well. Villarreal and Gil-Sarratea's (2020) research stands out as one of the limited inquiries into the impact of collaborative writing in EFL secondary school settings. The outcomes they observed from a Spanish secondary school suggested that, despite producing shorter texts, the pairs demonstrated increased accuracy and slightly greater lexical and

grammatical complexity, no changes in lexical complexity. Additionally, the collaborative group (n=16) outperformed the individual writing group (n=16) in terms of content, structure, and organization. Yet, their evaluation of the t-test outcome relied solely on a mere increase in means, without considering the significance level (p-value). This raises concerns about the internal validity due to inappropriate interpretation of the data, as an increase in means alone may not signify significant progress in understanding the t-test outcomes. Another study by Khatib and Meihami (2015) provided evidence for investigating the impact of collaborative writing in EFL secondary settings. Following a six-week quasi-experiment in an Iranian secondary school, the pair-samples t-test results showed that the collaborative group (n=17) significantly outperformed the control individual writing group (n=18) in terms of overall performance, vocabulary, organization, content, grammar, and mechanics.

The studies mentioned earlier generally portray a favourable influence of collaborative writing in L2 contexts, although conflicting results exist regarding improvements in particular writing skills. Notably, these studies usually involved fewer than 20 learners in collaborative writing groups. To date, the applicability and effectiveness of collaborative writing in large-size-class settings remain relatively unexplored. This gap underscores the significance of the present study, particularly in the context of mainland Chinese secondary schools, where classes typically comprise nearly 50 students. By examining the impact of collaborative writing in such large classroom settings, this study aims to provide insights that can inform more effective integration of collaborative writing practices into L2 instruction on a broader scale.

2.2 Writing metacognition in L2 writing

2.2.1 Definition and framework of writing metacognition

Metacognition refers to the awareness and understanding individuals have about their own cognitive processes, namely ‘cognition about cognition’ (Flavell, 1979). As shown in Figure 1, metacognition comprises two key components: knowledge of cognition (knowledge about self) and regulation of cognition (knowledge about learning process) (Schraw, 1998).

The figure originally presented here cannot be made freely available via ORA because of copyright.
The figure was sourced at Schraw, G. (1998). Promoting general metacognitive awareness. *Instructional science*, *26*, 113-125. https://doi.org/10.1023/A:1003044231033

Following Schraw's (1998) metacognition model, metacognitive knowledge is further divided into three dimensions: declarative, procedural, and conditional knowledge, each aspect of these awareness playing a vital role in shaping an individual's approach to L2 writing tasks (Magno, 2008; Ramadhanti & Yanda, 2021). In an L2 writing setting, declarative knowledge could be the learner's self-concept about knowing facts and information related to L2 writing (Negretti, 2012). According to Schraw (1998), procedural knowledge entails knowing how to execute tasks or actions at each stage of the writing process. Conditional knowledge contains understanding the conditions under which certain writing strategies or actions are most effective and the reason for it. In addition to metacognitive knowledge, metacognitive regulation as the other dimension of writing metacognition in Schraw's (1998) model involves planning, monitoring, evaluating, and regulating one's learning processes (see Figure 1). Specifically, planning includes setting goals and devising strategies before starting a task. Monitoring involves assessing progress during the writing process. Evaluating includes reviewing the effectiveness of the writing and strategies used, while regulating involves making real-time adjustments to optimize learning strategies.

Focusing on these metacognitive skills is of great significance for L2 writing because they provide learners with the tools to independently manage and improve their writing abilities (Teng & Yue, 2023). These strategies enable learners to not only understand and apply writing techniques but also to adapt their approaches based on self-assessment and feedback (Negretti, 2012). This adaptability is crucial in the dynamic context of L2 writing, where diverse linguistic and cultural challenges often arise (Oxford, 2017). By integrating these writing metacognitive skills into L2 writing instruction, educators could help learners develop a more

structured and effective approach to writing, ultimately leading to improved writing performance and greater learner autonomy (Díaz, 2013).

2.2.2 Effects of metacognition in L2 writing

In L2 writing, metacognitive skills—comprising metacognitive knowledge and metacognitive regulation—foster self-regulated learning abilities, empowering learners to set achievable writing goals and strategize their writing plans effectively (Lee & Mak, 2018). These skills are reliable predictors of both writing proficiency and self-regulated learning (Negretti, 2012; Teng & Huang, 2019), underlining the critical role that metacognitive skills play in shaping the landscape of L2 writing.

Recognizing the positive impact of writing metacognition on L2 writing, various instructional approaches have been developed to enhance these skills. Effective strategies include incorporating teachers' reflective queries at the planning, editing, revising, and publishing stages (Sumarno et al., 2022), providing writing process checklists for learners to use during writing (Farahian & Avarzamani, 2018), and directly teaching or training students with specific metacognitive regulatory strategies before writing (Shirvani & Porkar, 2022; Teng & Zhang, 2020). Empirical evidence supports the effectiveness of explicit instruction in fostering metacognitive skills, demonstrating significant improvements in overall writing performance, accuracy, fluency, and complexity following interventions that include metacognitive guidance (Al-Jarrah et al., 2018; Balta, 2018; Negretti, 2012; Sun & Zhang, 2023; Teng, 2020; Teng & Huang, 2023). These findings highlight the efficacy and applicability of metacognitive process-oriented writing instruction in L2 writing classrooms (Lee & Mak, 2018; Sumarno et al., 2022; Xiao, 2007).

While explicit metacognitive instruction has proven effective in traditional teaching settings, it is essential to explore how these metacognitive skills can be cultivated in more collaborative contexts. Some studies deliberately incorporated writing metacognitive strategies in the training phase preceding the collaborative writing activity (Teng & Huang, 2023; Yarrow & Topping, 2001). Others explored the comparative efficacy of explicit metacognitive strategy training before writing versus the implicit acquisition of metacognitive skills through peer interaction in collaborative writing (Chen & Hapgood, 2021; Teng, 2021). However, despite the proven benefits of explicit metacognitive instruction from these empirical researches, there remains a lack of understanding how implicit learning opportunities embedded in interactions in collaborative writing could potentially enhance learners' writing metacognition. As the previous sociocultural constructivist theory supports,

collaborative writing activities involve unique thinking-aloud nature of collaborative dialogue on verbalization of thought (Ericsson & Simon, 1998). This verbalization of cognition may serve as an implicit metacognitive learning source for improvement in writing performance. To elaborate, to reach agreement on the jointly produced text, the paired learners should have the negotiation process of where to start writing and which section to move next. These "metacognitive talks" guiding the application of effective collaboration strategies may potentially contribute to the cultivation of learner's metacognitive regulation (Jafarigohar & Mortazavi, 2017; Molenaar et al., 2014). Therefore, this study aims to provide insights into whether peer interactions in collaborative writing could implicitly develop EFL learners' writing metacognitive skills.

2.3 Writing anxiety in L2 writing

2.3.1 Definition and framework of writing anxiety

Writing anxiety, also widely known as writing apprehension, is a form of state anxiety characterized by the "intensity at a particular time of subjective feelings of tension, apprehension, nervousness, and worry, with associated activation (arousal) of the auto-nomic nervous system" (Spielberger & Reheiser, 2009, p. 276). Specifically, L2 Writing anxiety is a language-skill-specific anxiety, distinct from generally foreign language learning anxiety that encompasses negative emotional reactions to overall foreign language learning (Cheng et al., 1999; Horwitz, 2001).

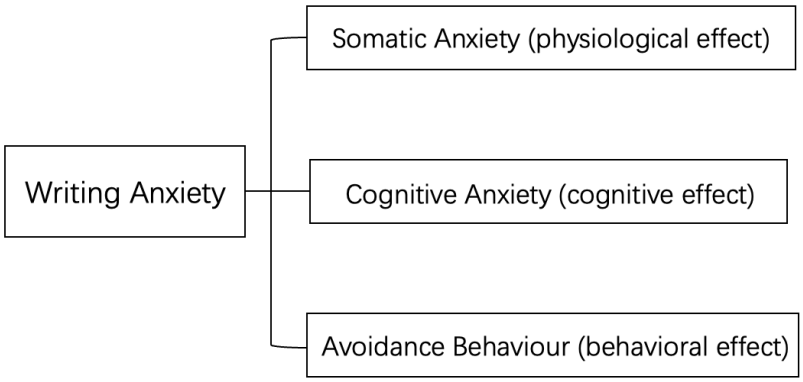


Figure 2. Multidimensional constructs for writing anxiety

To assess L2 writing anxiety, Cheng (2004) designed a self-report scale called the Second Language Writing Anxiety Inventory (SLWAI). This instrument comprises three sub-dimensional constructs within the writing anxiety domain: Somatic Anxiety, Cognitive Anxiety, and Avoidance Behaviour (see Figure 2). To elaborate, somatic anxiety refers to the physiological or bodily aspects of anxiety, involving physical symptoms like a pounding heart,

a blank mind, freezing up and rigid body rigid during writing tasks. Next, cognitive anxiety involves mental processes such as worry, fear, self-doubt, and negative thoughts related to writing English compositions. Third, avoidance behaviour involves behavioural responses to anxiety in the context of writing, with actions taken by individuals to avoid or escape the anxiety-provoking English writing tasks. This scale provides a comprehensive understanding of the multifaceted nature of L2 writing anxiety, reflecting cognitive, physiological, and behavioural responses to anxiety, which indicates writing anxiety as the gateway to explore complex experiences of learners in the dynamic process of L2 writing and development (Horwitz, 2001; Papi, 2021).

2.3.2 Writing anxiety in L2 writing

Writing anxiety has been found to negatively predict the use of writing strategies and overall performance in L2 writing tasks (Al-Ahdal & Abduh, 2021; Al-Sawalha et al., 2012; Bailey & Almusharraf, 2022). Specifically, higher levels of writing anxiety correlate with decreased frequency of writing strategies employed during the planning, writing, and revising stages (Abolhasani et al., 2022). This suggests that writing anxiety may impair cognitive functions and hinder the effective application of writing strategies, a phenomenon that aligns with attentional control theory (Derakshan & Eysenck, 2009; Eysenck et al., 2007). In L2 writing contexts, individuals experiencing writing anxiety often struggle with negative attentional control (Güvendir & Uzun, 2023), making it difficult to ignore task-irrelevant stimuli such as distracting thoughts, self-doubt, and concerns about negative evaluation. They may also face challenges with positive attentional control, which complicates their ability to shift focus flexibly across various stages of the writing process, including idea generation, content organization, and revision (Huerta et al., 2017; Martinez et al., 2011).

Given the aforementioned significant detrimental impact of writing anxiety on cognitive processes and writing performance, it is crucial to explore effective strategies to mitigate this anxiety tp support L2 learners in their writing endeavours. Several studies have explored strategies to reduce writing anxiety and enhance learners' language learning experiences. On an individual level, techniques such as mindfulness, positive thinking, realistic goal-setting, and gradual exposure to progressively challenging writing tasks have been employed to foster more positive perceptions of writing competence. These strategies aim to increase self-efficacy and help learners manage their thoughts and emotions during writing tasks (Alrabai, 2014; Cheng, 2002; Wynne et al., 2014). Additionally, frequent writing practice, such as maintaining diaries, has been identified as an effective way to alleviate writing anxiety by

increasing familiarity with the writing process and boosting confidence in language abilities (Cocuk et al., 2016).

On a social level, strategies for reducing writing anxiety often involve support from both teachers and peers. Teacher support can include providing process-based instructions and clear expectations before writing, engaging students in pre-writing brainstorming activities, and offering constructive feedback that emphasizes strengths while also addressing areas for improvement. Such feedback helps build students' confidence and motivation (Chuang, 2019). Peer support, on the other hand, is fostered through activities like peer feedback and collaborative writing projects, which create a supportive environment that enhances motivation and reduces feelings of isolation and anxiety (Jawas, 2019; Kurniasih et al., 2023; Yastıbaş & Yastıbaş, 2015). Given this context, the current research aims to investigate the extent to which peer support in collaborative writing could potentially help alleviate EFL learners' writing anxiety.

2.4 Purpose of the study and research questions

The current study seeks to contribute valuable insights into the applicability and complexities of collaborative writing within larger classroom settings. Specifically, this dissertation aims to explore the complex and multifaceted mechanism of individuals L2 writing development in the activity of collaborative writing by investigating the impact of collaborative writing on individual writing performance, writing metacognition, and writing anxiety. Meanwhile, the roles of writing metacognition and anxiety in this process will also be examined. Based on the literature review, Figure 3 shows the current study's proposed model for mechanism of individuals L2 writing development in the activity of collaborative writing.

Built upon the socio-cultural theory, which views learning as a social process (Vygotsky, 1978), collaborative writing emerges as a rich platform for learners. It enables them to work collectively on writing tasks, thereby fostering meaningful language-related episodes (Alwaleedi, 2017). This collaborative interplay, often termed 'languaging', has the potential to enhance writing metacognition by facilitating peer communication, strategy sharing, feedback exchange, and reflective dialogue throughout the writing processes (Khatib & Meihami, 2015). This perspective underscores the potential of collaborative writing as a facilitator for strengthening writing metacognition through continuous negotiation in planning, drafting, and evaluating stages. Grounded in the socio-cultural theory, this study seeks to empirically

investigate whether these theoretical insights are reflected in authentic language learning classrooms.

Not only cognitive factors but also affective variables play crucial roles in the act of writing. Writing anxiety, an affective factor, often exerts a negative impact on writing performance (Blasco, 2016; Stewart et al., 2015). It is proposed that collaborative writing, by fostering a supportive learning environment, could alleviate this anxiety (Tarkan-Blanco, 2021). However, to what extent writing anxiety mediates the influence of collaborative writing on individual writing performance and whether this mediation effect is significant are questions that remain unclear. Moreover, research has identified a negative correlation between writing metacognitive regulation and anxiety (Aglina et al., 2020; Balta, 2018; Blasco, 2016). For instance, effective metacognition can enhance learners' self-efficacy, thereby reducing anxiety by instilling a sense of control and confidence in their writing abilities (Stewart et al., 2015). Yet, whether this relationship persists within the context of collaborative writing is a question that invites further investigation.

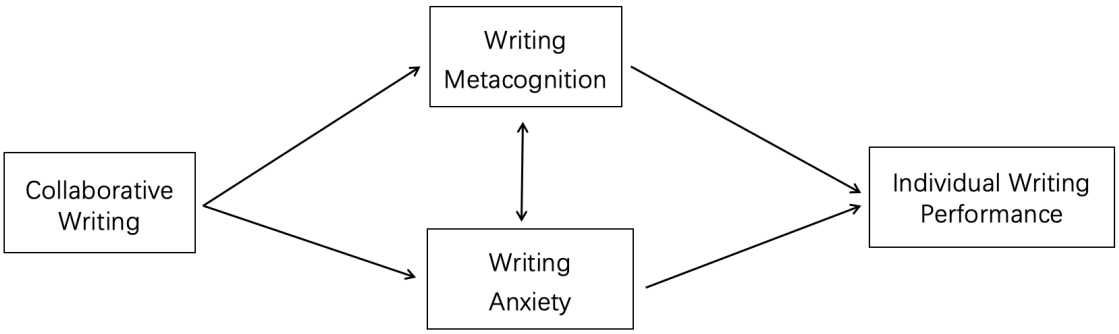


Figure 3. Proposed model for mechanism of collaborative writing

Drawing upon the above literature review and analysis, this study proposes a model for mechanism of individuals L2 writing development in the activity of collaborative writing (see Figure 3). The research questions (RQs) guiding this study are as follows:

RQ1: To what extent does collaborative writing affect EFL secondary students' individual writing performance?

RQ2: Do writing anxiety and/or metacognition mediate this relationship?

RQ3: Do writing anxiety and metacognition affect one another?

RQ4: To what extent does collaborative writing affect EFL secondary students' writing anxiety?

RQ5: To what extent does collaborative writing affect EFL secondary students' writing metacognition?

3 Methodology

This section outlines the research methodology employed to investigate the roles of metacognition and writing anxiety within collaborative writing frameworks and their impact on individual writing performance. A mixed-methods design was utilized, integrating quantitative and qualitative approaches to provide a comprehensive understanding of the research questions. The rationale for this design, alongside the positionality of the researcher, participant selection, ethical considerations, and data collection instruments, will be discussed in this section. Additionally, the procedures for implementing the study, data analysis methods, and measures of reliability and validity will also be detailed, ensuring a rigorous approach to the research.

3.1 Rationale for mixed-methods design

A mixed-methods design involves integrating both quantitative and qualitative data collection and analysis within a single research study to gain a breadth and depth of understanding for the research problem (Johnson et al., 2007). The current study adopted mixed-methods design (see Figure 4) to investigate the impact of collaborative writing on individual writing performance in an EFL context so as to obtain a comprehensive understanding of the effect and process of collaborative writing on writing anxiety and metacognition.

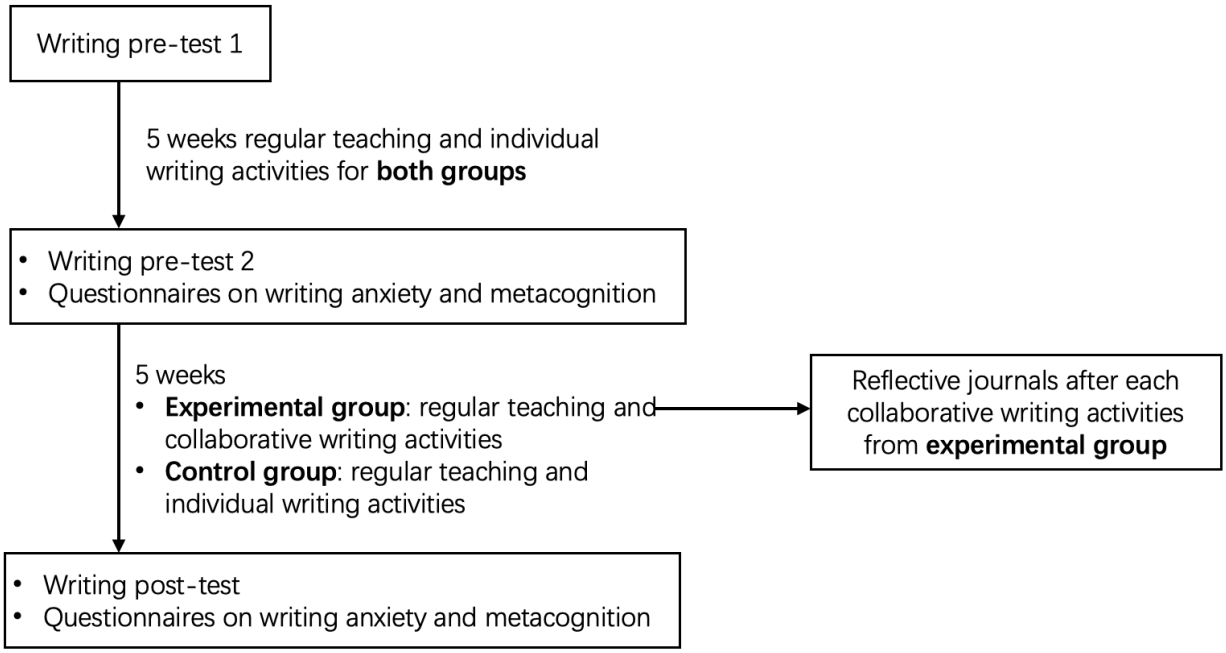


Figure 4. Mixed-methods design

Quantitatively, this study administered three writing tests to assess individual writing performance at three distinct points: before any intervention (Pre-test 1), after five weeks of regular teaching and same individual writing activities (Pre-test 2), and after five weeks of collaborative writing interventions on experimental group (Post-test). These tests aimed to evaluate both the natural progression from regular teaching and learning activities and the specific effects from collaborative writing activities. Questionnaires using a 5-point Likert scale were also administered before and after collaborative writing interventions to measure participants' writing anxiety and metacognitive strategies (see Appendix 5), helping to evaluate the levels of writing anxiety and metacognition at different time points. To further enrich the study, qualitative data were collected through reflective journals from participants in the experimental groups. These journals, prompted by open-ended questions, allowed participants to document their experiences, challenges, and perceived impacts of the collaborative writing process. This qualitative data provided deeper insights into the contextual factors and subjective experiences, complementing the quantitative findings (Creswell & Clark, 2017).

Overall, an explanatory sequential design was employed, combining path analysis and content analysis to provide a comprehensive understanding of the intervention's impact. This mixed-method approach, specifically the follow-up explanations model, allowed for an in-depth exploration of the quantitative results through qualitative insights (Creswell & Clark, 2017). To be more specific, quantitative findings may reveal statistical associations between collaborative writing and writing performance and the underlying mechanisms with cognition and affection, while qualitative insights could elucidate contextual factors driving these associations. This holistic interpretation may potentially deepen understanding and inform more comprehensive discussions and implications of the research findings.

3.2 Positionality

Positionality refers to the researcher's subjective standpoint in relation to the research they are conducting, shaped by researcher's worldview, researcher-participant relationship and sociocultural context (Holmes, 2020; Savin-Baden & Major, 2023). Therefore, the upcoming section aims to elucidate the researcher's positionality from two angles: philosophical assumptions and practical positioning. This examination sheds light on how the researcher's perspective shapes the scope of the current research, the approach to participants, and the maintenance of research rigor as an insider within the community under study.

3.2.1 Philosophical underpinning

The present study on collaborative writing in EFL contexts is inherently grounded in the paradigm of pragmatism. Pragmatism is a philosophical perspective that prioritizes the practical consequences and utility of ideas, beliefs, and actions, rejecting rigid adherence to abstract principles (Biesta, 2010; Garrison & Neiman, 2003). Central to pragmatism is the recognition of the dynamic interaction between theory and practice, acknowledging that knowledge is shaped by its application in real-world contexts (Legg & Hookway, 2021). Accordingly, this study employed a quasi-experimental design to implement collaborative writing in authentic EFL classrooms, aiming to explore its efficacy in practical settings. By embracing pragmatism's emphasis on practical consequences and dynamic understanding of reality, the research sought to generate findings that could inform future educational practices and interventions, thereby contributing to the advancement of knowledge and the enhancement of writing instruction in EFL contexts.

The philosophical underpinning of pragmatism serves as the ontological foundation for the chosen research topic and guides the epistemological stance of the current mixed-methods research design. Ontologically, pragmatism rejects a fixed understanding of reality, acknowledging its dynamic nature shaped by ongoing interactions and interpretations (Popkewitz, 1997). While previous studies have explored collaborative writing in EFL contexts, they typically focused on small-sized classes with fewer than 20 students per group (Anggraini et al., 2020; Villarreal & Gil-Sarratea, 2020; Zhang, 2018). Recognizing the limitations of these studies to capture the practicality and effect of collaborative writing in large-size classes, the current research situates itself in authentic large-class settings with around 45 EFL students per class. This deliberate choice aims to uncover new insights and develop effective collaborative writing schemes tailored to this specific sociocultural context. Moreover, understanding the complexities of writing behaviors and the multifaceted norms shaped by cultural, linguistic, and educational contexts necessitates a fluid approach rooted in practical pedagogical strategies and participants' underlying cognitive processes. Therefore, the research not only examines participants' objective writing scores but also delves into their subjective cognitive and affective processes during engagement. This exploration is facilitated through the use of reflective journals, allowing participants to record their thoughts, emotions, and reflections throughout the intervention periods.

Regarding epistemology, which concerns the nature and scope of knowledge (Noddings, 2018), pragmatism views inquiry as a dynamic process of problem-solving rather than a static

quest for absolute truths (Legg & Hookway, 2021). Pragmatism emphasizes the importance of fluid experiences in the acquisition of knowledge, advocating for active engagement with one's environment, learning through interactions, and adapting behavior based on experiences (Shields, 2004). By adopting a pragmatic stance, this study acknowledges the complexity and variability inherent in educational settings. The integration of multiple data sources allows for a nuanced exploration of collaborative writing practices, considering the contextual factors and individual experiences that influence them. Thus, pragmatism guides the research methodology, enabling a thorough and adaptable approach to understanding and improving collaborative writing in educational contexts.

3.2.2 Context positionality

The current study was initiated within a high school located in southern China, where I am positioned as a formal English teacher instructing a tenth-grade class. Invitations were extended to my colleagues and students, resulting in the participation of three teachers (identified as K, L, and Z) and their respective six classes of students. Due to Teacher K's interest in the innovative pedagogical approach of collaborative writing, this approach was implemented in Teacher K's two classes, as well as in one class that I instruct, forming the experimental group. The classes instructed by Teachers L and Z constituted the control group.

In this context, my positionality as a teacher-researcher is multi-dimensional, influenced by various factors within the school community, my colleagues, and my students. As an internal member of the school community, I possess an intimate understanding of the institution's culture, norms, and dynamics, enabling me to design collaborative writing activities that are directly pertinent to the curriculum and resonate with students' backgrounds, interests, and experiences (Cochran-Smith & Lytle, 2009).

Secondly, the collaboration with colleagues, dissolving the traditional researcher-teacher dichotomy, fosters an egalitarian exchange of ideas and practices and encourages a culture of shared learning and professional development (Bannister, 2015). However, the coordination of schedules and management of logistics presented challenges. To ensure consistent monitoring of all experimental classes, I provided detailed lesson plans to Teacher K and maintained open lines of communication, ensuring I was kept abreast of the progress of the collaborative writing activities.

Lastly, the depth of my relationships with students also significantly influenced my positionality. My understanding of their personalities and English proficiency levels offered insights into potential challenges that they might encounter during collaborative writing

activities (Biesta, 2012). However, this familiarity required a delicate balance to prevent bias and maintain the integrity of the research. Measures such as standardized task instructions, prepared handouts, and a blinded assessment approach were implemented to ensure the objectivity of observations and evaluations.

3.3 Participants

This study recruited 270 EFL students (125 females, 137 males) aged between 16 and 17 from a high school in southern China. The participants were distributed across six classes, with class sizes ranging from 41 to 51 students. Among them, three classes were designated as the collaborative writing experimental group (75 females, 62 males), while the remaining three classes served as the individual writing control group (50 females, 83 males). Approval for the study was obtained from the school principal prior to its commencement (see Appendix 1). Participation in the study was voluntary. Students were informed about the research's purpose and the requirements of participating in the writing training (see Appendix 2). They were also informed that there would be no rewards other than the potential improvement in their English writing skills through participation in the tasks and receiving feedback from teachers. Informed consent forms (see Appendix 3) were collected after informing students that they could withdraw from the study unconditionally before the intervention began.

As the students had not previously taken international English tests like IELTS or TOEFL, their English proficiency was assessed using China's Standards of English Language Ability (CSE). This proficiency level system, introduced in 2018 by the Chinese Ministry of Education and the National Language and Text Committee, categorizes English proficiency into nine levels, facilitating communication between English learning, teaching, and assessment across educational stages in China (Liu, 2019). The participants in this study were first-year high school students who had all passed the English exam of the high school entrance examination, indicating they had achieved a level-five English proficiency upon completing compulsory education. According to Peng et al. (2022), level five in CSE aligns with B1 to B2 level in Common European Framework of Reference for Languages (CEFR). Specifically, the level-five proficiency signifies the ability to (1) comprehend language materials on general topics across various situations, identify main ideas, focus on key points, clarify facts, opinions, and details, and understand others' intentions and attitudes; (2) engage in effective communication, discussion, and negotiation on topics related to familiar situations, such as learning and work; (3) write short essays on topics of interest with arguments and evidence, using a variety of connecting devices to maintain semantic coherence; (4) write reports related

to their professional field, such as book reports and research reports, with a complete structure; (5) produce common application documents, such as thank-you letters and meeting minutes, with correct formatting and language expression meeting established requirements.

3.4 Ethical considerations

The ethical considerations of the current study concerned two aspects on engaging my colleagues into administering my interventions as well as the involvement of students in intervention activities.

Regarding the engagement of my colleagues, one colleague was responsible for teaching and providing feedback to nearly one hundred students across two control group classes. Following the completion of the individual writing tasks outlined in this study, my colleague faced the substantial workload of providing writing feedback to one hundred students within a two-day period. Recognizing the ethical implications of imposing such a demanding task, I offered to assist in providing feedback to her students. This collaborative approach not only ensured the quality and timeliness of the feedback but also demonstrated a commitment to fairness and consideration for my colleague's workload. Ethically, this action reflected the importance of maintaining professional respect and support among colleagues, acknowledging the additional burden placed on them by the study.

As for the students, maintaining confidentiality and privacy was essential in this study, particularly given the inherent power dynamics in the teacher-student relationship, which could influence students' willingness to participate or provide honest feedback. To navigate these dynamics ethically and protect students' rights and well-being, the design of this study adhered to the guidelines set forth by the British Educational Research Association (BERA). Additionally, the present study obtained approval from the Education Departmental Research Ethics Committee (REF- EDUC_C1A_24_090) in the Department of Education at the University of Oxford (see appendix 4).

Despite all students signing opt-in consent forms, during the interventions in the experimental group classes, two pairs of students encountered issues due to conflicts with their partners or a preference for writing independently. In response, I proposed two options to accommodate their needs and preferences ethically. The first option allowed students to choose new partners who were willing to collaborate on the writing tasks. The second option respected their desire to work independently, permitting them to complete the writing tasks alone while their peers engaged in collaborative writing. This approach ensured that all

students could participate in a manner that was comfortable and conducive to their learning, upholding the ethical principle of respecting individual autonomy and preferences. By offering these choices, the study maintained ethical integrity, addressing student concerns and fostering an inclusive and supportive learning environment. This commitment to ethical research practices was reinforced by our adherence to BERA guidelines and the rigorous ethical clearance process by the Departmental Research Ethics Committee.

3.5 Instrumentations

3.5.1 Writing tests

The school organized three rounds of regular English tests, including monthly exams, midterms, and other standardized assessments. These tests comprehensively evaluated students' English skills through sections such as listening comprehension, grammar selection, reading comprehension, cloze tests, word spelling, and writing. Each test lasted between 90 to 120 minutes, depending on the number of questions. The writing component, consistently worth 20 points, featured practical tasks like letter writing based on themes from the students' regular English classes. Example topics included recommending a city or discussing the decision to choose medicine as a university major, with a required word count of around 100 words.

Table 1. Essay scoring rubric

Band	Points	Content	Language Use	Coherence
Band 4	16-20	Complete and emotionally engaging content	Rich and accurate language use	Strong logical coherence
Band 3	11-15	Relatively complete and coherent content	Slightly less polished language use	Basic coherence
Band 2	6-10	Some relevant content	Limited language variety, significant errors	Basic coherence
Band 1	0-5	Minimal content	Numerous language errors	Lack of coherence

The assessment of these writing tests followed the principles of holistic scoring (see Table 1), referring to assign an overall score to a piece of writing based on an overall impression of its quality (Cooper, 1977). The rubric with four bands categorized and described essays at four levels from three aspects: content, language, and coherence. Holistic scoring offers a quick and efficient evaluation process, providing an overall impression of writing quality, which is beneficial for scoring a large number of essays in a short period. This method has been shown

to have higher reliability than analytic scoring on several distinct criteria (Schipolowski & Böhme, 2016). However, holistic scoring can be subjective, with potential inconsistencies across time and raters (Hayes et al., 2000; Lumley, 2002).

3.5.2 Second Language Writing Anxiety Inventory (SLWAI)

The Second Language Writing Anxiety Inventory (SLWAI) developed by Cheng (2004) is a 22-item scale designed to measure learners' degree of anxiety related to L2 writing activities (see Table 10 in Appendix 6). This questionnaire developer Cheng (2004) as a Taiwanese developed the SLWAI in both English and Chinese versions to accommodate different language speakers. For the purposes of this study, the Chinese version of the SLWAI was used to better suit the linguistic background of the participants. SLWAI used a 5-point Likert-type scale with responses ranging from strongly disagree, disagree, uncertain, agree, to strongly agree. To ensure accurate scoring, certain items (specifically items 1, 4, 7, 17, 18, 21, and 22) required reverse scoring.

3.5.3 Metacognitive strategies in writing (MSW)

To evaluate EFL learners' metacognitive strategies in second language writing, this study translated the Metacognitive Strategies in Writing (MSW) scale developed by Qin et al. (2022) into Chinese. The MSW is a 30-item questionnaire designed to assess both metacognitive knowledge and metacognitive regulation in L2 writing (see appendix 6). It is a 5-point Likert-type scale, with options ranging from strongly disagree to strongly agree. Since the original questionnaires were targeted to university students, the present study adapted some items to better suit senior high school students' writing background. For instance, the original item "I am well aware of some grading rubrics of English expository essays, e.g., the CET-4 essay" was modified into "I am well aware of some grading rubrics of English essays in examinations" to align with the senior high school students' academic context in the current study.

3.5.4 Reflective journals

Collecting qualitative data in large class settings presents significant challenges, primarily due to the difficulty of individually monitoring each student and the limited time available for interactions. These limitations make it particularly hard to observe specific pairs' collaboration in detail in classes with around 50 students. To address these challenges, reflective journals were administered after each collaborative writing intervention to gain self-reported insights

into students' experiences and interactions. This approach allowed for the collection of rich qualitative data without the need for continuous close monitoring of each student.

By having participants complete these journals, researchers could gather detailed insights into individual experiences and perspectives at the students' convenience. As shown in Appendix 8, the reflective journal included six open-ended questions designed to capture various aspects of the collaborative experience. To minimize the students' extracurricular burden, they were allowed to freely choose two or three questions to answer. These questions covered the level of communication and collaboration between partners, interesting or impressive occurrences, difficulties encountered, conflicts and their resolutions, and the overall impact on the collaborative writing process.

3.6 Procedures

3.6.1 Interventions

The intervention activities in this study included two collaborative writing sessions. In order to ensure that the experiments did not disrupt the normal teaching trajectory, collaborative writing activities were be implemented within the framework of regular class units, following the curriculum progression of the target school. These writing sessions were scheduled 40 minutes every two weeks to align with the school's existing syllabus and timetable.

The writing tasks were derived from the regular course requirements to ensure that the intervention was consistent with the students' normal learning activities and objectives. This approach ensured that the collaborative writing sessions were beneficial for the students' overall curriculum and exam preparation. All writing tasks, including the two collaborative sessions and the pre- and post-tests, were practical writing tasks in the form of letter writing. The first writing task for the first interventions asked students to write a letter of recommendation for their favourite movie, while the second writing task required students to complete a letter to introduce their hometown. In experimental groups, students were asked to work in pair throughout the collaborative writing activity to complete a single composition, while students in control groups continued with the traditional individual writing mode, where each student completed the same writing task independently.

There were no time restrictions imposed on either individual or collaborative writing tasks, allowing students to focus on the quality of their work rather than the time taken to complete it. The researcher collected data on the completion times for both the control

groups and the experimental groups through convenience sampling in researcher's own class and a colleague's class who volunteered to assist with time statistics. The results showed that the completion time for individual writing ranged from 15 to 20 minutes (n=46, m=16.4, SD= 1.7). For collaborative writing, the completion time ranged from 15 to 33 minutes (n=25, m=21.4, SD= 4.8). This increase in time for collaborative writing was expected, as it involved more interaction and coordination between partners.

3.6.2 Data collection procedures

This study collected data at three time points (see Figure 5) to evaluate the effects of collaborative writing activities on students' writing performance, writing anxiety, and metacognitive awareness. The procedures and timeline for data collection and intervention were structured as follows.

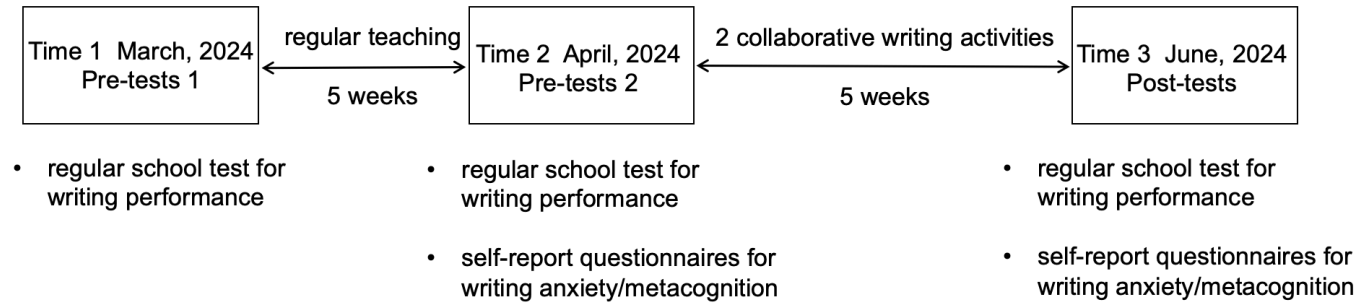


Figure 5. Data collection procedures at three time points

At the first time point, serving as the baseline, writing test scores were collected from all participants to establish a reference point for assessing changes in writing performance throughout the study. Following the baseline data collection, there was a five-week period of regular teaching during which the usual instructional methods and individual writing activities took place without any additional interventions. During the initial five weeks, both the experimental and control groups underwent regular teaching and individual writing activities. This period serves to self-control for potential confounding variables such as differences in teaching styles, student learning styles, and motivation levels and so on. The purpose of this phase was to examine the extent of students' progress in writing under regular teaching and learning conditions and ensure that any subsequent differences observed in the next five weeks could be more confidently attributed to the intervention rather than these extraneous factors.

Five weeks after the baseline data collection, at the second time point, writing test scores were collected again to monitor any immediate changes in performance due to regular teaching. Additionally, participants completed questionnaires designed to measure writing anxiety and metacognitive awareness. These questionnaires provided insights into the students' emotional and cognitive states related to writing before the intervention began.

Following the second data collection, the intervention phase was implemented. Over a period of five weeks, students engaged in collaborative writing activities organized every two weeks. These two collaborative writing activities were designed to foster cooperative learning and improve writing skills through peer interaction and feedback. After each collaborative writing session, students completed reflective journals to capture their experiences, thoughts, and perceptions about the collaborative writing process, offering qualitative data to complement the quantitative measures.

The third time point occurred five weeks after the second, marking the end of the intervention period. At this stage, writing test scores were collected once more to assess any changes in writing performance post-intervention. Additionally, the questionnaires on writing anxiety and metacognitive awareness were re-administered to evaluate shifts in these areas following the collaborative writing activities.

3.7 Data analysis

3.7.1 Quantitative analysis

For the quantitative data analysis, path analysis was used to explore the impact of collaborative writing on individual writing performance, writing metacognition and writing anxiety in an EFL context, and to examine the roles of writing anxiety and writing metacognition played in this process.

Before conducting the path analysis, several steps were taken to clean and prepare the data. First of all, samples from participants who did not attend all rounds of writing tests were excluded. Then, responses where all items on the questionnaire were answered with the same option were excluded from the dataset. Thirdly, reverse-scored items were appropriately re-coded to ensure consistency in the direction of responses. Next, missing data were addressed using multiple imputation (Sinharay et al., 2001), as the missing items were determined to be missing at random (e.g., due to inattention rather than issues related to the study's theme, design, or specific items). A check for normality distribution of variables is displayed in Appendices 9, 10, and 11.

Following data cleaning, an Exploratory Factor Analysis (EFA) was conducted to identify the underlying factor structure of the measured variables. EFA was selected for its ability to uncover latent constructs from a set of observed variables, thus reducing dimensionality while preserving essential information about the influencing factors. Factor scores were calculated by applying weighted factor loadings derived from the EFA, ensuring that the contributions of individual items to their respective factors were accurately represented (DiStefano et al., 2019). These composite scores were then averaged to represent the corresponding variables in the path analysis. The use of weighted factor loadings acknowledges the varying contributions of individual items to their factors, resulting in factor scores that more accurately reflect the degree to which each respondent exhibits characteristics associated with the underlying constructs (DiStefano et al., 2019).

Path analysis was subsequently conducted to evaluate both the direct effects of collaborative writing on individual writing performance, writing metacognition, and writing anxiety, as well as the indirect effects mediated by writing metacognition and writing anxiety (Little, 2024). The theoretical path analysis model (see Figure 6) was tested using AMOS 26.0. The final path analysis model executed in AMOS 26.0 is presented in Figure 7. Hypotheses for each path were formulated to address the research questions (RQs) of this study:

Hypothesis 1: Collaborative writing positively affects individual writing performance.

Hypothesis 2: Collaborative writing affects writing metacognition.

Hypothesis 3: Collaborative writing affects writing anxiety.

Hypothesis 4: Writing metacognition positively affects individual writing performance.

Hypothesis 5: Writing anxiety negatively affects individual writing performance.

Hypothesis 6: Writing anxiety negatively affects writing metacognition.

Hypothesis 7: Writing metacognition negatively affects writing anxiety.

This path analysis model provides a good fit to the data, with (χ^2=28.334, df=24, p=0.246>0.05, Normed Fit Index (NFI)= 0.906, the Incremental Fit Index (IFI)=1.009, Tucker Lewis Index (TLI)=1.002, comparative fit index (CFI)=1.000, root mean square error of approximation (RMSEA)=0.000 [90% confidence interval (CI)=0.000-0.105], all meeting the desired critical values (NFI, IFI, TLI and CFI > 0.90; RMSEA < 0.05, Kline, 2015).

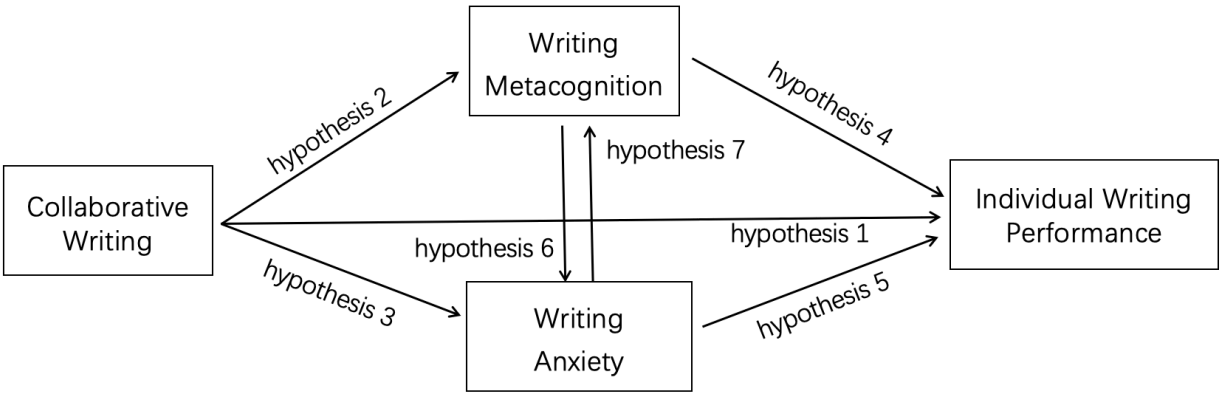


Figure 6. Proposed theoretical model and corresponding hypotheses

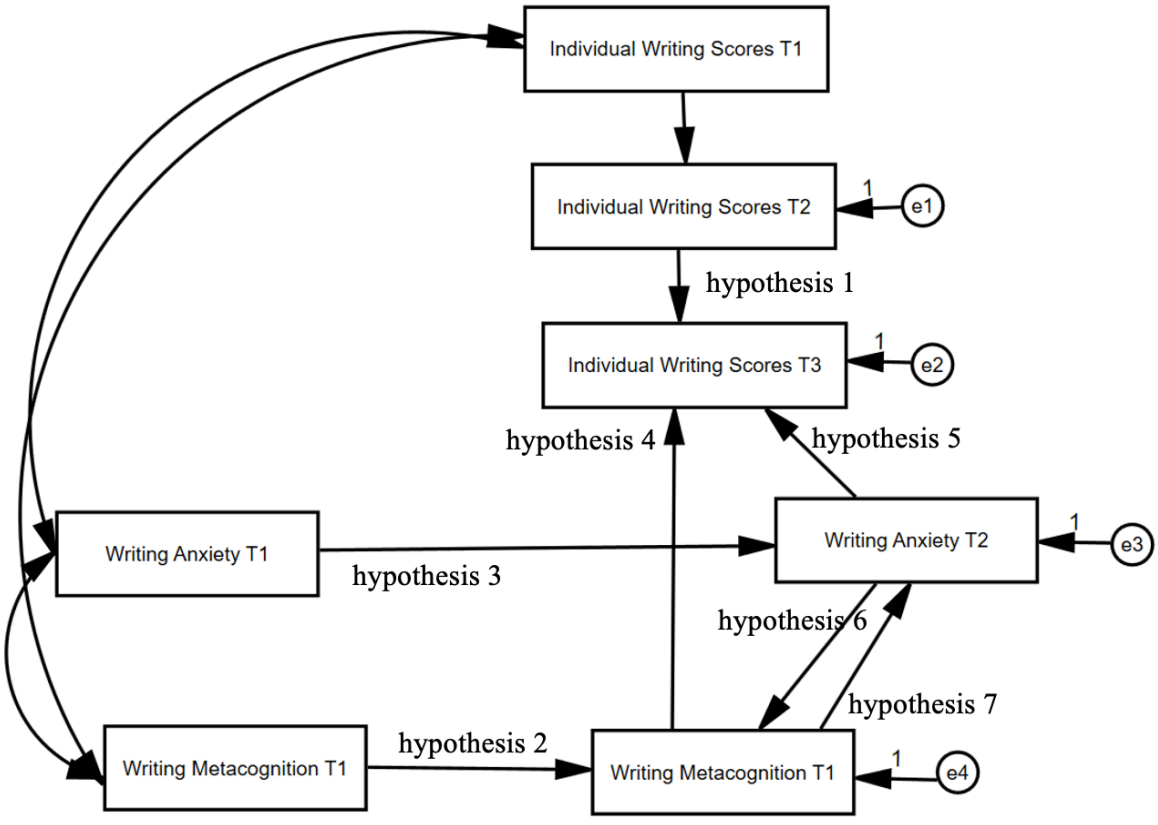


Figure 7. Proposed path analyses model and corresponding hypotheses

3.7.2 Qualitative analysis

This study applied content analysis to qualitatively examine a total of 233 pieces of reflective journals collected from experimental group students after each collaborative writing session. Content analysis is “a method for systematically describing the meaning of qualitative material. It is done by classifying material as instances of the categories of a coding frame” (Schreier, 2012, p.1). It is characterized by a structured approach that involves the development of a coding frame, the segmentation of text into manageable units, and the refinement of the coding frame to capture relevant themes (Dawson, 2009). The rationale for applying content analysis in this study lies in its alignment with the explanatory sequential mixed-methods design, aiming to provide an in-depth exploration of the quantitative results through qualitative insights. By concentrating on elements directly related to the quantitative analysis, content analysis facilitates a focused examination of the reflective journals, avoiding an exhaustive exploration of all aspects of the material. This method ensures that the qualitative data elucidate the quantitative findings, offering a comprehensive and targeted understanding of the research questions.

The implementation of content analysis in this study involved several steps. First, a coding frame was developed based on the research questions, categories covering individual writing performance, writing metacognition, and writing anxiety. Second, materials were divided into unit of coding, with each meaningful chunk (a sentence or a phrase) representing the smallest segment of content that can be analysed and categorized based on the coding frame. Third, the coding frame was tested on several pieces of reflective journals. Meanwhile, coding frame was evaluated and modified as the regular patterns of themes emerged. During this process, sub-categories were developed. Table 2 displays the coding frame, along with definitions and examples from reflective journals for each code. Finally, with the coding frame set, the main analysis was conducted on all reflective journals. The frequency of each code's occurrence was counted and documented to provide a comprehensive understanding of the data.

Table 2. Content analysis coding frame

Category & Subcategory	Code
Individual Writing Performance	
– Benefits in Linguistics	**Content:** The enhancement and enrichment of ideas and information in writing contents through collaborative efforts. e.g., "I had limited ideas, but after discussing with my partner, I could incorporate his/her insights into the essay." "It's less likely to go off-topic with others thinking along." **Language:** Improvement in the use of diverse sentence patterns, corrective grammar and advanced expressions through peer interaction. e.g., "I learned many different sentence structures and advanced expressions." "Communication helped us recall more good words and phrases." "Helped me correct many grammatical errors." **Coherence:** The enhancement of logical flow and clarity in writing achieved through collaborative exchange and organization. e.g., "Communication helps improve the logic of the essay." "Two people organizing the essay structure made it very clear."
– Challenges in Linguistics	**Content:** Difficulties in integrating divergent content and ensuring it aligns well within the collaborative context. e.g., "(Our) familiar content doesn't overlap." **Language:** Struggles with finding appropriate expressions and ending up with suboptimal choices. e.g., "Neither of us knew how to express it well, so we ended up choosing a very 'low' expression." **Coherence:** Issues with the logical connection and integration of separately written parts. e.g., "The separately written content didn't connect well." "We spent a lot of time on the initial parts, so the latter half was written very hastily."
Writing Metacognition	
– Benefits in Metacognition	**Metacognitive regulation:** Effective planning, monitoring, and evaluating of writing processes within the group. e.g., "The collaborative model helped with planning the writing process; we wrote an outline before starting the essay." "Helped me plan, write, and revise more reasonably." **Metacognitive knowledge:** Enhanced understanding and awareness of writing strategies and cognitive processes through shared experiences. e.g., "I learned some excellent structuring ideas." "Through mutual learning, I improved my writing proficiency and diversity; my writing methods became more flexible." "I learned different writing conception patterns from my partner."

– Challenges in Metacognition	**Cognitive overload:** Mental strain and confusion from managing conflicting viewpoints and ideas in collaborative writing. e.g., “Arguing endlessly over a single sentence.” “Conflicting viewpoints sometimes significantly impacted efficiency.” “Multiple ideas in group collaboration led to confusion.” **Loss of Autonomy:** The reduction in opportunities for independent thinking and personal issues due to the collaborative nature of the writing process. e.g., “I lost many opportunities for independent thinking.” “Writing alone would better reflect individual issues.”
Writing Anxiety	
– Benefits in Socio-emotional Development	**Smooth social engagement:** Positive and supportive interactions within the group enhancing the collaborative experience. e.g., “The group was very welcoming.” “Collaboration was very pleasant.” **Workload reduction:** The decrease in individual stress and increase in efficiency achieved by dividing tasks and roles within the group. e.g., “Dividing tasks improved efficiency as everyone knew their role.” “Being freed from some tasks allowed for better thinking; one could write while the other provided better suggestions.” **Writing enjoyment:** Increased enjoyment and reduced monotony in writing through collaboration. e.g., “Writing became less tedious.” “Group collaboration brought fresh ideas to my brain, making writing more interesting.”
– Challenges in Socio-emotional Development	**Communication barriers:** Difficulties in effectively communicating ideas and collaborating with partners. e.g., “No common language with the partner.” **Time stress:** Pressure arising from managing time and meeting deadlines collaboratively. e.g., “Not enough time.” “Disagreements on wording and content direction led to extended time use.” **Unequal participation:** Imbalance in the contributions and responsibilities among group members. e.g., “Difficult to divide responsibilities in collaboration.” “Partner was unwilling to participate in writing.”

3.7.3 Mixed analysis

To ensure a comprehensive understanding of the intervention’s impact, findings from the quantitative data (writing test scores and questionnaires) were triangulated with the

qualitative data from the reflective journals. For instance, qualitative insights from students' reflective journals on perceived benefits and challenges related to metacognitive writing skills could help explain the outcomes observed in the quantitative analysis in discussion section. This integration could help validate the results and provided a richer, more nuanced interpretation of the effects of collaborative writing activities on students' writing performance, anxiety, and metacognitive awareness.

3.8 Reliability and validity

3.8.1 Writing tests

This study examines inter-rater reliability to ensure consistent and valid scoring of three rounds student writings blindly rated by four teachers on a 0 to 20 scale. Inter-rater reliability refers to the degree of agreement among raters (Johnson & Christensen, 2020). Weighted Krippendorff's Alpha was selected as the measure of inter-rater reliability due to its ability to handle interval data (Gwet, 2014) and is reliable in handling the complexity of multiple raters (Antoine et al., 2014; Krippendorff & Craggs, 2016). This choice is particularly relevant given the 0 to 20 holistic scoring scale used in this study. In the context of essay scoring, minor disagreements (e.g., scores of 10 and 11) differ significantly from major discrepancies (e.g., scores of 10 and 15). Weighted Krippendorff's Alpha accounts for these variations by incorporating weights that reflect the magnitude of disagreements between raters. This weighted measure provides a more nuanced evaluation of agreement, which is essential when the differences between ratings are significant. Quadratic weighting was specifically chosen to ensure that larger differences between ratings are penalized more heavily than smaller ones. For instance, a disagreement between scores of ten and fifteen is more critical than a disagreement between ten and eleven. This approach aligns with the goal of maintaining high standards of consistency in academic assessments.

The weighted Krippendorff's Alpha analysis was conducted using Python 3.12. The scores from the four teachers for the 18 essays were organized into a matrix format. The krippendorff library was utilized to compute the alpha coefficient. The data were transposed to fit the expected input format for the krippendorff.alpha function, and a quadratic weighting function was defined to calculate the distance between scores. The resulting Weighted Krippendorff's Alpha was 0.93, indicating a high level of agreement among the raters. This high alpha value demonstrates that the four trained teachers provided consistent scores, supporting the reliability of the scoring process.

3.8.2 Writing anxiety scale

Reliability refers to the consistency and stability of a measurement instrument or test for the construct it measures (Field, 2018). To ensure the robustness of the Writing Anxiety Scale (WAS), both its reliability and validity were assessed. Internal consistency reliability was evaluated using Cronbach's alpha, which yielded a coefficient of 0.91. This high coefficient indicates strong internal reliability among the scale items. Construct validity, defined as the degree to which items on a test measure the same construct (Johnson & Christensen, 2020), was assessed through exploratory factor analysis (EFA). The Kaiser-Meyer-Olkin (KMO) measure verified the sampling adequacy for EFA, with a KMO value of 0.91. Additionally, Bartlett's test of sphericity was significant ($\chi^2 = 2683.617$, $df = 231$, $p < 0.001$), indicating that the data were highly suitable for factor analysis (Hutcheson & Sofroniou, 1999). The results of th EFA using Principal Axis Factoring and Varimax rotation with Kaiser Normalization revealed a four-factor solution (see Table 9 in appendix 6), which accounted for 60% of the total variance.

These four factors were cognitive anxiety, somatic anxiety, avoidance behaviour, and writing agency, with higher scores typically indicating higher levels of anxiety (see Table 10 in appendix 6). *Cognitive anxiety* included items related to mental stress and worry during the writing process, such as feeling nervous about evaluations and fearing poor grades. *Somatic anxiety* captured physiological responses to writing, including symptoms like trembling, sweating, and rapid heartbeat, particularly under time constraints. *Avoidance behaviour* reflected tendencies to avoid writing tasks or situations requiring writing in English, including making excuses to avoid writing and feeling blank when asked to write unexpectedly. *Writing agency* represented individual's sense of control, choice, and proactive engagement and preference for using English in writing tasks and actively seeking opportunities to write outside of class. It was recognized that writing agency may inherently oppose the notion of writing anxiety, with higher scores on writing agency indicating a lower level of anxiety. To maintain consistency across the questionnaire, this research reversed the scores of the items revealing high writing agency. This adjustment ensures that higher scores across all factors, including writing agency, uniformly reflect higher levels of anxiety, maintaining consistency and coherence in the composite scores and comparisons across different factors of writing anxiety.

3.8.3 Writing metacognition scale

The Writing Metacognition Scale (WMS) underwent an Exploratory Factor Analysis (EFA) to examine its factor structure, reliability, and validity. The results of Bartlett's test of

sphericity (χ^2=3020.202, df=435, p<0.001) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (KMO=0.86) indicated that the data were suitable for factor analysis, suggesting that the items were correlated and greatly suitable for factor extraction (Hutcheson & Sofroniou, 1999). The results of EFA revealed an eight-factor solution based on Principal Axis Factoring and Varimax rotation with Kaiser Normalization (see Table 11 in Appendix 7), accounting for 51% of the total variance. The names and descriptions of identified eight factors are displayed in Table 3. These factors aligned with the theoretical constructs of metacognitive knowledge (MK) and metacognitive regulation (MR) in Schraw's (1998) metacognition model. The identified factors and corresponding items were displayed in Table 12 in Appendix 7. One item (mr5) had very low communalities (0.17) along with loadings below 0.4, so it was subsequently removed from the analysis to enhance the factor structure's clarity and interpretability (Field, 2018).

Table 3. Identified factors from writing metacognition scale and descriptions

Dimensions	Factors	Sub-Dimensions	Descriptions
Metacognitive Regulation (MR)	1	MR-Evaluating	The evaluative reflection on the content, organization, and accuracy of the essays after writing.
	2	MR- Monitoring	The active monitoring of logical organization, language clarity, and word usage during the writing process.
	3	MR - Planning	The planning and consideration of genre, purpose, and audience before initiating the writing process.
Metacognitive Knowledge (MK)	4	MK - Task Organization	The assessment of whether the organization of essay fulfils the task requirements and maintains relevance to the topic.
	5	MK – Task Knowledge	The understanding of task requirements, setting appropriate writing goals, adhering to genre conventions, and utilizing knowledge of English discourse.
	6	MK - Strategic Knowledge	The implementation of composing processes, adapting revision steps as necessary, and prioritizing content development during writing.
	7	MK - Self-Efficacy and Confidence	The expression of interest and ease in English writing, confidence in audience engagement and habitual use of English during writing.
	8	MK - Self-Knowledge	The awareness of personal English writing competence, depth of knowledge in English writing, and familiarity with grading criteria for English essays

4 Results

This chapter is divided into three sections, each covering different aspects of the study's results. The first section presents the results from descriptive statistics, detailing students' overall individual writing achievement, and their levels of writing anxiety and metacognition over time. The second section focuses on utilizing path analysis results to address the research questions concerning the effectiveness of the collaborative writing intervention on students' individual writing performance, writing anxiety, and writing metacognition. Finally, the third section provides a content analysis of the experimental group participants' reflective journals, seeking to capture students' first-hand experiences during the collaborative writing activities.

4.1 Descriptive statistics

Table 4 provides the descriptive statistics for the full sample, as well as for the control and experimental groups separately. The statistics include mean, standard deviation (SD), minimum, and maximum values for writing scores across three writing sessions, writing anxiety at two time points (T1 and T2), and writing metacognition at two time points (T1 and T2). As Table 4 and Figure 8 show, the control group experienced a decrease in writing scores during the second session, followed by a recovery in the third session. In contrast, the experimental group maintained a comparatively steady performance across all three writing sessions. Additionally, Table 4 indicates that writing anxiety slightly reduced for the experimental group, while the control group's anxiety levels remained stable. Writing metacognition improved slightly in the experimental group but showed a slight decrease in the control group.

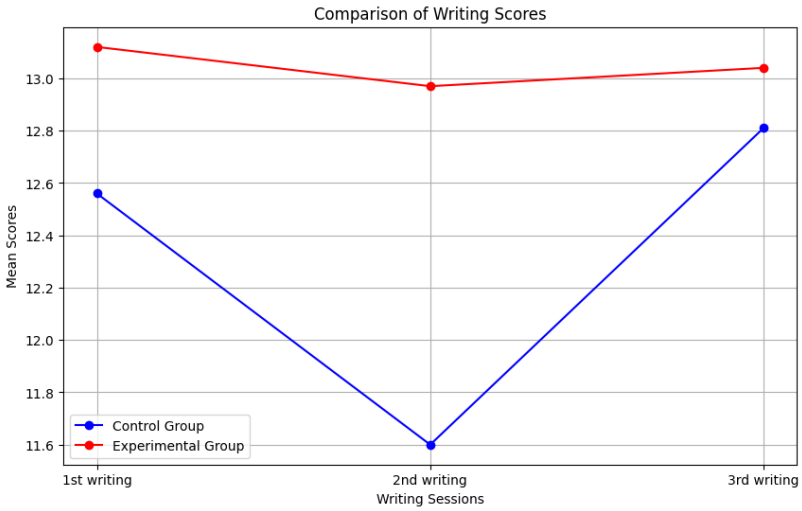


Figure 8. Comparison of writing scores across three writing assessments for control and experimental groups

Table 4. Descriptive statistics for full sample, control, and experimental groups

Groups	Variables	Mean	SD	Mini	Max
Full sample (N=238)	1st writing scores	12.84	2.28	5.0	18.0
	2nd writing scores	12.27	2.68	1.0	17.0
	3rd writing scores	12.92	2.52	1.0	18.0
	Writing anxiety T1	12.71	2.29	4.76	18.64
	Writing anxiety T2	12.56	2.17	5.25	19.4 1
	Writing Metacognition T1	28.10	3.53	17.36	36.78
	Writing Metacognition T2	28.23	3.97	11.75	39.53
Control group (N=121)	1st writing scores	12.56	2.39	5.0	18.0
	2nd writing scores	11.60	3.77	1.0	17.0
	3rd writing scores	12.81	2.57	1.0	18.0
	Writing anxiety T1	12.70	2.15	7.64	17.78
	Writing anxiety T2	12.71	2.25	5.25	19.41
	Writing Metacognition T1	27.75	3.58	17.35	36.21
	Writing Metacognition T2	27.41	4.29	11.75	39.53
Experimental group (N=117)	1st writing scores	13.12	2.13	7.0	18.0
	2nd writing scores	12.97	2.41	3.0	17.0
	3rd writing scores	13.04	2.49	7.0	18.0
	Writing anxiety T1	12.73	2.44	4.76	18.64
	Writing anxiety T2	12.40	2.09	7.93	17.13
	Writing Metacognition T1	28.45	3.46	22.39	36.78
	Writing Metacognition T2	29.08	3.41	22.05	36.74

4.2 Path analysis results

The path analyses results are displayed in Figure 9 for control group and Figure 10 for experimental group. Table 5 shows the results of the multiple group comparison between the experimental and control groups. The model comparison results indicate no significant differences in structural weights between the experimental and control groups ($p = 0.543$). Most of the individual path comparisons also show non-significant differences with all paths $p>0.05$, suggesting similar structural relationships in both groups. Table 6 displays the path analysis results for the experimental group, while Table 7 provides the results for the control group only.

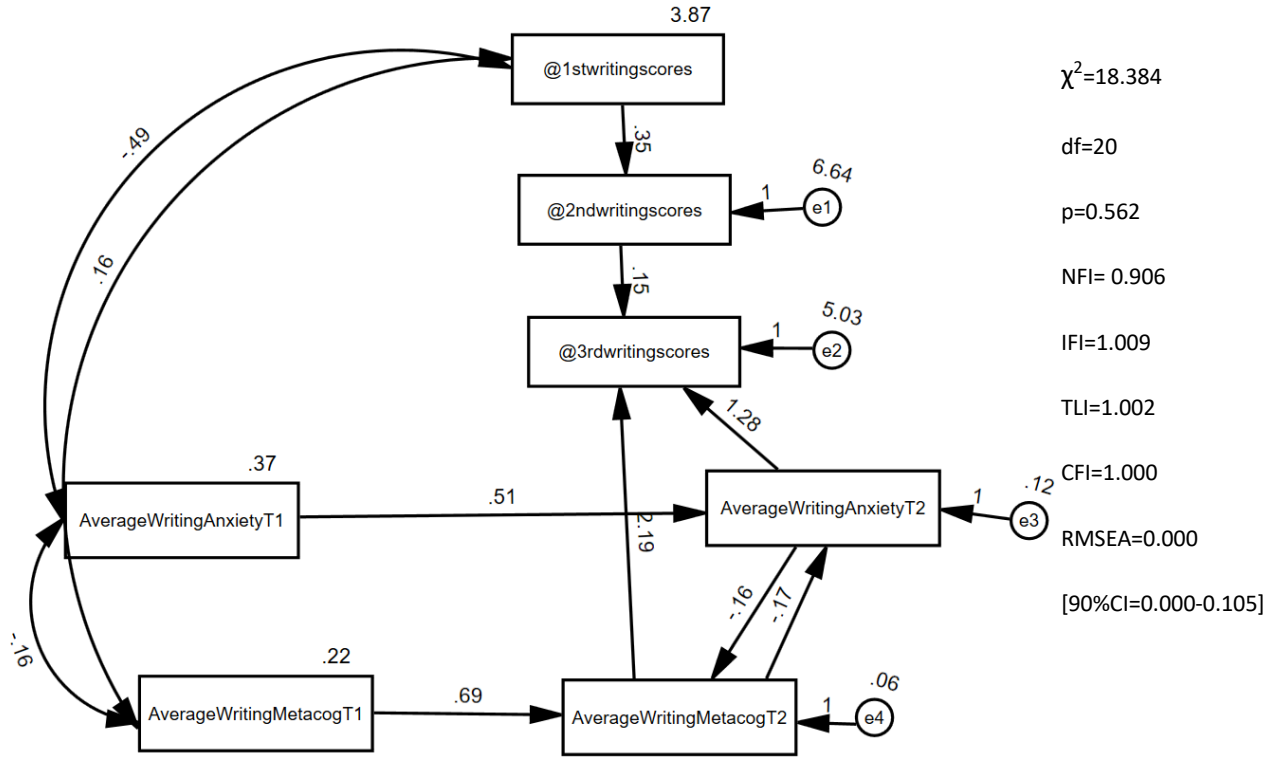


Figure 9. Path analyses results for control group

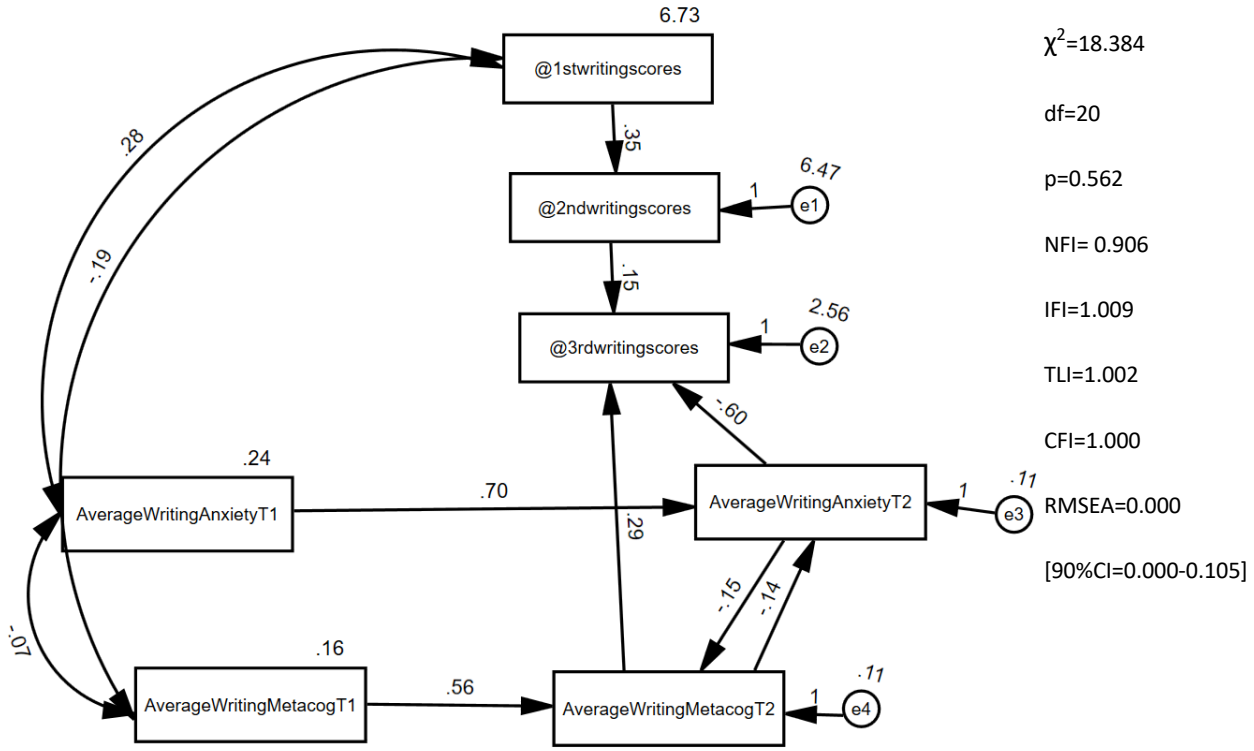


Figure 10. Path analyses results for experimental group

Table 5. Multiple group comparisons between experimental and control groups

Model	DF	CMIN	p	NFI	IFI	RFI	TLI
Structural weights	8	6.943	.543	.036	.041	-.017	-.022
Writing T1-Writing T2	1	.000	.997	.000	.000	-.010	-.013
Writing T2 -Writing T3	1	.571	.450	.003	.003	-.005	-.007
Metacognition T2 - Writing T3	1	2.211	.137	.011	.013	.009	.011
Anxiety T2 – Writing T3	1	2.999	.083	.015	.018	.016	.020
Anxiety T1 - Anxiety T2	1	1.412	.235	.007	.008	.002	.003
Metacognition T1-Metacognition T2	1	.602	.438	.003	.004	-.005	-.006
Anxiety T2- Metacognition T2	1	.009	.924	.000	.000	-.010	-.013
Metacognition T2 – Anxiety T2	1	.015	.901	.000	.000	-.010	-.013

Table 6. Path analysis results for the effects of individual writing performance, writing anxiety, and writing metacognition for control group

Paths			Estimate	S.E.	C.R.	p
Writing T2	<---	Writing T1	.697	.109	6.367	***
Writing T3	<---	Writing T2	.561	.136	4.142	***
Writing T3	<---	Metacognition T2	.316	.629	.502	.616
Writing T3	<---	Anxiety T2	-.587	.539	-1.089	.276
Metacognition T2	<---	Metacognition T1	.348	.150	2.327	.020
Anxiety T2	<---	Anxiety T1	.184	.090	2.039	.041
Metacognition T2	<---	Anxiety T2	-.139	.156	-.890	.373
Anxiety T2	<---	Metacognition T2	-.146	.134	-1.086	.277

Note: ***p<0.001

Table 7. Path analysis results for the effects of individual writing performance, writing anxiety, and writing metacognition for experimental group

Paths			Estimate	S.E.	C.R.	p
Writing T2	<---	Writing T1	.511	.112	4.551	***
Writing T3	<---	Writing T2	.690	.101	6.840	***
Writing T3	<---	Metacognition T2	2.063	.964	2.141	.032
Writing T3	<---	Anxiety T2	1.207	.868	1.391	.164
Metacognition T2	<---	Metacognition T1	.349	.210	1.666	.096
Anxiety T2	<---	Anxiety T1	.060	.134	.447	.655
Metacognition T2	<---	Anxiety T2	-.167	.172	-.971	.332
Anxiety T2	<---	Metacognition T2	-.162	.108	-1.495	.135

Note: ***p<0.001

RQ1: To what extent does collaborative writing affect EFL secondary students' individual writing performance?

For individual writing scores, students in the experimental group received regular writing instruction between T1 and T2, while they participated in collaborative writing activities between T2 and T3. In response to the first research question, the path coefficient from the T2 to T3 writing score is 0.697 ($p < 0.001$) in experimental group (see Table 7), indicating a large positive effect from the interventions between T2 and T3. Likewise, the path coefficient from the T1 to T2 writing score is 0.561 ($p < 0.001$) in control group (see Table 6), also indicating a large positive effect from the regular teaching between T1 and T2. This aligns with the multiple group comparison results for the path "WritingT2-WritingT3" (see Table 5), which show no significant differences in writing score changes between the groups ($p = 0.571>0.05$).

Hence, the analysis shows that collaborative writing has a positive impact on individual writing performance, as evidenced by the significant improvement in writing scores from T2 to T3 in the experimental group. However, according to the multiple group comparison results, the collaborative writing activities did not result in significantly different outcomes compared to the regular instruction, indicating that both methods are effective in enhancing EFL secondary students' individual writing performance.

RQ2: Do writing anxiety and/or metacognition mediate this relationship?

In the experimental group, both writing metacognition (Estimate = 0.316, $p = 0.616>0.05$) and writing anxiety (Estimate = -0.587, $p = 0.276>0.05$) did not significantly predict the third writing score, indicating a lack of mediation effect. For the control group, writing metacognition significantly predicted the third writing score (Estimate = 2.063, $p = 0.032<0.05$), suggesting a very small mediation effect of writing metacognition in regular instruction. Writing anxiety, however, did not show a significant mediation effect (Estimate = -0.459, $p = 0.317>0.05$) in control group.

In terms of multiple group comparisons, while writing metacognition demonstrates a slight mediation effect in the control group, this effect is not significantly different from the experimental group based on the multiple group comparison results in the path "Metacognition T2 - Writing T3" ($p = 0.137>0.05$). For writing anxiety, it does not exhibit a significant mediation effect in either group, in line with the multiple group comparison in the path "Anxiety T2 – Writing T3" ($p = 0.083>0.05$) supporting that there is no significant difference between the groups in this regard. Therefore, neither writing anxiety nor writing

metacognition are significant mediators between instructional input (lectures from teachers/collaborative writing from peers) and individual writing performance across groups.

RQ3: Do writing anxiety and metacognition affect one another?

To address RQ3, whether writing anxiety and metacognition influence each other in both the experimental and control groups was examined. In the experimental group, writing metacognition at Time 2 does not significantly affect writing anxiety at Time 3 (Estimate = 0.215, p = 0.512>0.05). Similarly, writing anxiety at Time 2 does not significantly influence writing metacognition at Time 3 (Estimate = -0.493, p = 0.264>0.05). These findings suggest that, within the context of collaborative writing interventions, changes in writing metacognition and anxiety do not significantly impact each other. In the control group, writing metacognition at Time 2 significantly affects writing anxiety at Time 3 (Estimate = 1.521, p = 0.029<0.05). The positive estimate indicates that an increase in metacognitive skills is associated with an increase in writing anxiety. This suggests that improved metacognitive skills through regular instruction might lead to greater awareness of writing challenges, thus increasing anxiety. However, writing anxiety at Time 2 does not significantly influence writing metacognition at Time 3 in control group (Estimate = -0.378, p = 0.396 > 0.05), indicating that changes in anxiety levels do not significantly impact metacognitive skills over time.

Multiple group comparisons reveal no significant differences between the experimental and control groups in how writing metacognition and anxiety affect each other (Metacognition T2 to Anxiety T3, p = 0.198>0.05; Anxiety T2 to Metacognition T3, p = 0.243>0.05). These non-significant p-values from multiple group comparisons indicate no substantial differences between the groups in terms of how writing metacognition and anxiety influence one another.

RQ4: To what extent does collaborative writing affect EFL secondary students' writing anxiety?

In the experimental group, the path coefficient from Anxiety T1 to Anxiety T2 is 0.06 (p = 0.655>0.05), indicating no significant change in anxiety due to the collaborative writing interventions. In contrast, in the control group, the path coefficient from Anxiety T1 to Anxiety T2 is 0.184 (p = 0.041<0.05), showing a slight but significant increase in anxiety from regular instruction. However, the multiple group comparison results for the path "Anxiety T1 – Anxiety T2" (p = 0.137>0.05) indicate that there is no significant difference in changes in writing anxiety between the experimental and control groups. This suggests that while regular

instruction leads to a slight increase in anxiety, this increase is not significantly different from the changes observed with collaborative writing interventions.

RQ5: To what extent does collaborative writing affect EFL secondary students' writing metacognition?

In the experimental group, the path coefficient from Time 1 to Time 2 writing metacognition is 0.316 ($p = 0.616>0.05$), indicating no significant improvement in writing metacognition due to the collaborative writing interventions. In the control group, the path coefficient from Metacognition T1 to Metacognition T2 is 0.150 ($p = 0.020<0.05$), showing that traditional teaching methods could positively affect students' writing metacognitive skills. Multiple group comparisons for the path "Metacognition T1 - Metacognition T2" ($p= 0.438>0.05$) indicate no significant difference between the experimental and control groups. Thus, the impact on writing metacognition does not significantly differ between collaborative writing and regular instructional methods.

4.3 Content analysis results

According to Table 8, the content analysis of reflective journals from participants in collaborative writing groups reveals a multifaceted impact on individual writing performance, metacognition, and socio-emotional development. When comparing the three dimensions, students reported linguistic benefits and challenges more frequently than those related to socio-emotional development and metacognition. This suggests that linguistic improvements and issues are more immediately noticeable in collaborative writing settings. Furthermore, students predominantly reported beneficial rather than challenging experiences across the two rounds of collaborative writing activities. A total of 132 students from the experimental group submitted reflective journals after the first round, and 101 students submitted journals after the second round, resulting in 233 respondents. Specifically, 176 respondents (75.5%) reported benefits in individual writing performance, 78 respondents (33.5%) mentioned benefits in writing metacognition, and 120 respondents (51.5%) noted benefits in socio-emotional development. This suggests a broad consensus among students that collaborative writing enhances their skills and experiences in multiple ways. This suggests a broad consensus among students that collaborative writing enhances their skills and experiences in multiple ways. This suggests a broad consensus among students that collaborative writing enhances their skills and experiences in multiple ways.

Table 8. Content analysis results

Categories	Subcategories	Code	Code frequency	Subcategory frequency	Category frequency
Individual writing performance	Benefits in Linguistics	Content	51 (21.9%)	176 (75.5%)	187 (80.3%)
		Language	99 (42.5%)		
		Coherence	26 (11.2%)		
	Challenges in Linguistics	Content	5(2.1%)	11 (4.7%)	
		Language	1 (0.4%)		
		Coherence	5 (2.1%)		
Writing metacognition	Benefits in metacognition	Metacognitive regulation	29 (12.4%)	78 (33.5%)	119 (51.1%)
		Metacognitive knowledge	49 (21.0%)		
	Challenges in metacognition	Cognitive overload	33 (14.2%)	41 (17.6%)	
		Loss of Autonomy	8 (3.4%)		
Writing anxiety	Benefits in socio-emotional development	Smooth social engagement	63 (27.0%)	120 (51.5%)	155 (66.5%)
		Workload reduction	45 (19.3%)		
		Writing enjoyment	12 (5.2%)		
	Challenges in socio-emotional development	Communication barriers	11 (4.7%)	35 (15.0%)	
		Time stress	15 (6.4%)		
		Unequal participation	9 (3.9%)		

Notes: the calculation of percentages is based on the total number of 233 respondents

In the category of individual writing performance, the most significant benefits were observed in linguistic aspects, with content (21.9% of respondents), language (42.5% of respondents), and coherence (11.2% of respondents) being enhanced through collaboration. Although less frequent, challenges were mainly related to coherence (2.1% of respondents) and content integration (2.1% of respondents), indicating the potential difficulties in merging individual thoughts into a cohesive whole in collaborative writing.

In terms of writing metacognition, students reported substantial benefits in metacognitive regulation (12.4% of respondents) and metacognitive knowledge (21.0% of respondents), highlighting improvements in planning, monitoring, and understanding writing strategies. Collaborative discussions and planning were seen as critical in enhancing their writing processes. However, cognitive overload (14.2% of respondents) was a significant challenge, reflecting the mental strain from managing conflicting viewpoints and ideas within the group. This suggests that while collaboration aids metacognitive development, it can also introduce complexity and stress for cognition.

As for factors relevant with writing anxiety, the socio-emotional benefits of collaborative writing were pronounced, with smooth social engagement (27.0% of respondents) and

workload reduction (19.3% of respondents) being the most frequently cited advantages. Students valued the positive interactions and the efficiency gained from dividing tasks, which potentially reduced individual stress and made writing more enjoyable. However, communication barriers (4.7% of respondents), time stress (6.4% of respondents), and unequal participation (3.9% of respondents) were significant challenges, indicating difficulties in effective communication and time management within collaborative settings.

5 Discussion

The present study evaluates the impact of collaborative writing on EFL secondary students' individual writing performance, writing anxiety, and metacognitive skills. This section explores the implications of the findings regarding the effects of collaborative writing on individual writing performance, writing anxiety, and writing metacognition. The discussion is organized into several key areas: first, the effect of collaborative writing on individual writing performance will be examined. Next, the impact of collaborative writing on writing anxiety will be addressed. Following this, the effects of collaborative writing on writing metacognition will be analysed. Additionally, the interaction relationships among writing metacognition, writing anxiety, and individual writing performance will be explored to uncover the complex dynamics between these constructs. Finally, the limitations of the study will be discussed, acknowledging constraints that may have influenced the results and offering recommendations for future research. This comprehensive overview aims to enhance understanding of the role of collaborative writing in shaping students' writing experiences and outcomes.

5.1 Effect of collaborative writing on individual writing performance

The significant path coefficients in both the experimental and control groups indicate that students' writing performance improved over time regardless of the instructional method—whether collaborative writing or regular teaching. On one hand, this finding aligns with existing literature showing that collaborative writing activities could enhance students' writing skills (e.g., Anggraini et al., 2022; Anshu & Yesuf, 2022; Khatib & Meihami, 2015). In the current research, students engaged in collaborative writing reported in their reflective journals that they benefited most from improvements in language use and content development, in accordance with the findings of Hsu and Lo (2018). This positive impact can be attributed to the interactive nature of the activities (Zhu & Carless, 2018). Stell (2018) observed that collaboration encourages students to engage in language-related episodes (LREs), which help them refine their language skills and negotiate meaning for a more nuanced understanding of the subject matter and richer content through peer feedback. This finding aligns with sociocultural constructivist perspectives, which suggest that learners can achieve higher levels of understanding and skill acquisition through scaffolding from and collaborative

interactions with more knowledgeable peers within the Zone of Proximal Development (ZPD) (De Guerrero & Villamil, 2000).

On the other hand, this study found that traditional instructional methods, involving implicit instructions and individual practice, have also been shown to improve writing performance. This echoes the findings of Graham and Perin (2007), who demonstrated that explicit instruction in writing strategies, coupled with regular practice, leads to significant gains in students' writing skills. The effectiveness of traditional teaching and learning methods could be attributed to their structured approach, which provides students with clear explicit guidelines and systematic feedback on their writing (Chen, 2022). These explicit instruction methods help students understand and internalize fundamental writing principles with specific focus on core assessment criteria, such as use of language and organization (Elander et al., 2006). Therefore, while collaborative writing offers unique advantages, such as peer interaction and feedback, traditional explicit writing strategy instructions may still remain a vital component of effective writing pedagogy.

However, the multiple group comparison revealed no significant difference between the groups, suggesting that collaborative writing and regular teaching would be equally effective in promoting students' writing performance. This comprehensive finding suggests that multiple instructional approaches could lead to similar learning outcomes. This is supported by what De Smedt et al. (2020) have found that a mix of peer-assisted learning and explicit instruction from teachers resulted in greater writing gains compared to using a single method. By blending collaborative writing with traditional approaches, teachers may be able to create a more dynamic and inclusive learning culture that caters to different learning styles and preferences (Valiandes et al., 2018). Therefore, in line with constructivist theories that emphasize the importance of diverse learning experiences (Vygotsky, 1978), it is suggested that educators could incorporate a variety of instructional methods in their teaching practices. Furthermore, recognizing that both collaborative and individual writing can yield positive outcomes encourages educators to remain flexible in their instructional strategies. Nonetheless, the decision to implement collaborative writing interventions should be weighed against their potential time and energy costs and the specific context of the educational setting. By maintaining a flexible and evidence-based approach, educators could optimize writing instruction to enhance student performance effectively in different contexts.

This multiple group comparison outcome in the present study revealing no difference between groups, however, is in contrast to Li (2023), who found that the collaborative writing

group experienced significantly greater improvements in writing performance. One possible explanation for this discrepancy is the difference in intervention duration. Kessler and Bikowski (2010) noted that the length of the intervention could impact the effectiveness of collaborative writing since collaboration may take time to develop. While both studies were conducted in mainland China, Li's (2023) study lasted thirteen weeks, compared to just five weeks in the current study, providing more time for students to adapt and benefit from the collaborative writing process. Another possible reason for the differing outcomes is the design and structure of the collaborative writing tasks between the two studies. Numerous studies on computer-assisted collaborative writing revealed that technology offers a convenient platform for students, enhancing their engagement and cooperation (Alwahoub et al., 2022; Rahimi & Fathi, 2022). For instance, Li (2023) employed an online platform that facilitated real-time collaboration and peer feedback, likely boosting student engagement and interaction. In contrast, the current study utilized a traditional paper-based approach to collaborative writing due to a lack of equipment available for every secondary student in the EFL writing class. This limitation may have hindered the same level of interaction and engagement among students (Zheng et al., 2021). Nevertheless, the effectiveness of using technology in collaborative writing also remains a topic of debate. For example, Ho and Savignon (2007) conducted a classroom-based study comparing the effects of written corrective feedback on accuracy in pen-and-paper versus computer-mediated collaborative writing, finding no significant differences between the two environments in terms of feedback processing. However, given the advancements in technology since their study, it is essential to revisit this comparison. Further research is needed to assess the effectiveness of pen-and-paper versus computer-mediated writing, particularly in the context of collaborative tasks. To sum up, to address these discrepancies, future research should examine the optimal duration and structure of collaborative writing interventions, as well as the effects of different collaborative environments on student outcomes. By identifying the specific conditions that enhance the effectiveness of collaborative writing, educators could design instructional strategies that maximize student learning and engagement (Li, 2018).

5.2 Effect of collaborative writing on writing anxiety

This study found that while the collaborative writing interventions did not lead to significant changes in students' anxiety levels, the control group experienced a slight but statistically significant increase in anxiety. This finding aligns with the conclusions of Huang et al. (2021), which suggest that collaborative writing could help stabilize or reduce writing

anxiety. The maintenance of anxiety levels may be attributed to the supportive and inclusive environment created by collaboration (Lakkala et al., 2021). Further support for this explanation comes from qualitative data collected in this study, where a significant portion of students reported positive experiences involving smooth social engagement (27.0% of respondents), workload reduction (19.3% of respondents), and writing enjoyment (5.2% of respondents) in their reflective journals during collaborative writing activities. These positive experiences suggest that the collaborative nature of the tasks allows students to feel more connected to their peers and less isolated, which in turn enhances their motivation and engagement in navigating writing challenges. In contrast, the results revealing control group's increase in anxiety highlights the potential drawbacks of traditional instructional methods. To elaborate, such teacher-centred conventional approaches may not adequately address individual students' emotional needs, often leading to heightened anxiety regarding writing tasks (Jeon, 2018). Research indicates that teacher-centred methods can increase anxiety by placing greater emphasis on individual performance and evaluation, but they often lack sufficient and effective individual feedback to guide students in their writing development (Tsai, 2012). Therefore, educators should create a more positive learning atmosphere that encourages personal growth and confidence in writing, and collaborative writing activities could be one effective learner-centred approaches that prioritize feedback and interaction.

It is important to note that the multiple group comparisons revealed no significant differences in changes in writing anxiety between the groups. While the collaborative writing approach effectively prevented an increase in anxiety, it did not significantly reduce anxiety levels compared to the control group. This may be partly due to the challenges of collaborative writing identified in qualitative data, including communication barriers (4.7% of respondents), time stress (6.4% of respondents), and unequal participation (3.9% of respondents). Although collaboration can foster supportive relationships, these stressors may hinder the process and negatively impact students' experiences. For instance, communication barriers can lead to misunderstandings, causing frustration and reducing writing focus (Rahimi & Fathi, 2022), while time spent debating ideas may limit efficient time devoted to writing task completion and thus increase anxiety (Alkhalaf, 2020). Furthermore, Zhang's (2022) findings indicate that unequal participation significantly affects both the quantity and quality of L2 learning opportunities in collaborative settings, suggesting that imbalances in contribution can exacerbate anxiety among students. Thus, simply implementing collaborative writing tasks may not alleviate writing anxiety. Educators should consider these challenges when designing activities and strive to create an environment that promotes positive interactions. Effective

strategies might include allowing self-selection of groups based on social relationships to improve pair dynamics, establishing clear expectations for group dynamics, and providing ample time for collaboration to mitigate writing-related pressure.

5.3 Effect of collaborative writing on writing metacognition

The current study found that collaborative writing did not result in a significant improvement in writing metacognition among EFL secondary students, as indicated by the lack of notable change in the experimental group. In contrast, the control group demonstrated a significant enhancement in metacognitive skills; however, multiple group comparisons showed no significant differences between the two approaches. This suggests that while traditional methods were effective, the collaborative writing approach did not provide a distinct advantage or disadvantage over conventional teaching in promoting metacognitive development.

In this study, it was assumed that students in the experimental group would implicitly acquire metacognitive knowledge and regulation through peer interactions during the collaborative writing process. However, the findings from Teng (2022) revealed that the combination of metacognitive instruction and cooperative practice opportunities yields the most significant improvements in writing metacognition, outperforming both collaborative group work alone and metacognitive instruction alone. In light of these findings, it appears that the collaborative writing activities alone in this study may not have been sufficient to enhance metacognitive skills without the support of explicit metacognitive strategy instructions. In the control group, the teacher likely had more time to explicitly instruct students on various writing techniques, which may potentially improve students' metacognitive skills in writing. This is in accord with existing findings in Guo et al. (2021), where participants from different schools reported that their English teachers commonly utilized process-based instruction in L2 writing classes, which effectively promoted their writing metacognitive knowledge and self-regulation strategies, including self-initiation, self-monitoring, and revising techniques.

Additionally, previous studies have found that explicit training in collaborative writing significantly helped students navigate positive interaction and learning opportunities throughout the planning, writing, and revising stages (Bui & Kong, 2019; Chen & Hapgood, 2021). This may particularly be relevant given that a significant number of students reported experiencing cognitive overload (14.2% of respondents) in the current study, which stemmed

from cognitive burden and struggle with conflicting viewpoints and ideas during interactions. Chen and Hapgood (2021) further emphasized that effective metacognitive training should encompass three types of knowledge: declarative knowledge (understanding the definition, advantages, and disadvantages of collaborative writing), procedural knowledge (learning specific procedures and techniques for effective collaborative writing), and conditional knowledge (examining successful collaboration examples). By equipping students with such comprehensive training, they would be better prepared to manage their writing processes and contribute effectively to group tasks. Hence, to enhance the effectiveness of collaborative writing in developing metacognitive skills, educators should consider incorporating explicit metacognitive training into their instructional practices. This could involve structured workshops or lessons that emphasize the importance of metacognitive awareness in writing, along with practical strategies for self-regulation and reflection.

5.4 Interaction relationship among writing metacognition, writing anxiety, and individual writing performance

This study uncovered an absence of an interaction relationship among writing metacognition, writing anxiety, and individual writing performance in the context of collaborative writing research. These results may be attributed to two primary reasons. One major reason for the lack of a significant interaction, as the previous discussion revealed, may be the minimal observed changes in both writing metacognition and writing anxiety. When the changes in these variables are subtle, their potential interactions may not be easily observable or significant enough to impact individual writing performance. Research indicates that metacognitive skills can be difficult to measure, especially when improvements are incremental rather than dramatic (Veenman et al., 2006). Similarly, writing anxiety may not fluctuate significantly in response to collaborative writing interventions if students are already accustomed to the writing process or if the collaborative environment does not adequately address their anxieties.

The second reason for the lack of an interaction relationship could be the inherent complexity and dynamism of the learning environment (Mercer, 2011). Writing is influenced by a multitude of factors, including individual differences (e.g., prior knowledge, motivation) (Chen & Yu, 2019), social dynamics within the group (Dobao & Blum, 2013; Zhang, 2019), and contextual elements (e.g., instructional practices, feedback mechanisms) (Guasch et al., 2013). These factors could play more significant roles than metacognition and anxiety in determining writing performance. However, due to constraints in time and resources, it is impossible for

this study to cover every potential variable. Particularly, factors such as individual differences in motivation, prior writing experience, and specific instructional strategies employed by teachers were not comprehensively examined. These factors are also found to significantly interact with writing performance and may have played a more substantial role in the outcomes observed (Coutinho & Neuman, 2008; Sun & Zhang, 2023).

5.5 Limitations

The limitations identified in the current study may influence its results in several ways. First, while the research benefited from a large sample size of 117 students in the experimental group and 121 students in the control group. The involvement of multiple teachers across different classes introduced variability in teaching styles and philosophies, which impacted the consistency of the collaborative writing activities. Each teacher's unique approach to instruction could have led to differences in how collaborative writing was implemented, affecting student engagement and the overall effectiveness of the intervention (Talib & Cheung, 2017). For instance, while the experimental group teacher initially agreed to collaborate, her preference for traditional lecturing likely resulted in reduced time for meaningful collaborative engagement. This inconsistency in treatment could have weakened the potential benefits of collaborative writing on students' metacognitive skills and writing performance, ultimately obscuring the true impact of the intervention.

Second, this study's quasi-experimental design, while beneficial in providing authentic insights, also restricted opportunities for conducting collaborative writing activities. Due to the pressures of examination schedules and the overall rigidity of the curriculum, the research was limited to only two rounds of collaborative activities. This insufficiency likely hindered the ability to fully capture the benefits of collaborative writing over time (Chen & Yu, 2019). More extensive engagement in collaborative tasks may have led to significant improvements in writing metacognition and reduced anxiety, but the limited exposure prevented a thorough investigation of these potential outcomes. Therefore, future longitudinal research is recommended to examine the long-term effects of collaborative writing activities.

Lastly, the collaborative nature of the writing tasks may have introduced other variables, such as the effectiveness of peer interactions and the distribution of roles within groups, that were not thoroughly examined due to the study's limited resources and time constraints. Understanding how peer interactions and group roles affect collaborative writing outcomes is crucial, as these elements can significantly impact student engagement and learning, as it also

plays significant role in influencing the dynamics on language learning in group activities (Elabdali & Arnold, 2020; Zhang, 2019). Thus, future studies should consider a more comprehensive approach to exploring these variables, including the dynamics of group interactions and the impact of different collaborative structures on outcomes.

6 Conclusion

This study investigated the effects of collaborative writing on individual writing performance, writing anxiety, and writing metacognition among high school students, comparing the outcomes of collaborative writing with traditional teaching methods employed in the control group. The findings revealed that both groups experienced significant improvements in individual writing performance after treatments, with no notable differences between the experimental and control groups. Additionally, while the control group exhibited significantly higher writing anxiety and metacognition over time, the experimental group did not show any change in writing anxiety and metacognition across time, with no significant differences between the groups. These results suggest that while collaborative writing may enhance writing skills over time in the experimental group, it may not provide statistically significant benefits over traditional individual writing approaches within the scope of this study.

Despite these outcomes, the research demonstrated several notable strengths. The considerable sample size provides valuable insights for the practicality of collaborative writing in large class settings and discusses the potential of incorporating a variety of instructional methods into classroom practice based on specific needs and context. In addition, the use of triangulation, combining quantitative data from writing tests together with questionnaires and qualitative insights from reflective journals, adds depth to the analysis, with quantitative results supported and explained by the qualitative findings. However, several limitations were identified. The limited time frame for this master's thesis restricted the ability to conduct a long period longitudinal study that could fully capture the sustained effects of collaborative writing. Furthermore, while the study analysed individual thoughts and reflections, which provided valuable insights into students' perceptions and experiences during the collaborative writing process, it did not thoroughly explore the influence of peer interactions and role distribution within groups, which may provide deeper insights into the dynamics of collaborative writing.

This research is significant both theoretically and practically. Theoretically, the current study contributes to the growing body of literature on the impact of collaborative writing by highlighting that collaborative writing does not necessarily lead to lower anxiety levels or higher writing metacognition compared to traditional methods. It also discusses the potential influence of intervention design details on the effects of collaborative writing. Practically, the findings suggest that educators might consider incorporating collaborative writing activities

into their curricula to enhance student engagement in writing classes, improve writing outcomes, and foster a positive attitude towards writing, while also being mindful of potential metacognitive burdens. Future research should address the identified limitations by conducting longer intervention periods, tracking student performance and feedback over time, and exploring the intricacies of group dynamics in collaborative writing. By doing so, the field could develop a deeper understanding of how collaborative writing can be effectively implemented to support student learning.

References

Abolhasani, H., Golparvar, S. E., & Robatjazi, M. A. (2022). Modelling the role of L2 writing anxiety in graph-based composing performance and strategy use. *Journal of Psycholinguistic Research*, *51*(2), 417-435. https://doi.org/10.1007/s10936-022-09858-8

Aglina, E. F., Rohmatillah, R., & Syamsiah, N. (2020). The correlation between students' metacognitive awareness and their anxiety in writing performance. *English Education: Jurnal Tadris Bahasa Inggris*, *13*(1), 63-74. http://dx.doi.org/10.24042/ee-jtbi.v13i1.6594

Alrabai, F. (2014). The influence of teachers' anxiety-reducing strategies on students' foreign language anxiety. *Innovation in Language Teaching and Learning*, *9*(2), 1- 18. https://doi.org/10.1080/17501229.2014.890203

Al-Ahdal, A. A. M. H., & Abduh, M. Y. M. (2021). English writing proficiency and apprehensions among Saudi College students: Facts and remedies. *TESOL international journal*, *16*(1), 34-56.

Aljaafreh, A., & Lantolf, J. P. (1994). Negative feedback as regulation and second language learning in the zone of proximal development. *The modern language journal*, *78*(4), 465-483.

Al-Jarrah, T. M., Mansor, N., & Ab Rashid, R. (2018). The impact of metacognitive strategies on Jordanian EFL learners' writing performance. *International Journal of English Linguistics*, *8*(6), 328-339. https://doi.org/10.5539/ijel.v8n6p328

Alkhalaf, N. A. (2020). Saudi female EFL learners and collaborative writing: attitudes and challenges. *Theory and Practice in Language Studies*, *10*(9), 1118-1127.

Al-Sawalha, A. M. S., Chow, T. V. V., & Foo, T. V. (2012). The effects of writing apprehension in English on the writing process of Jordanian EFL students at Yarmouk University. *International Interdisciplinary Journal of Education*, *1*(1), 6-14.

Alwahoub, H. M., Jomaa, N. J., & Azmi, M. N. L. (2022). The impact of synchronous collaborative writing and Google Docs collaborative features on enhancing students' individual writing performance. *Indonesian Journal of Applied Linguistics*, *12*(1), 113-125. https://doi.org/10.17509/ijal.v12i1.46541

Alwaleedi, M. A. (2017). Examining language related episodes (LREs) of Arabic as a second language (ASL) learners during collaborative writing activities. *Theory and Practice in Language Studies*, *7*(4), 256.

Anggraini, R., Rozimela, Y., & Anwar, D. (2020). The effects of collaborative writing on EFL learners' writing skills and their perception of the strategy. *Journal of language teaching and research*, *11*(2), 335-341.

Anshu, A. H., & Yesuf, M. Y. (2022). Effects of Collaborative Writing on EFL Students' Paragraph Writing Performance: Focus on Content and Coherence. *International Journal of Education and Literacy Studies*, *10*(1), 36-47.

Aydin, Z., & Yildiz, S. (2014). Use of wikis to promote collaborative EFL writing.

Azizi, M., Nemati, A., & Estahbanati, N. (2017). Meta-cognitive awareness of writing strategy use among Iranian EFL learners and its impact on their writing performance. *International Journal of English Language & Translation Studies*, *5*(1), 42-51.

Bailey, D. R., & Almusharraf, N. (2022). A structural equation model of second language writing strategies and their influence on anxiety, proficiency, and perceived benefits with online writing. *Education and information technologies*, *27*(8), 10497-10516. https://doi.org/10.1007/s10639-022-11045-0

Balta, E. E. (2018). The Relationships among Writing Skills, Writing Anxiety and Metacognitive Awareness. *Journal of Education and Learning*, *7*(3), 233-241. https://doi.org/10.5539/jel.v7n3p233

Bannister, N. A. (2015). Reframing practice: Teacher learning through interactions in a collaborative group. *Journal of the learning sciences*, *24*(3), 347-372.

Biesta, G. (2010). 'This is My Truth, Tell Me Yours'. Deconstructive pragmatism as a philosophy for education. *Educational Philosophy and Theory*, *42*(7), 710-727.

Biesta, G. J. (2012). Giving teaching back to education: Responding to the disappearance of the teacher. *Phenomenology & Practice*, *6*(2), 35-49.

Biria, R., & Jafari, S. (2013). The Impact of Collaborative Writing on the Writing Fluency of Iranian EFL Learners. *Journal of Language Teaching & Research*, *4*(1).

Bitchener, J., & Storch, N. (2016). The sociocultural perspective on written CF for L2 development. In Bitchener, J., & Storch, N (eds.), *Written Corrective Feedback for L2 Development* (pp. 67-86). Multilingual Matters.

Blasco, J. A. (2016). The relationship between writing anxiety, writing selfefficacy, and Spanish EFL students' use of metacognitive writing strategies: a case study. *Journal of English Studies*, *14*, 7-45.

Bodrova, E., Leong, D. J., & Akhutina, T. V. (2011). When everything new is well-forgotten old: Vygotsky/Luria insights in the development of executive functions. *New Directions for Child and Adolescent Development*, *2011*(133), 11–28. https://doi.org/10.1002/cd.301

Brumfit, C. (1977). Correcting written work. *Modern English Teacher*, *5*(3), 22-3.

Bui, G., & Kong, A. (2019). Metacognitive instruction for peer review interaction in L2 writing. *Journal of Writing Research*, *11*(2), 357-392.

Chen, A. H. (2022). The Effects of Writing Strategy Instruction on EFL Learners' Writing Development. *English Language Teaching*, *15*(3), 29-37.

Chen, W. (2019). An exploratory study on the role of L2 collaborative writing on learners' subsequent individually composed texts. *The Asia-Pacific Education Researcher*, *28*(6), 563-573.

Chen, W., & Hapgood, S. (2021). Understanding knowledge, participation and learning in L2 collaborative writing: A metacognitive theory perspective. *Language Teaching Research*, *25*(2), 256-281. https://doi.org/10.1177/1362168819837560

Chen, W., & Yu, S. (2019). A longitudinal case study of changes in students' attitudes, participation, and learning in collaborative writing. *System*, *82*, 83-96. https://doi.org/10.1016/j.system.2019.03.005

Cheng, X., & Liu, Y. (2022). Student engagement with teacher written feedback: Insights from low-proficiency and high-proficiency L2 learners. *System*, *109*, 102880. https://doi.org/10.1016/j.system.2022.102880

Cheng, Y. S. (2002). Factors associated with foreign language writing anxiety. *Foreign language annals*, *35*(6), 647-656. https://doi.org/10.1111/j.1944-9720.2002.tb01903.x

Cheng, Y. S. (2004). A measure of second language writing anxiety: Scale development and preliminary validation. *Journal of second language writing*, *13*(4), 313-335.

Cheng, Y. S., Horwitz, E. K., & Schallert, D. L. (1999). Language anxiety: Differentiating writing and speaking components. *Language learning*, *49*(3), 417-446. https://doi.org/10.1111/0023-8333.00095

Chuang, C. H. (2019). University Teachers' Strategies for Alleviating EFL Learner Anxiety. *Journal of Asia TEFL*, *16*(2), 691-700. http://dx.doi.org/10.18823/asiatefl.2019.16.2.17.691

Cochran-Smith, M., & Lytle, S. L. (2009). Teacher research as stance. *The Sage Handbook of Educational Action Research. London: Sage*, 39-49.

Cocuk, H. E., Yanpar-Yelken, T. & Ozer, O. (2016). The relationship between writing anxiety and writing disposition among secondary school students. *Eurasian Journal of Educational Research*, *16*(63), 335-352. http://dx.doi.org/10.14689/ejer.2016.63.19

Cooper, C. R. (1977). Holistic evaluation of writing. *Evaluating writing: Describing, measuring, judging*, 3-31.

Coutinho, S. A., & Neuman, G. (2008). A model of metacognition, achievement goal orientation, learning style and self-efficacy. *Learning environments research*, *11*, 131-151.

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*. Sage publications.

Dawson, C. (2009) Introduction to Research Methods. Oxford: How to Books Limited.

De Guerrero, M. C., & Villamil, O. S. (2000). Activating the ZPD: Mutual scaffolding in L2 peer revision. *The Modern Language Journal*, *84*(1), 51-68. https://doi.org/10.1111/0026-7902.00052

De Smedt, F., Graham, S., & Van Keer, H. (2020). "It takes two": The added value of structured peer-assisted writing in explicit writing instruction. *Contemporary Educational Psychology*, *60*, 101835.

Derakshan, N., & Eysenck, M. W. (2009). Anxiety, processing efficiency, and cognitive performance: New developments from attentional control theory. *European Psychologist*, *14*(2), 168-176. https://doi.org/10.1027/1016-9040.14.2.168

Díaz, G. (2013). Metacognitive writing strategies in academic writing: the path to enhance autonomy and to become expert writers.

Dillenbourg, P., Baker, M., Blaye, A. & O'Malley, C. (1996). The evolution of research on collaborative writing. In P. Reimann & H. Spada (Eds.), *Learning in Humans and Machine: Towards an Interdisciplinary Learning Science* (pp. 189–211). Elsevier.

DiStefano, C., Zhu, M., & Mindrila, D. (2019). Understanding and using factor scores: Considerations for the applied researcher. *Practical assessment, research, and evaluation*, *14*(1), 20.

Dobao, A. F., & Blum, A. (2013). Collaborative writing in pairs and small groups: Learners' attitudes and perceptions. *System*, *41*(2), 365-378.

Ede, L. & Lunsford, A. (1990). *Singular texts/plural authors*. Southern Illonois University Press.

Edge, J. (1989). *Mistakes and Correction*. Longman.

Elabdali, R. (2021). Are two heads really better than one? A meta-analysis of the L2 learning benefits of collaborative writing. *Journal of Second Language Writing*, *52*, 100788. https://doi.org/10.1016/j.jslw.2020.100788

Elabdali, R., & Arnold, N. (2020). Group dynamics across interaction modes in L2 collaborative wiki writing. *Computers and Composition*, *58*, 102607.

Elander, J., Harrington, K., Norton, L., Robinson, H., & Reddy, P. (2006). Complex skills and academic writing: a review of evidence about the types of learning required to meet core assessment criteria. *Assessment & Evaluation in Higher Education*, *31*(1), 71-90.

Englert, C. S., Mariage, T. V., & Dunsmore, K. (2006). Tenets of sociocultural theory in writing instruction research. In MacArthur, C. A., Graham, S., & Fitzgerald, J. (Eds.), *Handbook of writing research* (pp. 208-221). Guilford Press.

Ericsson, K. A., & Simon, H. A. (1998). How to study thinking in everyday life: Contrasting think-aloud protocols with descriptions and explanations of thinking. *Mind, Culture, and Activity*, *5*(3), 178-186. https://doi.org/10.1207/s15327884mca0503_3

Erkan, D. Y., & Saban, A. I. (2011). Writing Performance Relative To Writing Apprehension, Self-Efficacy In Writing, And Attitudes Towards Writing: A Correlational Study In The Turkish Tertiary-Level EFL Context. *Asian EFL Journal*, *13*(1), 164–192.

Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: attentional control theory. *Emotion*, *7*(2), 336. https://psycnet.apa.org/doi/10.1037/1528-3542.7.2.336

Farahian, M., & Avarzamani, F. (2018). The impact of portfolio on EFL learners' metacognition and writing performance. *Cogent Education*, *5*(1), 1450918. https://doi.org/10.1080/2331186X.2018.1450918

Field, A. P. (2018). *Discovering statistics using IBM SPSS statistics* (5th edition, North American edition.). Sage.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American psychologist*, *34*(10), 906. https://doi.org/10.1037/0003-066X.34.10.906

Foster, P., & Ohta, A. S. (2005). Negotiation for meaning and peer assistance in second language classrooms. *Applied linguistics*, *26*(3), 402-430. https://doi.org/10.1093/applin/ami014

Garrison, J., & Neiman, A. (2003). Pragmatism and education. In Blake, N. (Ed).*The Blackwell guide to the philosophy of education* (pp. 19-37). Blackwell.

Gisev, N., Bell, J. S., & Chen, T. F. (2013). Interrater agreement and interrater reliability: key concepts, approaches, and applications. *Research in Social and Administrative Pharmacy*, *9*(3), 330-338. https://doi.org/10.1016/j.sapharm.2012.04.004

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*(3), 445–476. https://doi.org/10.1037/0022-0663.99.3.445

Guasch, T., Espasa, A., Alvarez, I. M., & Kirschner, P. A. (2013). Effects of feedback on collaborative writing in an online learning environment. *Distance education*, *34*(3), 324-338.

Guo, W., Bai, B., & Song, H. (2021). Influences of process-based instruction on students' use of self-regulated learning strategies in EFL writing. *System*, *101*, 102578.

Güvendir, E., & Uzun, K. (2023). L2 writing anxiety, working memory, and task complexity in L2 written performance. *Journal of Second Language Writing*, *60*, 101016.

Hayes, J. R., Hatch, J. A., & Silk, C. M. (2000). Does holistic assessment predict writing performance? Estimating the consistency of student performance on holistically scored writing assignments. *Written Communication*, *17*(1), 3-26.

Ho, M. C., & Savignon, S. J. (2007). Face-to-face and computer-mediated peer review in EFL writing. *CALICO journal*, 269-290. https://www.jstor.org/stable/24147912

Holmes, A. G. D. (2020). Researcher Positionality--A Consideration of Its Influence and Place in Qualitative Research--A New Researcher Guide. *Shanlax International Journal of Education*, *8*(4), 1-10.

Horwitz, E. (2001). Language anxiety and achievement. *Annual review of applied linguistics*, *21*, 112-126. https://doi.org/10.1017/S0267190501000071

Hsu, H. C., & Lo, Y. F. (2018). Using wiki-mediated collaboration to foster L2 writing performance. *Language Learning & Technology*, *22*(3), 103-123.

Huang, X., Liu, X., Hu, Y., & Liu, Q. (2021, November). The effect of online collaborative prewriting via DingTalk group on EFL Learners' writing anxiety and writing performance. In *International Symposium on Emerging Technologies for Education* (pp. 48-60). Cham: Springer International Publishing.

Huerta, M., Goodson, P., Beigi, M., & Chlup, D. (2017). Graduate students as academic writers: writing anxiety, self-efficacy and emotional intelligence. *Higher Education Research & Development*, *36*(4), 716-729. https://doi.org/10.1080/07294360.2016.1238881

Hutcheson, G. D., & Sofroniou, N. (1999). *The multivariate social scientist: Introductory statistics using generalized linear models*. Sage.

Jafarigohar, M., & Mortazavi, M. (2017). The impact of scaffolding mechanisms on EFL learners' individual and socially shared metacognition in writing. *Reading & Writing Quarterly*, *33*(3), 211-225.

Jawas, U. (2019). Writing Anxiety among Indonesian EFL Students: Factors and Strategies. *International Journal of Instruction*, *12*(4), 733-746. https://doi.org/10.29333/iji.2019.12447a

Jeon, E. Y. (2018). The Effect of Learner-Centered EFL Writing Instruction on Korean University Students' Writing Anxiety and Perception. *TESOL International Journal*, *13*(3), 100-112.

Johnson, R.B., Onwuegbuzie, A.J. & Turner, L.A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research, 1*(2), 112-133.

Khatib, M., & Meihami, H. (2015). Languaging and writing skill: The effect of collaborative writing on EFL students' writing performance. *Advances in Language and Literary Studies*, *6*(1), 203-211. http://dx.doi.org/10.7575/aiac.alls.v.6n.1p.203

Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford publications.

Kurniasih, K., Cahyono, B. Y., Astuti, U. P., & Suryati, N. (2023). Online writing class: EFL University Students' perception of Teachers' strategies in alleviating their writing anxiety. *Computer Assisted Language Learning Electronic Journal*, *24*(1), 1–24.

Lakkala, S., Galkienė, A., Navaitienė, J., Cierpiałowska, T., Tomecek, S., & Uusiautti, S. (2021).

Teachers supporting students in collaborative ways—An analysis of collaborative work creating supportive learning environments for every student in a school: Cases from Austria, Finland, Lithuania, and Poland. *Sustainability*, *13*(5), 2804.

Lantolf, J. P. (2000). Second language learning as a mediated process. *Language teaching*, *33*(2), 79-96. https://doi.org/10.1017/S0261444800015329

Lantolf, J. P., & Thorne, S. L. (2006). *Sociocultural theory and the genesis of L2 development*. Oxford University Press.

Leary, M. R. (1990). Anxiety, cognition and behavior: In search of a broader perspective. In M. Booth-Butterfield (Ed.), *Communication, cognition, and anxiety* (pp. 39-44). Sage.

Lee, I. (2003). L2 writing teachers' perspectives, practices and problems regarding error feedback. *Assessing Writing*, *8*(3), 216-237. https://doi.org/10.1016/j.asw.2003.08.002

Lee, I. (2004). Error correction in L2 secondary writing classrooms: The case of Hong Kong. *Journal of second language writing*, *13*(4), 285-312. https://doi.org/10.1016/j.jslw.2004.08.001

Lee, I. (2008). Student reactions to teacher feedback in two Hong Kong secondary classrooms. *Journal of second language writing*, *17*(3), 144-164. https://doi.org/10.1016/j.jslw.2007.12.001

Lee, I. (2010). Writing teacher education and teacher learning: Testimonies of four EFL teachers. *Journal of Second Language Writing*, *19*(3), 143-157. https://doi.org/10.1016/j.jslw.2010.05.001

Lee, I. (2019). Teacher written corrective feedback: Less is more. *Language Teaching*, *52*(4), 524–536. https://doi.org/10.1017/s0261444819000247

Lee, I., & Mak, P. (2018). Metacognition and metacognitive instruction in second language writing classrooms. *TESOL quarterly*, *52*(4), 1085-1097. https://www.jstor.org/stable/44987051

Legg, C., & Hookway, C. (2021). Pragmatism. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Summer 2021 Edition). Retrieved from https://plato.stanford.edu/archives/sum2021/entries/pragmatism/

Li, M. (2018). Computer-mediated collaborative writing in L2 contexts: An analysis of empirical research. *Computer Assisted Language Learning*, *31*(8), 882-904.

Li, Y. (2023). The effect of online collaborative writing instruction on enhancing writing performance, writing motivation, and writing self-efficacy of Chinese EFL learners. *Frontiers in Psychology*, *14*, 1165221.

Little, T. D. (2024). *Longitudinal structural equation modeling*. Guilford Publications.

Liu, J. (2019). China's Standards of English Language Ability. *Chinese Foreign Language*, 1, 11-12. https://doi.org/10.13564/j.cnki.issn.1672-9382.2019.03.001

Lumley, T. (2002). Assessment criteria in a large-scale writing test: What do they really mean to the raters?. *Language Testing*, *19*(3), 246-276. https://doi.org/10.1191/0265532202lt230oa

Luo, Z., Subramaniam, G., & O'STEEN, B. I. L. L. Y. (2020). Will anxiety boost motivation? The relationship between anxiety and motivation in foreign language learning. *Malaysian Journal of ELT Research*, *17*(1).

Magno, C. (2008). Reading strategy, amount of writing, metacognition, metamemory, and apprehension as predictors of English written proficiency. *Asian EFL Journal*, *29*(2), 16-48.

Martinez, C. T., Kock, N., & Cass, J. (2011). Pain and pleasure in short essay writing: Factors predicting university students' writing anxiety and writing self-efficacy. *Journal of Adolescent & Adult Literacy*, *54*(5), 351-360. https://doi.org/10.1598/JAAL.54.5.5

Mercer, S. (2011). Understanding learner agency as a complex dynamic system. *System*, *39*(4), 427-436.

Molenaar, I., Sleegers, P., & van Boxtel, C. (2014). Metacognitive scaffolding during collaborative learning: A promising combination. *Metacognition and learning*, *9*, 309-332.

Namkung, Y., & Kim, Y. (2024). Learner engagement in collaborative writing: The effects of SCMC mode, interlocutor familiarity, L2 proficiency, and task repetition. *System*, 103251. https://doi.org/10.1016/j.system.2024.103251

Negretti, R. (2012). Metacognition in student academic writing: A longitudinal study of metacognitive awareness and its relation to task perception, self-regulation, and evaluation of performance. *Written Communication*, *29*(2), 142-179. https://doi.org/10.1177/0741088312438529

Noddings, N. (2018). *Philosophy of education*. Routledge.

Oxford, R. L. (2017). *Teaching and Researching Language Learning Strategies: Self-Regulation in Context* (2nd ed.). Routledge.

Özdemir, S. (2024). The Effects of Collaborative Writing on L2 Individual Writing Performance in Terms of Complexity, Accuracy, Fluency and Functional Adequacy. *Pegem Journal of Education and Instruction*, *14*(4), 235-244.

Papi, M. (2021). The role of motivational and affective factors in L2 writing performance and written corrective feedback processing and use. In Manchón, R. M., & Polio, C. (Eds.), *The Routledge handbook of second language acquisition and writing* (pp. 152-165). Routledge.

Peng, C., Liu, J., & Cai, H. (2022). Aligning China's Standards of English Language Ability with the Common European Framework of Reference for Languages. *The Asia-Pacific Education Researcher*, *31*(6), 667-677.

Pham, V. P. H. (2021). The Effects of Collaborative Writing on Students' Writing Fluency: An Efficient Framework for Collaborative Writing. *Sage Open*, *11*(1). https://doi.org/10.1177/2158244021998363

Phan, H. L. T., & Dao, P. (2023). Engagement in collaborative writing: Exploring learners' control of task content and text quality. *International Journal of Applied Linguistics*.

Piret, C., Demorsy, S., Barbier, E., & Colognesi, S. (2020). Teaching Writing-With or Without Metacognition : An Exploratory Study of 11- to 12-Year-Old Students Writing A Book Review. *International Electronic Journal of Elementary Education*, *12*(5), 459–470. https://doi.org/10.26822/iejee.2020562136

Popkewitz, T. S. (1997). A changing terrain of knowledge and power: A social epistemology of educational research. *Educational researcher*, *26*(9), 18-29.

Qin, C., Zhang, R., & Xiao, Y. (2022). A questionnaire-based validation of metacognitive strategies in writing and their predictive effects on the writing performance of English

as foreign language student writers. *Frontiers in Psychology*, *13*, 1071907. https://doi.org/10.3389/fpsyg.2022.1071907

Rahimi, M., & Fathi, J. (2022). Exploring the impact of wiki-mediated collaborative writing on EFL students' writing performance, writing self-regulation, and writing self-efficacy: a mixed methods study. *Computer Assisted Language Learning*, *35*(9), 2627-2674.

Ramadhanti, D., & Yanda, D. P. (2021). Students' Metacognitive Awareness and Its Impact on Writing Skill. *International Journal of Language Education*, *5*(3), 193-206.

Rendón, L. I. (2008). Sentipensante (sensing/thinking) pedagogy: Educating for wholeness, social justice and liberation. Taylor & Francis.

Sato, M., & Lyster, R. (2012). Peer interaction and corrective feedback for accuracy and fluency development: Monitoring, practice, and proceduralization. *Studies in Second Language Acquisition*, *34*(4), 591-626. https://doi.org/10.1017/S0272263112000356

Savin-Baden, M., & Major, C. (2023). *Qualitative research: The essential guide to theory and practice*. Routledge.

Schipolowski, S., & Böhme, K. (2016). Assessment of writing ability in secondary education: Comparison of analytic and holistic scoring systems for use in large-scale assessments. *L1-Educational Studies in Language and Literature*, *16*(1), 1–22. https://doi.org/10.17239/L1ESLL-2016.16.01.03

Schreier, M. (2012). *Qualitative content analysis in practice*. Sage.

Shehadeh, A. (2011). Effects and student perceptions of collaborative writing in L2. *Journal of second language writing*, *20*(4), 286-305.

Shields, P. M. (2004). Classical pragmatism: Engaging practitioner experience. *Administration & Society*, *36*(3), 351-361.

Shirvani, M., & Porkar, R. (2022). Online-Based L2 Writing Courses and Practicing Metacognitive Strategies: Teacher-Regulated or Individualized?. *Theory and Practice in Language Studies*, *12*(7), 1419-1427. https://doi.org/10.17507/tpls.1207.23

Schraw, G. (1998). Promoting general metacognitive awareness. *Instructional science*, *26*, 113-125. https://doi.org/10.1023/A:1003044231033

Sinharay, S., Stern, H. S., & Russell, D. (2001). The use of multiple imputation for the analysis of missing data. *Psychological methods*, *6*(4), 317-329.

Soleimani, M., Modirkhamene, S., & Sadeghi, K. (2017). Peer-mediated vs. individual writing: Measuring fluency, complexity, and accuracy in writing. *Innovation in Language Learning and Teaching*, *11*(1), 86-100. https://doi.org/10.1080/17501229.2015.1043915

Spielberger, C. D., & Reheiser, E. C. (2009). Assessment of emotions: Anxiety, anger, depression, and curiosity. *Applied Psychology: Health and Well-Being*, *1*(3), 271-302. https://doi.org/10.1111/j.1758-0854.2009.01017.x

Stell, A. (2018). Exploring the use of collaborative writing in an EFL classroom context. *University of Sydney Papers in TESOL*, *13*, 63-97.

Stewart, G., Seifert, T. A., & Rolheiser, C. (2015). Anxiety and Self-Efficacy's Relationship with Undergraduate Students' Perceptions of the Use of Metacognitive Writing Strategies. *Canadian Journal for the Scholarship of Teaching and Learning*, *6*(1), 4.

Storch, N. (2005). Collaborative writing: Product, process, and students' reflections. *Journal of second language writing*, *14*(3), 153-173.https://doi.org/10.1017/S0267190511000079

Storch, N. (2013). *Collaborative writing in L2 classrooms*. Multilingual Matters.

Sumarno, W. K., Kusumaningrum, W. R., & Nurhayati, E. (2022). The effects of knowledge and regulation of cognition on the students' writing skills in a metacognitive process-oriented writing instruction. *Journal of Language and Linguistic Studies*, *18*(1), 523-536. https://doi.org/10.52462/jlls.200

Sun, Q., & Zhang, L. J. (2023). Examining the effects of English as a foreign language student-writers' metacognitive experiences on their writing performance. *Current Psychology*, *42*(27), 23743-23758. https://doi.org/10.1007/s12144-022-03416-0

Suzuki, W. (2012). Written languaging, direct correction, and second language writing revision. *Language Learning*, *62*(4), 1110-1133. https://doi.org/10.1111/j.1467-9922.2012.00720.x

Swain, M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. In Lantolf, J. P. (Ed.), *Sociocultural theory and second language learning* (pp. 97-114). Oxford university press.

Swain, M. (2006) Languaging, agency and collaboration in advanced language proficiency. In H. Byrnes (ed.) *Advanced Language Learning: The Contribution of Halliday and Vygotsky* (pp. 95–108). Continuum.

Talib, T., & Cheung, Y. L. (2017). Collaborative writing in classroom instruction: A synthesis of recent research. *The English Teacher*, *46*(2), 43-57.

Tarkan-Blanco, B. (2021). Reducing Second Language Writing Anxiety: Creating a Novel Process-and-Collaboration-Centered Pedagogy. In Hancı-Azizoğlu, B. E., & Kavaklı, N. (Eds.), *Futuristic and Linguistic Perspectives on Teaching Writing to Second Language Students* (pp. 28-47). IGI Global.

Teng, F. (2020). The role of metacognitive knowledge and regulation in mediating university EFL learners' writing performance. *Innovation in Language Learning and Teaching*, *14*(5), 436-450. https://doi.org/10.1080/17501229.2019.1615493

Teng, F., & Huang, J. (2019). Predictive effects of writing strategies for self-regulated learning on secondary school learners' EFL writing proficiency. *Tesol Quarterly*, *53*(1), 232-247. https://www.jstor.org/stable/45214917

Teng, L. S., & Zhang, L. J. (2020). Empowering learners in the second/foreign language classroom: Can self-regulated learning strategies-based writing instruction make a difference?. *Journal of Second Language Writing*, *48*, 100701. https://doi.org/10.1016/j.jslw.2019.100701

Teng, M. F. (2021). The effectiveness of incorporating metacognitive prompts in collaborative writing on academic English writing skills. *Applied Cognitive Psychology*, *35*(3), 659-673. https://doi.org/10.1002/acp.3789

Teng, M. F. (2022). Effects of cooperative–metacognitive instruction on EFL learners' writing and metacognitive awareness. *Asia Pacific Journal of Education*, *42*(2), 179-195.

Teng, M. F., & Huang, J. (2023). The effects of incorporating metacognitive strategies instruction into collaborative writing on writing complexity, accuracy, and fluency. *Asia Pacific Journal of Education*, *43*(4), 1071-1090. https://doi.org/10.1080/02188791.2021.1982675

Teng, M. F., & Yue, M. (2023). Metacognitive writing strategies, critical thinking skills, and academic writing performance: A structural equation modeling approach. *Metacognition and Learning*, *18*(1), 237-260.

Trafimow, D., Sheeran, P., Lombardo, B., Finlay, K. A., Brown, J., & Armitage, C. J. (2004). Affective and cognitive control of persons and behaviours. *British Journal of Social Psychology*, *43*(2), 207-224. https://doi.org/10.1348/0144666041501642

Tsai, M. H. (2012). A study of university students' anxiety differences between traditional and online writing classes. *Focus on Colleges, Universities, and Schools*, *6*(1), 1-20.

Valiandes, S., Neophytou, L., & Hajisoteriou, C. (2018). Establishing a framework for blending intercultural education with differentiated instruction. *Intercultural Education*, *29*(3), 379-398.

Villamil, O. S., & De Guerrero, M. C. (1996). Peer revision in the L2 classroom: Social-cognitive activities, mediating strategies, and aspects of social behavior. *Journal of second language writing*, *5*(1), 51-75. https://doi.org/10.1016/S1060-3743(96)90015-6

Villamil, O.S. & Guerrero, M.C.M. de (2006) Sociocultural theory: A framework for understanding the social-cognitive dimensions of peer feedback. In K. Hyland & F. Hyland (eds.) *Feedback in Second Language Writing. Contexts and Issues* (pp. 23–41). Cambridge University Press.

Villarreal, I., & Gil-Sarratea, N. (2020). The effect of collaborative writing in an EFL secondary setting. *Language Teaching Research*, *24*(6), 874-897. https://doi.org/10.1177/1362168819829017

Vygotsky, L. S. (1978). *Mind in society: The development of higher mental processes*. Harvard University Press.

Watanabe, Y. (2014). *Collaborative and independent writing: Japanese university English learners' processes, texts and opinions*. University of Toronto (Canada).

West, S. G., Finch, J. F., & Curran, P. J. (1995). *Structural equation models with nonnormal variables: Problems and remedies*. Sage.

Wynne, C., Guo, Y. J., & Wang, S. C. (2014). Writing anxiety groups: A creative approach for graduate students. *Journal of Creativity in Mental Health*, *9*(3), 366-379. https://doi.org/10.1080/15401383.2014.902343

Xiao, Y. (2007). Applying metacognition in EFL writing instruction in China. *Reflections on English Language Teaching*, *6*(1), 19-33.

Yarrow, F., & Topping, K. J. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British journal of educational psychology*, *71*(2), 261-282. https://doi.org/10.1348/000709901158514

Yastıbaş, G. C., & Yastıbaş, A. E. (2015). The effect of peer feedback on writing anxiety in Turkish EFL students. *Procedia-Social and Behavioral Sciences*, *199*, 530-538. https://doi.org/10.1016/j.sbspro.2015.07.543

Yu, S., Zheng, Y., Jiang, L., Liu, C., & Xu, Y. (2021). "I even feel annoyed and angry": Teacher emotional experiences in giving feedback on student writing. *Assessing Writing*, *48*, 100528. https://doi.org/10.1016/j.asw.2021.100528

Zacharias, N. T. (2007). Teacher and student attitudes toward teacher feedback. *RELC journal*, *38*(1), 38-52. https://doi.org/10.1177/0033688206076157

Zhan, L. (2016). Written teacher feedback: Student perceptions, teacher perceptions, and actual teacher performance. *English Language Teaching*, *9*(8), 73-84. http://dx.doi.org/10.5539/elt.v9n8p73

Zhang, C., Yan, X., & Liu, X. (2015). The development of EFL writing instruction and research in China: An update from the International Conference on English Language Teaching. *Journal of Second Language Writing*, *30*, 14-18. http://dx.doi.org/10.1016/j.jslw.2015.06.009

Zhang, M. (2018). Collaborative writing in the EFL classroom: The effects of L1 and L2 use. *System*, *76*, 1-12.

Zhang, M. (2019). Towards a quantitative model of understanding the dynamics of collaboration in collaborative writing. *Journal of second language writing*, *45*, 16-30.

Zhang, M. (2022). A re-examination of pair dynamics and L2 learning opportunities in collaborative writing. *Language teaching research*, *26*(1), 10-33.

Zhao, H. (2010). Investigating learners' use and understanding of peer and teacher feedback on writing: A comparative study in a Chinese English writing classroom. *Assessing Writing* 15, 3–17. https://doi.org/10.1016/j.asw.2010.01.002

Zheng, L., Zhong, L., Niu, J., Long, M., & Zhao, J. (2021). Effects of personalized intervention on collaborative knowledge building, group performance, socially shared metacognitive regulation, and cognitive load in computer-supported collaborative learning. *Educational Technology & Society*, *24*(3), 174-193.

Zheng, Y., Yu, S., & Tong, Z. (2022). Understanding the dynamic of student engagement in project-based collaborative writing: Insights from a longitudinal case study. *Language Teaching Research*, 13621688221115808. https://doi.org/10.1177/13621688221115808

Zhu, Q., & Carless, D. (2018). Dialogue within peer feedback processes: Clarification and negotiation of meaning. *Higher Education Research & Development*, *37*(4), 883-897.

Appendices

Appendix 1: Written application sent to principals of participating school

Dear [Headteacher/classroom teacher],

My name is xxx and I am a formal English teacher at your school as well as a student at the Department of Education, University of Oxford. I am currently working on my thesis as a part of my Master's degree course completion, which investigates the impact of collaborative writing activity on Chinese high school student's metacognition and affect.

I am reaching out to request your kind consideration in allowing me to conduct a brief research study with your high school students during school hours from April to June 2024. This study has undergone thorough review and has received approval from Oxford's Central University Research Ethics Committee (CUREC; approval reference REF- EDUC_C1A_24_090).

Participating students will be invited to engage in three sessions, during which they will complete the following activities:

- Self-report questionnaires (pre & post intervention, approximately 6 minutes each)
  - 52 items rated on a four-point scale (never, sometimes, often, always)
  - Example items include: While writing in English, I am not nervous at all; I feel my heart pounding when I write English compositions under time constraint.
- Reflective journals (post intervention, approximately 10 minutes each)
  - 5 questions for students to reflect after each intervention
  - Example questions: What do you think of the collaborative writing activity? What have you learned from this activity and your group members? Can you give an example?
- Intervention sessions (approximately 40 minutes each)
  - Three rounds of collaborative writing tasks will be conducted in English class, with intervals of one to two weeks between each activity.

Oxford University has strict ethical procedures on conducting ethical research with teachers and students, consistent with current British Educational Research Association guidelines. Before beginning the research, I would inform parents/guardians about the research and offer the students and parents/guardians the opportunity to refuse to participate. Throughout the research, students and parents/guardians will be able to withdraw from the study until May 15th, at which point all data will be rendered anonymous.

All participants, including students, teachers and the school, would be made anonymous in all research reports. The data collected would be kept strictly confidential, available only to my supervisor Dr. xxx and myself and not used other than specified without the further consent of all involved being obtained. I have enclosed copies of the information for parents/guardians and students with this letter.

If your school would like to take part in the study, or you need more information about what is involved, please contact me. Whether or not you feel it would be appropriate for your school to participate, I would be grateful if you would complete the attached consent form,

and return it to me in the stamped addressed envelope enclosed in this letter. Thank you for your time and attention. I look forward to hearing from you.

Yours Sincerely,

xxx

The impact of collaborative writing on EFL secondary students' individual writing performance, writing anxiety and writing metacognition



[researcher name]

Department of Education

xxx High School

[address]

[Head Teacher name]

☐ We do not wish to participate in this project.

☐ We would like to find out more about this project.

☐ We would like to take part in this project.

If you would like further information, or are interested in taking part, please give the name of a contact person for your school, and details of the best way to contact him or her.

Contact name:

Contact email:

Contact telephone number:

Please return this form in the stamped addressed envelope enclosed with this letter.

Thank you for your help.

Appendix 2: Participant information sheet

The Impact of Collaborative Writing on EFL Secondary Students' Individual Writing Performance, Writing Anxiety, and Writing Metacognition

PARTICIPANT INFORMATION SHEET

Central University Research Ethics Committee Approval Reference: [REF-EDUC_C1A_24_090]

Introductory paragraph

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part.

Why is this research being conducted?

This study aims to explore the impact of collaborative writing activity on Chinese high school student's metacognition and affect. It will provide insights into the positive impact of collaborative activity, and suggest ways to maximize their impact in large-size classrooms.

Why have I been invited to take part?

You have been invited to participate in this study because the target sample comprises Chinese high school students aged 15-16 studying English as their foreign language.

Do I have to take part?

No. It is up to you to decide whether to take part. You can opt-out of the study at any time without providing a reason. However, one withdrawal limit is that you should aim to either complete all three sections of the study (pre-test, collaborative writing intervention, post-test) or opt-out of the study entirely. If you were to opt-out after the first section, the data collected would not be able to be used for analysis. However, it should be noteworthy that you are permitted to withdraw from the study until May 15th, at which point all data will be rendered anonymous.

What will happen to me if I take part in the research?

The participating school will grant permission for the researcher to work with the students who have given consent to participate in the study. Teachers will be recruited to help out with the administration of the study, such as collecting questionnaires, helping to teach the collaborative writing intervention, and monitoring the situation to ensure the health and safety of each participant.

Participating students will be invited to engage in three sessions, during which they will complete the following activities:

Self-report questionnaires (approximately 6 minutes):
- 52 items rated on a four-point scale (never, sometimes, often, always)
- Example items include: While writing in English, I am not nervous at all; I feel my heart pounding when I write English compositions under time constraint.

Reflective journals (approximately 10 minutes each)
- 5 questions for students to reflect after each intervention
- Example questions: What do you think of the collaborative writing activity? What have you learned from this activity and your group members? Can you give an example?

Intervention sessions (approximately 40 minutes each)
- Three rounds of collaborative writing tasks will be conducted in English class, with intervals of one to two weeks between each activity. You will be asked to collaborate with another peer to complete a writing task and collectively generate one written piece.

What are the possible disadvantages and risks in taking part?

Collaborative writing involves communication in a group, and you and your fellow students may encounter communication challenges in the process of the task. Clear guidance for the task and support from the teacher to encourage focused and productive discussion will hopefully help to avoid unpleasant or uncomfortable group working experiences.

Are there any benefits in taking part?

All writing exercises will be integrated into the regular curriculum and conducted during standard class sessions. Thus, these tasks will not impose any additional extracurricular burden for you. Additionally, teacher feedback will be provided throughout all writing tasks and assessments. You will not only gain opportunities to practice writing but also receive feedback and evaluation from the teacher, thereby potentially enhancing their English writing skills.

Expenses and payments

There will be no payment for taking part in this research and any expenses will be covered by the researcher.

What information will be collected and why is the collection of this information relevant for achieving the research objectives?

Your name will not be documented; however, you will be required to input your student number when filling out the questionnaires and writing tests. This is essential for linking your responses across various questionnaires throughout this longitudinal study. All the collected data will be kept strictly confidential and only myself and my supervisor will have access to it. All data collected on paper will be stored in a locked drawer in my office to ensure security. All documents will be stored securely on the Oxford Nexus 365 OneDrive. Only the researchers will have access to the research data. Responsible members of the University of Oxford may be given access to data for monitoring and/or audit of the research.

Will the research be published? Could I be identified from any publications or other research outputs?

All participants, including students, teachers and the school, would be made anonymous in all research reports or published paper. The University of Oxford is committed to the dissemination of its research for the benefit of society and, in support of this commitment, has established an online archive of students' research outputs. A copy of my master's thesis will therefore be deposited both in print and online in the Oxford University Research Archive where it will be publicly available to facilitate its use in future research, thereby increasing its potential impact and use.

Data Protection

The University of Oxford is the data controller with respect to your personal data, and as such will determine how your personal data is used in the research. The University will process your personal data for the purpose of the research outlined above. Research is a task that is performed in the public interest. Further information about your rights with respect to your personal data is available from the University's Information Compliance web site at https://compliance.admin.ox.ac.uk/individual-rights.

Who is funding the research?

This research is part of xxx's MSc Education course completion, which is a self-funded programme of study for which she receives no financial recompense.

Who has reviewed this research?

This research has received ethics approval from a subcommittee of the University of Oxford Central University Research Ethics Committee. (Ethics reference: **REF- EDUC_C1A_24_090)**.

Who do I contact if I have a concern about the research or I wish to complain?

If you have a concern about any aspect of this research, please contact xxx at xxx or xxx at xxx, and we will do our best to answer your query. We will acknowledge your concern within 10 working days and give you an indication of how it will be dealt with. If you remain unhappy or wish to make a formal complaint, please contact the Chair of the Research Ethics Committee at the department of education in University of Oxford who will seek to resolve the matter as soon as possible:
The Chair, Education Departmental Research Ethics Committee;
Email: student.curec@education.ox.ac.uk;
Department of Education
University of Oxford
15 Norham Gardens
Oxford, OX2 6PY

Further Information and Contact Details

If you would like to discuss the research with someone beforehand (or if you have questions afterwards), please contact:

xxx
Department of Education
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44(0)1865 274024
Email: xxx

Appendix 3: Students consent form

UNIVERSITY OF OXFORD

DEPARTMENT OF EDUCATION

15 Norham Gardens, Oxford OX2 6PY

Tel: +44(0)1865 274024 Fax: +44(0)1865 274027

general.enquiries@education.ox.ac.uk

PARTICIPANT CONSENT FORM

REF- EDUC_C1A_24_090

The Impact of Collaborative Writing on EFL Secondary Students' Individual Writing Performance, Writing Anxiety, and Writing Metacognition

This study aims to explore the impact of collaborative writing activity on Chinese high school student's metacognition and affect. It will provide insights into the positive impact of collaborative activity, and suggest ways to maximize their impact in large-size classrooms.

Please initial each box

I confirm that I have read and understand the information sheet version for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
I understand that my participation is voluntary and that I can only withdraw from this study before 15 May 2024.	☐
I understand that research data collected during the study may be looked at by designated individuals from the University of Oxford where it is relevant to my taking part in this study. I give permission for these individuals to have access to this data.	☐
I understand who will have access to personal data provided, how the data will be stored and what will happen to the data at the end of the project.	☐
I understand that all information will be kept strictly confidential except in rare circumstances in which it is judged that I am, or someone else is, at immediate risk of serious harm, or where information is requested by a court of law.	☐
I understand how to raise a concern or make a complaint.	☐
I agree to take part in the above study.	☐
I agree that my contact details can be retained in a secure database so that the researchers can contact me about future studies.	YES/ NO

_____	dd / mm / yyyy	_____
Name of participant	Date	Signature
_____	dd / mm / yyyy	_____
Name of person taking consent	Date	Signature

Appendix 4: Approval from Education Departmental Research Ethics Committee

SOCIAL SCIENCES & HUMANITIES
INTERDIVISIONAL RESEARCH ETHICS COMMITTEE
DEPARTMENTAL RESEARCH ETHICS COMMITTEE

Department of Education
15 Norham Gardens, Oxford OX2 6PY
student.curec@education.ox.ac.uk; staff.curec@education.ox.ac.uk

[redacted]
Department of Education, Social Sciences Division
University of Oxford

20 March 2024

Dear [redacted]

Research ethics approval

Research title: The impact of collaborative writing on individual writing performance: the mediating roles of writing anxiety and writing metacognition

Research ethics reference: EDUC_C1A_24_090

The above application has been considered on behalf of the Education Departmental Research Ethics Committee (DREC) in accordance with the University's procedures for ethical approval of all research involving human participants.

I am pleased to confirm that, on the basis of the information provided to the DREC, ethics approval has now been granted for this study.

Please note the following:

Personal data: It is the responsibility of the PI to ensure that all personal data collected during the project is managed in accordance with the University's guidance and legal requirements.

In-person activities: Any data collection involving in-person interactions with participants must have an up-to-date fieldwork risk assessment in place; further guidance is available from the Safety Office's website.

Amendments: Please notify the committee if you intend to make any amendments to the information in your ethics application as submitted at date of this approval, as all changes must receive ethical approval prior to implementation. The amendment form is available on the SSH IDREC webpage.

We welcome feedback on your experience of the ethical review process and suggestions for improvement. Please email any comments to staff.curec@education.ox.ac.uk / student.curec@education.ox.ac.uk or ethics@socsci.ox.ac.uk.

Yours sincerely

[redacted]

DREC member

cc: [redacted] as Supervisor)

Appendix 5: Questionnaires for students on writing anxiety and metacognition

Class： _____

Student Number（e.g. 01）： _____

Filling Instructions: There are no right or wrong answers to the questions in this survey. Please answer truthfully based on your own situation.

Items	Questions	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	While writing in English, I am not nervous at all.	5	4	3	2	1
2	I feel my heart pounding when I write English compositions under time constraint.	5	4	3	2	1
3	While writing English compositions, I feel worried and uneasy if I know they will be evaluated.	5	4	3	2	1
4	I often choose to write down my thoughts in English.	5	4	3	2	1
5	I usually do my best to avoid writing English compositions.	5	4	3	2	1
6	My mind often goes blank when I start to work on an English composition.	5	4	3	2	1
7	I don't worry that my English compositions are a lot worse than others.	5	4	3	2	1
8	I tremble or perspire when I write English compositions under time pressure.	5	4	3	2	1
9	If my English composition is to be evaluated, I would worry about getting a very poor grade.	5	4	3	2	1
10	I do my best to avoid situations in which I have to write in English.	5	4	3	2	1
11	My thoughts become jumbled when I write English compositions under time constraint.	5	4	3	2	1
12	Unless I have no choice, I would not use English to write compositions.	5	4	3	2	1
13	I often feel panic when I write English compositions under time constraint.	5	4	3	2	1
14	I am afraid that the other students would deride my English composition if they read it.	5	4	3	2	1
15	I freeze up when unexpectedly asked to write English compositions.	5	4	3	2	1
16	I would do my best to excuse myself asked to write English compositions.	5	4	3	2	1
17	I don’t worry at all about what other people would think of my English compositions.	5	4	3	2	1

Items	Questions	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
18	I usually seek every possible chance to write English compositions outside of class.	5	4	3	2	1
19	I usually feel my whole-body rigid and tense when write English compositions.	5	4	3	2	1
20	I am afraid of my English compositions being chosen as a sample for discussion in class.	5	4	3	2	1
21	I am not afraid at all that my English compositions would be rated as very poor.	5	4	3	2	1
22	Whenever possible, I would use English to write compositions.	5	4	3	2	1

Items	Questions	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
mk1	I am very interested in English writing.	5	4	3	2	1
mk2	I find English writing very easy.	5	4	3	2	1
mk3	I am quite aware of my English writing competence.	5	4	3	2	1
mk4	I am quite aware of how much I know about English writing strategies (e.g., planning or revising the text).	5	4	3	2	1
mk5	I am well aware of some grading rubrics of English essays.	5	4	3	2	1
mk6	I think it is very important to understand the requirements of a writing task.	5	4	3	2	1
mk7	I usually set up my writing goals based on the requirements of a writing task.	5	4	3	2	1
mk8	I write according to the genre (e.g., an exposition, a letter, a note) of an essay.	5	4	3	2	1
mk9	I use my knowledge of English discourse (e.g., thesis statement, topic sentences, coherence, transitional words) to complete a writing task.	5	4	3	2	1
mk10	I have a strong awareness of my readers and my communication with them.	5	4	3	2	1
mk11	I usually think in English when I write English essays.	5	4	3	2	1
mk12	I tackle the problems that I encounter during the writing process with appropriate remedial strategies.	5	4	3	2	1
mk13	My composing process is usually like this: Analyzing the writing prompt, generating ideas, planning, outlining, drafting, and revising.	5	4	3	2	1

Items	Questions	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
mk14	Based on the situation, I would repeat one or more of the above writing steps to revise my essay.	5	4	3	2	1
mk15	When writing, I pay more attention to the content development of my essay.	5	4	3	2	1
mr1	Before writing, I pay attention to the genre (e.g., an exposition, a letter, a note) of a writing task.	5	4	3	2	1
mr2	Before writing, I pay attention to the purpose (e.g., to express opinion, to thank someone, to complain about a service) of a writing task.	5	4	3	2	1
mr3	Before writing, I pay attention to the audience (e.g., the instructor, customers, supervisor, classmates, general public...etc.) of a writing task.	5	4	3	2	1
mr4	Before writing, I pay attention to specific parts of the language (e.g., the wording and grammar) of a writing task.	5	4	3	2	1
mr5	Before writing, I consciously recall model essays related to the writing prompt.	5	4	3	2	1
mr6	When writing, I check if my essay meets the requirements of the writing task.	5	4	3	2	1
mr7	When writing, I check if the content of my essay is relevant to the topic.	5	4	3	2	1
mr8	When writing, I check if the organization of my essay is logical.	5	4	3	2	1
mr9	When writing, I check if the language of my essay is clear enough.	5	4	3	2	1
mr10	When writing, I check if my word usage is accurate enough.	5	4	3	2	1
mr11	After finishing writing, I reflect on the content of my essay to see if any addition or deletion is needed.	5	4	3	2	1
mr12	After finishing writing, I reflect on the accuracy of my grammar.	5	4	3	2	1
mr13	After finishing writing, I reflect on the organization of my essay to see if it is clear enough.	5	4	3	2	1
mr14	After finishing writing, I reflect on my essay holistically to see if it achieves the goals of the writing task.	5	4	3	2	1
mr15	After finishing writing, I reflect on the composing process of “compose and revise, revise and compose”.	5	4	3	2	1

Appendix 6: Writing anxiety scale and factor analysis results

Table 9. Exploratory factor analysis results for writing anxiety scale

Items	Factors			
	Cognitive Anxiety	Somatic Anxiety	Avoidance Behaviour	Writing Agency
wa17	.77			
wa21	.69			
wa14	.59			
wa20	.52			
wa9	.52			
wa7	.50			
wa3	.46			
wa1	.44			
wa13		.84		
wa11		.65		
wa2		.63		
wa8		.56		
wa19		.44		
wa16			.68	
wa15			.60	
wa10			.57	
wa5			.52	
wa6			.41	
wa4				.71
wa22				.70
wa12				.66
wa18				.63

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 6 iterations.

Table 10. Factors and corresponding items derived from factor analysis of the writing anxiety scale

Factors	Items that require reverse scoring: 1, 4, 7, 17, 18, 21, 22 5 Likert-scale 1= strongly disagree, 2= disagree, 3= uncertain, 4= agree, 5=strongly agree
Cognitive Anxiety	1 While writing in English, I am not nervous at all. 3 While writing English compositions, I feel worried and uneasy if I know they will be evaluated. 7 I don't worry that my English compositions are a lot worse than others. 9 If my English composition is to be evaluated, I would worry about getting a very poor grade. 14 I am afraid that the other students would deride my English composition if they read it. 17 I don’t worry at all about what other people would think of my English compositions 20 I am afraid of my English compositions being chosen as a sample for discussion in class. 21 I am not afraid at all that my English compositions would be rated as very poor.
Somatic Anxiety	2 I feel my heart pounding when I write English compositions under time constraint. 8 I tremble or perspire when I write English compositions under time pressure 11 My thoughts become jumbled when I write English compositions under time constraint. 13 I often feel panic when I write English compositions under time constraint. 19 I usually feel my whole-body rigid and tense when write English compositions.
Avoidance Behaviour	5 I usually do my best to avoid writing English compositions. 6 My mind often goes blank when I start to work on an English composition. 10 I do my best to avoid situations in which I have to write in English 15 I freeze up when unexpectedly asked to write English compositions. 16 I would do my best to excuse myself asked to write English compositions.
Writing Agency	4 I often choose to write down my thoughts in English. 12 Unless I have no choice, I would not use English to write compositions. 18 I usually seek every possible chance to write English compositions outside of class. 22 Whenever possible, I would use English to write compositions.

Appendix 7: Writing metacognition scale and factor analysis results

Table 11. Exploratory factor analysis results for writing metacognition scale

items	Factors							
	1	2	3	4	5	6	7	8
mk10	.60							
mk1	.55							
mk2	.53							
mk11	.50							
mk4		.84						
mk3		.48						
mk5		.44						
mk8			.61					
mk6			.53					
mk7			.52					
mk9			.41					
mk14				.78				
mk13				.52				
mk15				.40				
mk12				.33				
mr1					.73			
mr2					.71			
mr3					.50			
mr4					.37			
mr6						.71		
mr7						.73		
mr9							.63	
mr8							.61	
mr10							.47	
mr13								.74
mr14								.70
mr15								.63
mr12								.63
mr11								.54

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 11 iterations.

Notes: The name of factors are showed in Table 12

Table 12. Factors and corresponding items derived from exploratory factor analysis of the writing metacognition scale

Dimensions	Factors		Items
Metacognitive Regulation (MR)	1	MR-Evaluating	mk1. I am very interested in English writing. mk2. I find English writing very easy. mk10. I have a strong awareness of my readers and my communication with them. mk11. I usually think in English when I write English essays.
	2	MR- Monitoring	mk3. I am quite aware of my English writing competence. mk4. I am quite aware of how much I know about English writing strategies (e.g., planning or revising the text). mk5. I am well aware of some grading rubrics of English essays.
	3	MR - Planning	mk6. I think it is very important to understand the requirements of a writing task. mk7. I usually set up my writing goals based on the requirements of a writing task. mk8. I write according to the genre (e.g., an exposition, a letter, a note) of an essay. mk9. I use my knowledge of English discourse (e.g., thesis statement, topic sentences, coherence, transitional words) to complete a writing task.
Metacognitive Knowledge (MK)	4	MK - Task Organization	mk12. I tackle the problems that I encounter during the writing process with appropriate remedial strategies. mk13. My composing process is usually like this: Analyzing the writing prompt, generating ideas, planning, outlining, drafting, and revising. mk14. Based on the situation, I would repeat one or more of the above writing steps to revise my essay. mk15. When writing, I pay more attention to the content development of my essay.
	5	MK – Task Knowledge	mr1. Before writing, I pay attention to the genre (e.g., an exposition, a letter, a note) of a writing task. mr2. Before writing, I pay attention to the purpose (e.g., to express opinion, to thank someone, to complain about a service) of a writing task. mr3. Before writing, I pay attention to the audience (e.g., the instructor, customers, supervisor, classmates, general public...etc.) of a writing task. mr4. Before writing, I pay attention to specific parts of the language (e.g., the wording and grammar) of a writing task.

	6	MK - Strategic Knowledge	mr6. When writing, I check if my essay meets the requirements of the writing task. mr7. When writing, I check if the content of my essay is relevant to the topic.
	7	MK - Self-Efficacy and Confidence	mr8. When writing, I check if the organization of my essay is logical. mr9. When writing, I check if the language of my essay is clear enough. mr10. When writing, I check if my word usage is accurate enough.
	8	MK - Self-Knowledge	mr11. After finishing writing, I reflect on the content of my essay to see if any addition or deletion is needed. mr12. After finishing writing, I reflect on the accuracy of my grammar. mr13. After finishing writing, I reflect on the organization of my essay to see if it is clear enough. mr14. After finishing writing, I reflect on my essay holistically to see if it achieves the goals of the writing task. mr15. After finishing writing, I reflect on the composing process of “compose and revise, revise and compose”.

Appendix 8: Prompts for reflective journals

Please select two to three questions to share your thoughts.

1. What have you learned from collaborative writing activity and your group members? Can you give an example?

2. What are the interesting or impressive things you had in collaborative writing process?

3. What are the difficulties you had in collaborative writing process? How did you cope with?

4. How did group members deal with conflicts or disagreements in writing process? Can you give an example?

5. How did you achieve the goals during each step of the writing process? Can you give an example?

6. To what extent did collaborative writing activity help you in planning, writing and revising process? In what way? Can you give an example?

Appendix 9: Descriptive statistics for normality check

Table 13. Descriptive statistics for normality check

Groups	Variables	Mean	SD	Skewness	Kurtosis
Full sample (N=238)	1st writing scores	12.84	2.28	-0.51	0.76
	2nd writing scores	12.27	2.68	-0.92	1.91
	3rd writing scores	12.92	2.52	-0.58	1.45
Control group (N=121)	1st writing scores	12.56	2.39	-0.84	0.89
	2nd writing scores	11.60	3.77	-0.87	2.06
	3rd writing scores	12.81	2.57	-1.02	3.24
Experimental group (N=117)	1st writing scores	13.12	2.13	-0.51	-0.95
	2nd writing scores	12.97	2.41	-0.92	1.90
	3rd writing scores	13.04	2.49	-0.58	-0.75

Notes: The skewness and kurtosis values across the groups and assessments indicated that most of distributions of scores deviated from normality (skewness within ± 2, kurtosis within ± 7, West *et al*.,1996)

Appendix 10: Normality histograms for writing tests scores by three time points

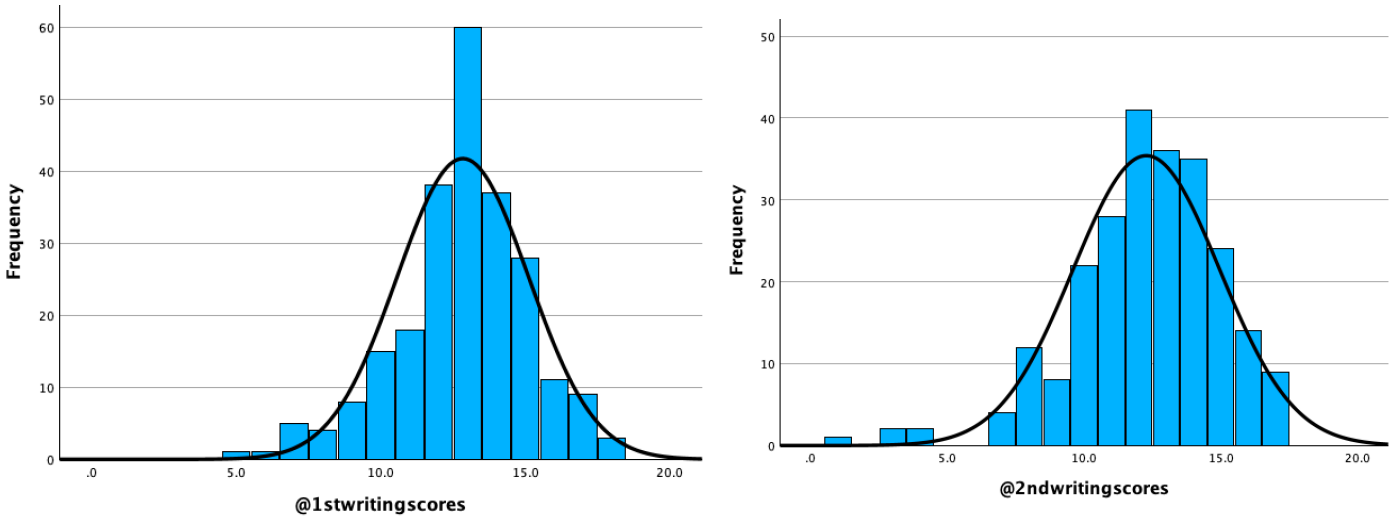


Figure 11. Distribution of writing scores for the first (left) and second (right) time points

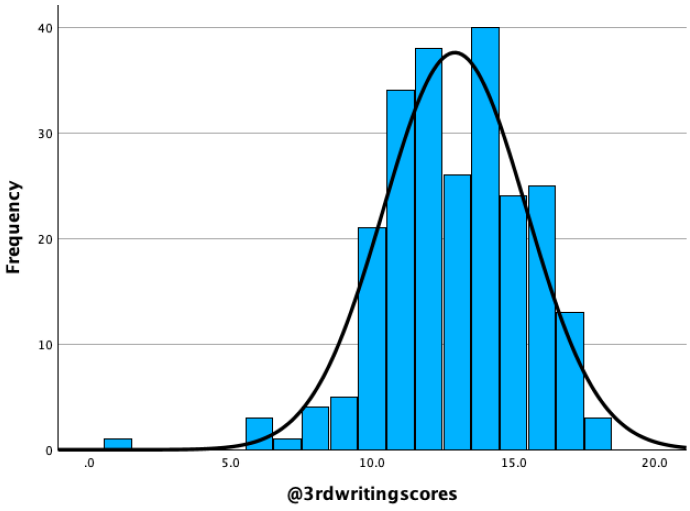


Figure 12. Distribution of writing scores for the third time points

Appendix 11: Normality histograms for writing anxiety and metacognition

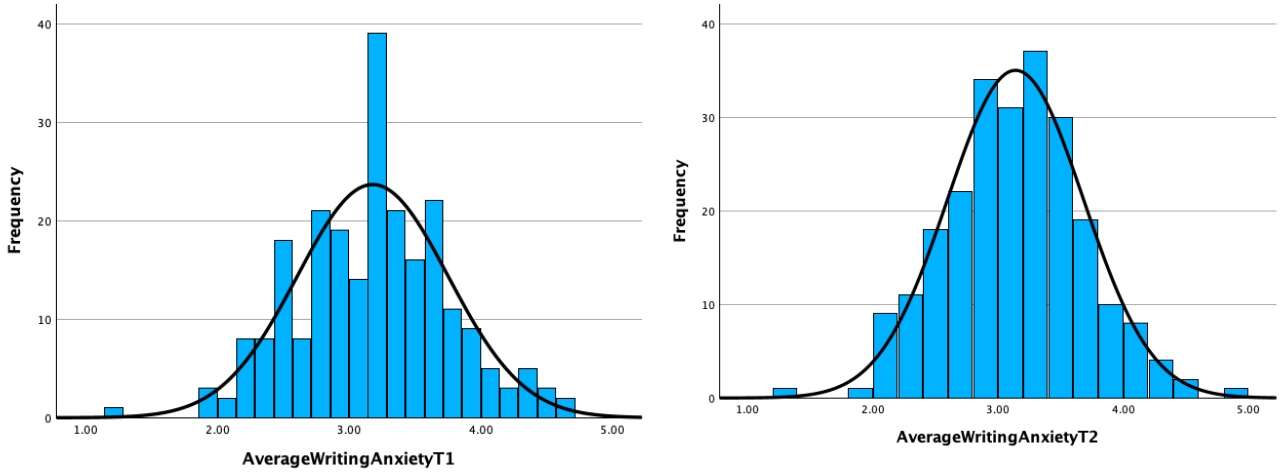


Figure 13. Distribution of writing anxiety for T1 (left) and T2 (right)

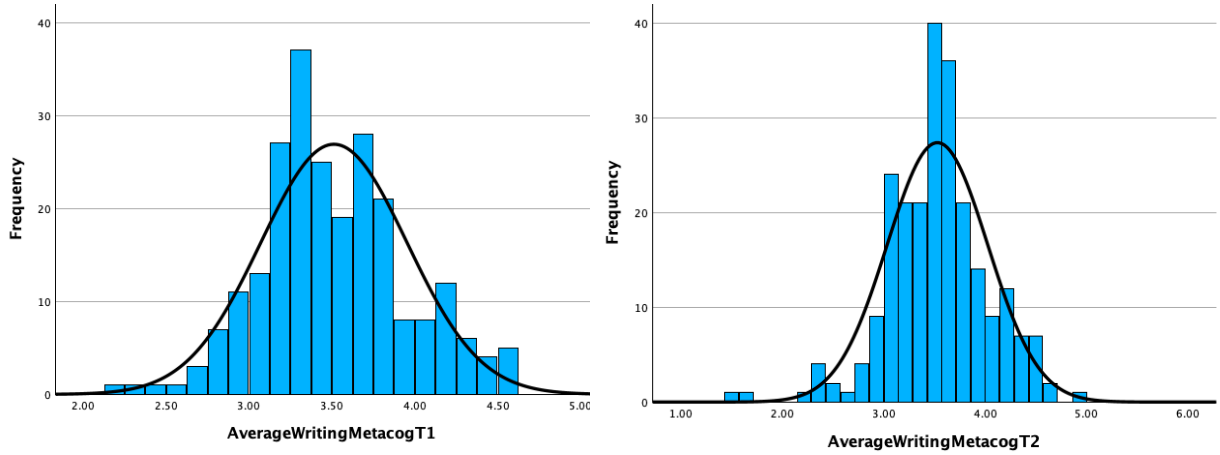


Figure 14. Distribution of writing metacognition for T1 (left) and T2 (right)