



Exploration of the Effect of Emotions in the Online Collaborative Writing

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Abstract

In light of the paucity of research on academic emotions in web-based collaborative writing, this study endeavors to examine the influence of diverse academic emotions on the web-based collaborative writing process, with a particular focus on written products. Utilizing a mixed-methods approach that integrates questionnaire surveys, writing tasks, and semi-structured interviews, this study employs both quantitative and qualitative research methodologies. Professional software, including SPSS and Nvivo, was utilized to meticulously analyze students' academic emotions and collaborative writing products. The findings reveal that there are significant disparities in emotional fluctuations and contrasts in online collaborative writing environments. Moreover, distinct academic emotions exert differential impacts on collaborative written products. This study underscores the pivotal role of academic emotions in the collaborative writing process and offers substantial theoretical and empirical insights for the field of L2 writing research. The results suggest that positive emotions such as enjoyment and pride can enhance writing quality, while negative emotions like anxiety and frustration may impede the collaborative writing process. Future research should further explore the mechanisms through which academic emotions influence collaborative writing and develop strategies to foster positive emotional experiences in web-based collaborative writing contexts.

Keywords

Academic achievement emotion; Collaborative writing; Second language writing; Qualitative research

1. Introduction

The proliferation of Web 2.0 technologies has facilitated the emergence of network-based online collaborative writing as a pedagogical approach, garnering increasing scholarly attention in second language acquisition research (Li, 2018; Motlhaka, 2020; Zhang, 2022). Wang (2015) conducted a comparative analysis of wiki-mediated online collaborative writing and traditional face-to-face group writing, demonstrating that the former significantly enhances learners' reader-awareness, textual organization, content elaboration, grammatical precision, and syntactic complexity, thereby fostering overall writing proficiency. While collaborative learning has long been recognized as a critical facilitator of linguistic skill development (Reed et al., 2003), empirical evidence indicates persistent challenges in sustaining learner engagement and participation rates in online collaborative writing contexts (Peng et al., 2022).

Recent scholarly discourse has increasingly emphasized the affective dimensions of second language acquisition.

Investigations into the emotional experiences of English majors reveal language enjoyment and anxiety as predominant affective states, with their fluctuations contingent upon both learners' linguistic competencies and contextual factors (Pin-tiel & Albert, 2018).

Online collaborative writing presents a unique affective landscape for language learners. Zhang et al. (2022) posit that effective emotion regulation and the cultivation of positive affective states constitute prerequisites for achieving optimal learning outcomes in such environments. Existing scholarship has predominantly focused on the deleterious impacts of negative emotions on L2 writing performance, whereas the constructive role of positive emotions has only recently entered academic purview. Furthermore, while prior studies have examined emotional dynamics in either online or offline collaborative writing contexts, there remains a paucity of controlled comparative studies systematically contrasting these modalities.

To address these gaps, this study investigates the interplay between academic emotions and writing performance in online collaborative contexts, while concurrently examining divergent affective patterns and their pedagogical implications in offline second language collaborative writing environments.

1.1 Research Questions

- (1) What are the changes in emotions in online collaborative writing?
- (2) What are the factors that affect the mood of collaborative writing?
- (3) What is the influence of collaborative writing emotions on written products?

2. Theoretical Framework

2.1 Collaborative Writing

Collaborative writing is defined as a special writing form that includes pairs or groups of learners making decisions and interacting with each other to finish the written product jointly (Dobao, 2012). Compared with face-to-face collaborative writing, online collaborative writing is more interactive, reflective, and transtemporal, which is conducive to creating a multi-interactive collaborative writing environment. Storch (2013) proposed that the writing task is usually considered an individual behavior and that writing in pairs or groups might seem rare in the daily writing process. Ede and Lunsford's (1992) view on collaborative writing from a narrow sense perspective seems to be better accepted. Storch (2019) defined collaborative writing in more detail as an activity in which at least two authors engage in interaction, negotiation, and decision-making in the writing process and share the responsibility to produce an article.

2.2 Academic Emotions

Pekrun (2002) proposed the concept of achievement emotion, which refers to emotions that are directly related to an individual's academic behavior and outcomes. Researchers have identified a range of academic emotions experienced by high school and university students, including enjoyment, hope, pride, anger, anxiety, boredom, and shame (Xiong et al., 2011). Regardless of how they are defined, scholars often focus on positive emotions and negative emotions, and high-arousal and low-arousal emotions.

2.3 Relations between Collaborative Writing and Academic Achievement Emotions

Huang (2021) explored the influence of the Dingding platform on online collaborative prewriting on English learners' writing anxiety and writing performance, and the results showed that collaborative network writing is beneficial for improving junior high school students' overall writing performance. Peng (2022) realized that, in the process of online cooperation, students with intergroup awareness information had deeper cognitive thinking and more positive emotions than did those with intragroup awareness information. Tao et al. (2022) investigated the dynamics of students' social knowledge construction and social emotional interaction in the context of computer-aided collaborative writing: a high-performing group exhibited a more systematic and meaningful pattern of social knowledge construction and social emotional interaction, while a low-performing group engaged in only a single repetitive behavior. Zhang et al. (2022) explored how English learners regulate individual and collective emotions to increase pleasure during online collaborative learning. It can be concluded that domestic studies on emotion and online cooperative writing have focused mainly on the influence of online cooperative writing on emotion, while there are few studies on the influence of emotion on writing.

Poehner and Swain (2016) believe that additional research is needed to explore unique patterns of positive emotions, especially enjoyment, in online collaborative learning to maintain effective coconstruction of language knowledge. Alqasham (2022) used sociocultural research methods to explore English learners' perceptions of collaborative writing, and the results showed that most learners were positive about online learning using Blackboard and Chatbox. In addition, Blackboard and the Chatbox can provide learners with the necessary emotional support to promote collaborative writing. Beseghi (2022) discussed the emotional aspects of foreign language online classrooms and possible interventions for negative emotions in the classroom, aiming to establish a safe and collaborative learning environment for the emotional reality of foreign language learning. Kim (2020) used a wiki-enhanced and blended writing course to track changes in student participation levels over the course of a Wiki-intensive writing course, and the results showed that wiki-based online discussion increased behavioral, emotional, and cognitive engagement. Therefore, emotional experience is significantly more positive when there is no language restriction. However, forced use of a second language is associated mainly with stress and anxiety.

Researchers have adopted a comprehensive approach, integrating local online writing software and platforms, to investigate the role of various emotions in collaborative writing. A review of the existing literature reveals that the majority of studies on emotion and online collaborative writing have predominantly focused on the impact of a single emotion or a specific category of emotions on the collaborative writing process. Conversely, limited research has been conducted to explore the commonalities between online collaborative writing and emotions.

3. Methodology

3.1 Participants

The study recruited 30 second-year undergraduate students majoring in English from a university in eastern China. The participants ranged in age from 19 to 21 years (Mean = 19.80, Standard Deviation = 0.66). These students were stratified into 15 groups based on their writing course performance in the first semester of their sophomore year. The sample comprised 25 female students. None of the participants had engaged in overseas study programs prior to the study. On average, the participants had received 11.43 years of English language education prior to participating in the formal experiment. Additionally, none of the participants had prior experience in online collaborative writing.

3.2 Procedures

The Achievement Emotion Questionnaire (AEQ) was administered at three distinct time points during the online experimental procedure: prior to the writing task, during the writing task, and subsequent to the completion of the writing task. Participants were organized into 15 groups, each comprising two members, tasked with collaboratively composing an essay based on a standardized IELTS writing prompt. To facilitate the collaborative writing process, participants were required to utilize WPS shared documents for co-editing their essay and Tencent Meeting for real-time negotiation and discussion of ideas. The final version of the essay, as determined by the participants, was considered the definitive product of their collaborative writing endeavor. Following the completion of the two writing tasks, a subset of participants, representing 50% of the total sample, were invited to engage in a semi-structured interview. The interviews were conducted via Tencent Meeting, and the data were meticulously recorded for subsequent analysis.

3.3 Instruments

3.3.1 Achievement Emotions Questionnaire (AEQ)

The achievement emotion questionnaire (AEQ) (Pekrun et al., 2002) was adopted for academic emotion measurement. The present study selected enjoyment, hopelessness, anxiety, hope, anger, boredom, shame, and pride for assessing academic emotions. The questionnaire has 79 items in total, including questions before class, during class, and after class.

Enjoyment was described by nine items (e.g., "I get excited about going to class"). Hope was described by eight items (e.g., "I am full of hope"). Pride was described by nine items (e.g., "I am proud of myself"). Anger was described by nine items (e.g., "Because I am angry, I get restless in class"). Anxiety was described by twelve items (e.g., "I worry the others will understand more than me"). Shame was described by eleven items (e.g., "I am embarrassed that I cannot express myself well"). Hopelessness was described by ten items (e.g., "I feel hopeless"). Boredom was described by eleven items (e.g., "I get bored"). Each indicator was measured from 1 (Strongly disagree) to 7 (Strongly agree). Scales are computed by summing the items of the scale and taking their mean.

3.3.2 Semi-structured Interviews

This study employed a semi-structured interview methodology to gather qualitative data from selected participants. The interviews were conducted in an offline, face-to-face format, with each session lasting approximately 15 minutes. The interview questions were developed based on the findings of our preceding quantitative research, which examined the relationship between emotions and written products in online collaborative writing tasks. The interview outline focused on four primary thematic areas: (1) the contexts and processes through which participants engaged in collaborative writing with their peers; (2) the specific emotions experienced by participants during both online and offline collaborative writing tasks; (3) the perceived differences between online and offline collaborative writing tasks in terms of emotional dynamics, interaction patterns, and task outcomes; and (4) participants' suggestions for enhancing the effectiveness of collaborative writing experiences.

This study employed a semi-structured interview methodology to gather qualitative data from selected participants. The interviews were conducted in an offline, face-to-face format, with each session lasting approximately 15 minutes. The interview questions were developed based on the findings of our preceding quantitative research, which examined the relationship between emotions and written products in online collaborative writing tasks. The interview outline focused on four primary thematic areas: (1) the contexts and processes through which participants engaged in collaborative writing with their peers; (2) the specific emotions experienced by participants during both online and offline collaborative writing tasks; (3) the perceived differences between online and offline collaborative writing tasks in terms of emotional dynamics, interaction patterns, and task outcomes; and (4) participants' suggestions for enhancing the effectiveness of collaborative writing experiences.

During the interviews, follow-up questions were dynamically formulated based on participants' responses and the evolving nature of the conversation. This approach ensured comprehensive coverage of all four thematic dimensions, thereby facilitating a nuanced understanding of the participants' experiences and perspectives.

4. Data Collection and Analysis

4.1 Quantitative Data Collection and Analysis

Cloud recording functionality was employed during the collaborative writing process via the Tencent Meeting platform to capture real-time interactions and discussions among participants. Additionally, the shared document of WPS Office was utilized to record the collaborative writing process and to generate the final written products. To mitigate scorer subjectivity in the analysis of written products, a web-based L2 Syntactic Complexity Analyzer (L2SCA) developed by Professor Lu (2010, 2011, 2015) was selected as the analytical tool. This analyzer is capable of measuring various dimensions of syntactic complexity, including the length of production units, the frequency of coordination and subordination, the degree of phrasal sophistication, and overall sentence complexity.

Furthermore, the 30 participants completed the Achievement Emotion Questionnaire (AEQ) via the WJX platform (available at Offline Collaborative Writing Questionnaire (After Class)). The collected data were subsequently analyzed using SPSS version 26.0 to examine the relationships between emotional experiences and collaborative writing outcomes.

4.2 Qualitative Data Collection and Analysis

The whole process of the interview was recorded in the form of an audio recording by the Tencent meeting, converted into text by its cloud recording function. NVivo 11 was used to process the data, and 15 samples were randomly selected for grounded theory analysis. Grounded theory involves three steps: open coding, axial coding, and selective coding (Strauss & Corbin, 1997). Research on emotional differences in collaborative tasks involves extracting relevant factors according to these three steps.

5. Results

5.1 Online Descriptive Statistics of Emotions and Written Products

The data were analysed with SPSS 25.0. The mean (M), standard deviation (SD), and maximum and minimum values of achievement emotions and written products online are shown in Table 1.

Table 1. Descriptive Statistics of Emotions and Written Products Online ($N = 30$)

	<i>M</i>	<i>SD</i>	Max	Min
Age	19.80	0.66	21	19
Years of English Study	11.43	2.29	15	5
Enjoyment	5.50	0.61	7	1
Hopelessness	2.56	0.87	7	1
Anxiety	3.43	0.93	7	1
Hope	5.18	0.69	7	2
Anger	2.40	0.71	7	1
Boredom	2.59	0.76	7	1
Shame	2.96	1.23	7	1
Pride	5.33	0.68	7	1
Word Count (W)	268.53	46.06	367	201
Clause (C)	21.53	4.09	28	13
T-unit (T)	14.73	2.71	19	10
Dependent Clause (DC)	7.33	2.72	11	2
Clause per T-unit (C/T)	1.48	0.28	2	0.93
Dependent Clause per Clause (DC/C)	0.33	0.10	0.46	0.15
Error-free T-units (EFT)	11.87	3.07	17	6
Error-free clauses (EFC)	19.67	4.24	27	12
EFT/T	0.80	0.12	0.94	0.55
EFC/C	0.91	0.05	1	0.82

5.2 Emotional Changes Before and After the Writing Process

According to the particular construct of the AEQ questionnaire and the complexity of emotion mechanisms, enjoyment, anger, and hopelessness were measured three times. The present study applied repeated measures analysis of variance (RMANOVA) to examine the changes in the three categories of emotions.

Repeated measures analysis of variance revealed marginally significant differences in enjoyment before, during, and after the writing process ($F(2,58) = 2.770$, $p = 0.071$; $\eta^2_p = 0.087$). According to the pairwise comparisons, enjoyment during writing was significantly greater than that after writing (mean difference (MD) = 0.360, $p = 0.030$) (Figure 1).

Table 2. Significance Test of Difference in Enjoyment Online

Writing Process	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	η
Before Writing	30	5.49	0.72			
During Writing	30	5.68	0.81	2.770	0.071	0.087
After Writing	30	5.32	0.79			

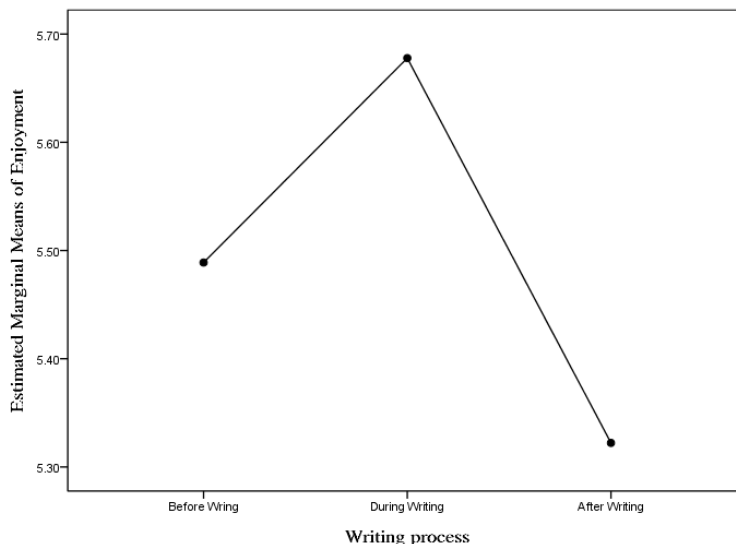


Figure 1. The Trend of Enjoyment during Online Processing.

Repeated measures analysis of variance revealed significant differences in anger before, during, and after the writing process ($F(2,58) = 12.390, p < 0.001; \eta^2_p = 0.299$). According to the pairwise comparisons, the anger level before writing was significantly lower than that before writing (mean difference (MD) = - 0.647, $p = 0.001$) and after writing (MD) = - 0.944, $p < 0.001$).

Table 3. Significance Test of Difference on Anger Online

Writing Process	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	η
Before Writing	30	1.87	1.06			
During Writing	30	2.51	0.83	12.390	<0.001	0.299
After Writing	30	2.81	0.86			

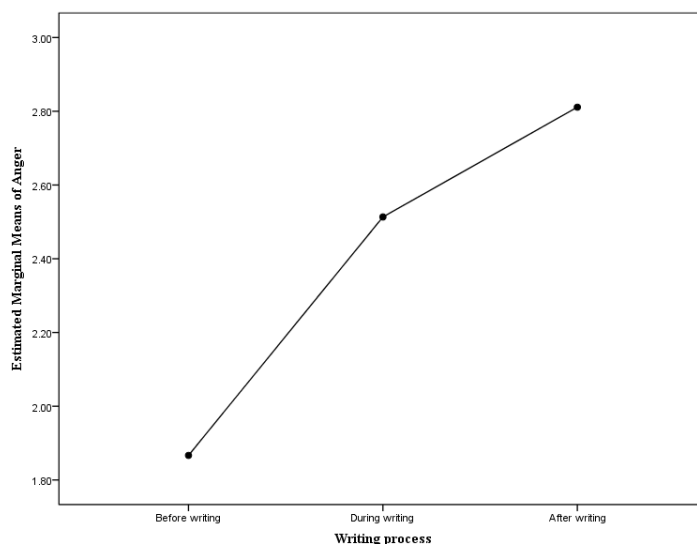


Figure 2. The Trend of Anger during Online Processing.

Repeated measures analysis of variance revealed no significant differences in hopelessness before, during or after the writing process ($F(2,58) = 2.111, p = 0.130, \eta^2_p = 0.068$).

Table 4. Significance Test of Difference on Hopelessness Online

Writing Process	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	η
Before Writing	30	2.49	1.06			
During Writing	30	2.43	0.84	2.111	0.130	0.068
After Writing	30	2.75	1.13			

5.2.1 The Results of the Semi-Structured Interviews

There were four main parts in the interview, including the participants' views on conflicts in writing, fluency, emotions, and prospects for collaborative writing.

5.2.2 Participants' Views on the Conflicts in Collaborative Writing

Through the first round of open coding, 9 original codes were gathered. Among them, "writing ideas" and "peer familiarity" were the most common in the interviews of 5 people (33%). In the second round of axial coding, the authors divided the 9 original codes into 4 categories: conflicts on the materials, conflicts on the relationships, the advantages of the conflicts, and the disadvantages of the conflicts. The third round of selective coding further refined the codes into two kinds: the causes of the conflicts and the impacts of the conflicts. The results are shown in Tables 5, which illustrate their attitudes toward conflicts.

Table 5. Tree Codes of Participants' Ideas about Conflicts in Collaborative Writing

Original Codes	Axial Codes	Selective Codes
The Understanding of Topic; The Writing Ideas; Choice of Words and Sentences	Conflicts on the Materials	The Causes of Conflicts
Peer Familiarity; Personality	Conflicts on the Relationships	
Broaden the Idea; Better Understand Conflicts; Exchange the Ideas	The Advantages of the Conflicts	The Impact of Conflicts
Inconvenient Communication	The Disadvantages of the Conflicts	

5.2.3 Participants' Views on Fluency in Collaborative Writing

Through the first round of open coding, 7 original codes were gathered. Among them, "vocabulary" and "convenient communication" were the most common and were mentioned in the interviews of 6 people (40%). In the second round of axial coding, the present study divided the 7 original codes into 3 categories: no difference between online and offline writing, no smooth online process, and a smoother offline process. The third round of selective coding further refined the codes into one kind, the comparison of fluency in online and offline writing.

Table 6. Tree Codes of Participants' Views on Fluency in Collaborative Writing

Original Codes	Axial Codes	Selective Codes
Vocabulary	No Difference between Online and Offline Writing	
Clear Division of Work; Convenient Communication	The Online Process is not Smooth	The Comparison of Fluency in Online and Offline Writing
Forget Knowledge on Vacation; Equipment Problem;	The Offline Process is Smoother	
Participating for the First Time; Net Delay		

5.2.4 Participants' Views on Emotions in Collaborative Writing

Sixteen original codes were obtained through the first round of open coding. Among them, "Writing Experience is Good"

and “Communication Smoothly” were the second most common terms and were mentioned in the interviews of 6 people (40%) and 5 people (33.3%), respectively. In the second round of axial coding, the authors divided the 16 original codes into 4 categories: causes of positive emotions, causes of negative emotions, effects of positive emotions on writing, and effects of negative emotions on writing. The third round of selective coding further refined the codes into two kinds: causes of emotions in writing and effects of emotions in writing.

Table 7. Tree Codes of Participants’ Views on Emotions in Collaborative Writing

Original Codes	Axial Codes	Selective Codes
Master the Rhythm of Writing; Face-to-face Communication; Take the Task like an Activity	Causes of Positive Emotions	
Unknown Writing Topic; Lexical and Grammatical Deficiency; Feedback is not Timely; Recording Anxiety; Unable to Keep Track of Writing Time	Causes of Negative Emotions	Causes of Emotions in Writing
Writing Experience is Good; Communicates Smoothly; Adjust Writing	The Effect of Positive Emotions on Writing	
Speed up the Writing; Affect the Writing Plan; Write Rigorously; Remedy the Essay Immediately; The Writing is not Fluent	The Effect of Negative Emotions on Writing	The Effect of Emotions on Writing

6. Discussion

Anger always fluctuates in both online collaborative writing, and it is inferred that there may be conflicts. Therefore, the present study lists questions about controversies or conflicts during writing. Moreover, only fluency exhibited significant differences in online writing. Therefore, the present study aims to explore the underlying reasons behind these findings. Most emotions did not differ in online writing. Therefore, the present study aims to learn about participants’ views on the emotions they experienced in collaborative writing.

6.1 Emotional Change

According to the results, only anger showed significant changes before and after the writing process. First, controversial topics may more easily arouse different voices during writing tasks (D’Mello & Caitlin, 2014). In addition, in the semi-structured interviews, most of the groups showed conflicts with their peers while writing. These conflicts may come from the understanding of the topic, the writing ideas, and the choices of words and sentences. Moreover, the two writing tasks consumed personal time (one during the Spring Festival holiday and the other during the first several weeks of the new semester), and participants may try to perform these tasks quickly. Therefore, they may express more anger during the writing process than before and after the writing process in both online and offline situations.

The expression of enjoyment showed a marginally significant change before and after the online writing process, which is consistent with the findings of previous studies (Zhang, 2022). We speculate that this may have been the participants’ first experience with collaborative writing, making this a relatively novel activity for them. Moreover, during the Spring Festival holiday, participants may experience prolonged separation from their partners, thereby deriving pleasure from the online process. However, having attended classes for nearly two weeks in an offline setting, they may have grown accustomed to face-to-face communication and thus experienced no significant fluctuations in enjoyment levels.

Contrary to our initial assumptions, the findings did not reveal significant differences in other types of emotions. Previous studies have shown that the emotional experience of collaborative English learning is dynamic and complex. In the collaborative mode, there is a high density of affective involvement networks, and emotional interactions are highly intricate (Zhang et al., 2022). According to the results of the semi-structured interview, the participants reported that they remained composed during both online and offline writing activities, were acquainted with their partners, and did not experience any emotional fluctuations. Moreover, peer familiarity is correlated with the emotions of collaborative writing (Davoli et al., 2009).

6.2 Emotional and Written Product Comparison

6.2.1 Emotional Comparison

The findings indicated that only happiness and anxiety exhibited significant differences. According to our interviews, participants reported experiencing enjoyment when completing the online task at home, as they could adopt a relaxed posture and mindset while composing their essays. However, they may feel self-conscious and uneasy when writing face-to-face due to being under constant scrutiny by their partner. This heightened awareness of being watched led to concerns about appropriate expression and behavior, resulting in increased levels of anxiety. This phenomenon may be attributed to the focus effect, whereby participants perceive themselves as the center of attention during the activity (Stebly, 1992). Additionally, Watson and Friend (1969) introduced the concept of negative evaluation fear, which suggests that individuals may experience anxiety about being judged by others and performing under pressure.

6.2.2 Written Product Comparison

The findings indicated that there were significant differences in fluency between the online and offline writing contexts, which contradicted our initial hypothesis. We postulate that this may be attributed to the drawbacks of online writing, such as network latency. Additionally, since it was the participants' second time engaging in offline writing, they may have become accustomed to the process and found it easier to enter a flow state. According to the interviews, participants reported that they were able to engage in instant interaction and observe each other's facial expressions. Compared to the online process, offline communication appeared more effective. However, given the similarity of the two tasks' topics, familiarity may have played a role.

6.2.3 The Effects of Emotion on Written Products

The findings indicate that the differences primarily arise in writing conditions, regardless of whether the participants experienced positive or negative emotions. This finding suggests that the writing context plays a more pivotal role in shaping the writing process and typically yields superior performance outcomes for offline composition tasks.

However, based on the pairwise comparisons, discernible differences were observed between the high negative emotion group and low negative emotion group in terms of dependent clauses, clauses per T-unit and dependent clauses per clause, which could indicate variations in fluency and complexity. The low negative emotion group outperformed the high negative emotion group, which supports part of our hypothesis and suggests a detrimental effect of negative emotions on written products.

Specific differences observed in the online condition indicate that the EFT/T of individuals with high positive emotions was significantly greater than that of individuals with high negative emotions, while the EFT/T of individuals with low positive emotions was significantly lower than that of individuals with low negative emotions. Additionally, the EFT/T of individuals with high negative emotions was significantly lower than that of individuals with low negative emotions. These findings partially support our hypothesis regarding accuracy in online writing. We can assert the impact of emotions on written output to a certain extent. However, our other hypotheses remain unverified in this study, possibly due to limitations in the experimental design. We will delve into this matter further in the subsequent section.

7. Limitations and Educational Implications

7.1 Limitations of the Present Study

The limitations of the present study include the inadequate sample size and low statistical power, which may impede the attainment of desired outcomes. Furthermore, the current study exclusively recruited participants from an English major, suggesting that future studies should consider recruiting participants from other majors. To mitigate practice effects, it is recommended that participants with similar writing proficiency be recruited for both online and offline writing tasks. When forming participant groups, it is important to consider their level of familiarity with each other and assign unfamiliar individuals as partners for subsequent studies. Our study revealed no significant differences in the writing process between participants with different emotions, except anxiety. However, we may attempt to induce emotional situations and explore their impact on writing. Several students noted that the topics covered in IELTS are comparable to those they practice writing, thus necessitating a broader range of writing topics and formats for future study.

7.2 Implications of the Present Study

This study provides inspiration for the organic integration of information technology and L2 writing in the new era. With the normalization of online teaching in the post-pandemic era, the effective use of information technology to create a

teaching environment free from the constraints of time and space is a new task facing L2 teachers. This study can help second language teachers deepen their understanding of online emotions and collaboration among students and provide a reference for the design of collaborative writing. The research showed that collaborative writing can help participants actively engage in the writing process for the purpose of common task goals, from which they can obtain a good learning experience.

8. Conclusion

The present study employed a multi-modal research design, incorporating questionnaire measurements, collaborative writing tasks, and semi-structured interviews, to comprehensively investigate students' academic emotions and collaborative writing products. Utilizing both quantitative and qualitative research methodologies, professional software tools were leveraged to systematically assess and analyze the data. Specifically, the Achievement Emotion Questionnaire (AEQ) was administered to quantify emotional states, while syntactic complexity and fluency of written products were analyzed using the L2 Syntactic Complexity Analyzer (L2SCA) and other relevant metrics. Qualitative data from interviews were processed using NVivo 11 and subjected to grounded theory analysis.

The findings reveal significant disparities in emotional fluctuations and contrasts between online and offline collaborative writing environments. Distinct emotions were found to exert differential impacts on collaborative writing outcomes. Specifically, enjoyment exhibited changes exclusively within the online context, while anger manifested alterations in both online and offline settings. Notably, anxiety was the only emotion that demonstrated a statistically significant difference between online and offline writing conditions. In terms of writing performance, fluency was the sole index that varied significantly between the two modalities.

This study integrates both quantitative and qualitative approaches to explore the positive and negative emotions elicited during online and offline collaborative writing, as well as their respective influences on the quality of written products. The significance of this research lies in its capacity to enhance our understanding of the intricate relationship between online collaborative writing and emotions. Furthermore, it provides novel insights into how local platforms and software can be effectively utilized to significantly improve writing instruction.

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